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# A Chronological Listing of Early Weather Events

7th Edition

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## Introduction

The first mercury thermometer was invented in 1714 A.D. The barometer was invented in 1643 A.D. This opened up a completely new scientific realm. Weather observations grew into the science of meteorology. One of the early American meteorologists was Charles Peirce. He meticulously recorded temperatures at three set times per day for a span exceeding 50 years. In 1847, his weather data was published in *A Meteorological Account of the Weather in Philadelphia from January 1, 1790 to January 1 1847*.<sup>1</sup> Additionally, this book also contained supplementary chapters that included a chronology of early accounts of abnormal weather observations throughout the world. This weather chronology began over 1,800 years ago.

The book by Charles Peirce was the initial source of the material used in this work. All other works cited are note numbered. Because this chronology begins almost eighteen hundred years ago, part of the purpose of including other references was to compare them against Peirce's chronology. I have combined and organized these accounts in chronological order.

At least that was the original intent! But as I delved deeper into validating the chronology given by Charles Peirce, I came across so many other different but complementary chronologies, I just found it hard to resist the desire of combining them into a greater global weather chronology. As a result, I just let this work go where it may and I followed.

The focus of this paper is early (historic) weather events. The chronology cuts off at the year 1900 A.D. Recent weather events are fairly well documented. Excluded from the chronology are events caused by man (such as the 1642 Kaifeng flood which killed 300,000 Chinese) and events caused by other non-weather related catastrophes (such as tsunami waves caused by earthquakes/volcanoes). In some cases, I have noted these events as comments within [brackets]. The chronology does include major volcano induced global cooling events.

This chronology begins at 1 A.D. A few of the source chronologies actually date some weather events as far back as 1,800 B.C. I have left these out of this chronology because the further one goes back in time, the less certain the dates. This is because these chronologies use calendars (such as AM – Anno Mundi), and the events in many cases were derived using a variety of ancient calendars systems. And date uncertainty is introduced in calendar conversion. This is also due to the inexactness within the narrative descriptions.

Why is a chronological listing of weather events of value? If one wishes to peer into the future, then a firm grasp of the past events is a key to that gateway. This is intrinsically true for the scientific underpinnings of weather and climate.

## Definition of Terms

In general, I have used the terminology found in the early chronologies. But I can see where this might be a little confusing to some. Therefore, a discussion of terms is in order.

**Frost Days** – the number of days during the winter when frost is present. Frost is the solid deposition of water vapor from saturated air. It is formed when solid surfaces are cooled to below the dew point of the adjacent air as well as below the freezing point of water, 32° F (0° C) or below.

**Hard Frost** – This type of frost occurs when both the air and soil temperatures drop below freezing. Generally, this happens when temperatures fall below 28° Fahrenheit (or -2° Celsius) for a few hours. A hard frost will kill tender plants.

**Hot Days / Very Hot Days / Extremely Hot Days** – after the invention of the thermometer, early European meteorologist began to describe the severity of summer in terms of the number of hot days, very hot days and extremely hot days. From the analysis of the temperature readings, it appears that hot days are defined as those with temperatures of 25° C (77° F) and greater but less than 31° C (87.8° F). Very hot days are those with temperatures 31° C (87.8° F) or greater but less than 35° C (95° F). And extremely hot days are those with temperatures of 35° C (95° F) or greater.

**Storm** – this term can describe a number of different weather conditions including a violent storm, a lightning storm, a hailstorm, a gale, a storm associated with tornado activity, a flash flood, a major hurricane.

**Inundation or Irruption of the Sea** – These are flood events, which can be caused by heavy rainfall, by unusually high tides, by storm surge or a combination of these. Some of these inundations from the sea are tsunami events caused by massive earthquakes or underwater landslides. (I have excluded non-weather related floods caused by earthquakes and landslides from the chronology when those events could be linked to the cause. But there are many instances where the flood cause is undetermined. These have not been filtered out.)

**Overflow** – Rivers can swell from heavy rains or during spring melt and rise above the banks of the river or levies and create massive floods.

**Freshet** – Most commonly used to describe a flood caused by a spring thaw from snow and ice melt in rivers located in the northern latitudes. Sometimes the term is used to describe a flood caused by a cloudburst.

**Interrupted by the Cold** – Cold weather can interrupt shipping by freezing harbors. Heavy snowfalls can interrupt transportation by blocking roads. Heavy snowfalls also can cause avalanches. Winds can create large snowdrifts that can block roads. Blocked roads and frozen ports can interrupt communications. The normal migration of birds can be interrupted by severe or prolonged cold weather.

**Freezing Rain** – Rain that freezes on contact. Raindrops become super-cooled while passing through a sub-freezing layer of air, and then freeze on contact with any object they encounter.

**Mercury Freezing** – Mercury in thermometers solidifies (freezes) at -37.89 °F (-38.83 °C).

**Norther** — In historical times in the central United States and Mexico, a “norther” was a sudden cold gale coming from the North. Today the term has been replaced by “blue norther”. A blue norther is a swift-moving cold frontal passage in the southern Great Plains, marked by a dark, blue-black sky with strong wintery winds from the northwest or north and temperatures that drop 20° F to 30° F in a few minutes.

**Corn** – Christopher Columbus brought corn [maize] from the West Indies to southern Spain in 1493 and first introducing this crop to Europe. Many early accounts in this chronology refer to corn. The name corn is given to the leading cereal crop of any major region. In England wheat is referred to as corn, while in Scotland and Ireland, it is oats.

**Vines** – Many of these early accounts refer to the vines. In general, these vines are grape vines primarily used in the production of wine.

**Hurricane** — A severe tropical cyclone. The intensity of a hurricane is often described as falling into Categories. Category 3-5 are considered major hurricanes. In general:

A Category 1 hurricane has a central barometric pressure of 28.94 inches (735.1 millimeters) or more and winds of 74 to 95 mph. The storm is accompanied by a 4 to 5 foot storm surge and causes minimal damage

A Category 2 hurricane has a central barometric pressure of 28.5 inches (723.9 millimeters) to 28.93 inches (734.8 millimeters), winds from 96 mph to 110 mph, storm surge 6 to 8 feet, damage moderate.

A Category 3 hurricane has a central barometric pressure of 27.91 inches (708.9 millimeters) to 28.49 inches (723.6 millimeters), winds from 111 mph to 130 mph, storm surge 9 to 12 feet, damage extensive.

A Category 4 hurricane has a central barometric pressure of 27.17 inches (690.1 millimeters) to 27.90 inches (708.7 millimeters), winds from 131 mph to 155 mph, storm surge 13 feet to 18 feet, damage extreme.

A Category 5 hurricane has a central barometric pressure of less than 27.17 inches (690.1 millimeters), winds greater than 155 mph, storm surge higher than 18 feet. Damage Catastrophic.

### Agricultural Cycles

**Nile River Inundation:** The flooding of the Nile River was the life-giving inundation which yearly fertilized the crops in *Egypt*. This annual flood generally peaked in September near Cairo. During the growing season (after the inundation had receded) the Egyptians planted their crops - around October and November - and tended to the fields. The Egyptians watered their crops using an irrigation system of canals or by bringing water to the fields in basins or by using the shaduf, to raise water from the river to the bank of the Nile. By the time the Nile reached its lowest level, some time around March or April, the crops would be ready for the harvest.

The highest point reached by the annual inundation, and very rarely reached, is a little above nineteen cubits. In this case, much cultivable land remains so long submerged that the sowing cannot take place; and it is as barren as a desert for that year, while in some spots which are ordinarily dry, yielded a rare harvest. But at this level, the inundation is accompanied by a great destruction of dwellings and of livestock. When the rise reaches eighteen cubits, there is great rejoicing, for the produce is then sufficient for two years' consumption, after the government dues are paid. When it reaches sixteen cubits, there is enough produce for the wants of the year; and this was called, "the Sultan's flood," because then the Sultan claimed his taxes. Below sixteen cubits, there is more or less scarcity. In these cases the south wind has prevailed, whereas during the good years, the north winds prevailed. The cubit at the Nilometer at Elephantine Island was equivalent to 19½ inches. There were 28 digits in a cubit.<sup>83</sup> [A Nilometer was an ancient structure used to measure the level of the Nile river during floods.]

**India Monsoon:** The success of India's crops from year to year depends upon two monsoons: the southwest, or *the rains*, and the northeast, which brings the winter rains. For a month or two before *the rains* (April and May), the greater part of the peninsula simmers in heat. The soil is baked and cultivation is impossible. With June comes the monsoon, which continues until the latter part of September. After the first showers the peasants plow their fields and sow the autumn harvest of millet and rice. The spring harvest, which consists largely of wheat and barley, is sown in October and November. Droughts can disarrange this schedule. Also prolonged rains, accompanied by east winds, cause the wheat to rust, while hot west winds cause the swelling grain to shrivel on the stalk.<sup>84</sup> More than 99 out of 100 famines in India are due to drought, the failure of the monsoon.<sup>179</sup>



**China Loess:** Over a large portion of the northern *China*, consisting of an area the size of France, there lies a deep deposit of the geological formation known as loess. The loess – from the German *löss* (loose) and called by the Chinese *hwang-tu* – is a sort of loose, sandy soil. This formation consists of a light friable soil, and covers the country to the depth of a hundred feet or more, leveling up the valleys and bringing low the hills. In favorable seasons when the rains are frequent and temperate, the crops grown on the loess are full and generous. It is only necessary for the farmer to scratch the surface and sow his seeds. Manure or other fertilizers are unnecessary, and the usual successions of rich crops, which are commonly yielded has earned for the district the name of the “Garden of China”. But all this fertility depends on the fall of sufficient rain and snow. In seasons when the clouds refuse their moisture; the winds, which prevail blow away the surface soil, and leave the seed grain exposed to the desiccating influence of the sun and the wind.<sup>154</sup>

## Discussion

This document is in *pdf* format. This format is printable and yet at the same time is viewable on computer screens. This format also allows single word searches, such as the name of specific cities, countries, and weather conditions. This format also allows phrase word searches provided they are contained within quotes, such as “diamond dust”.

Generally the original core chronology dates are tied to distinct events that occurred during a year. But within a winter season, several events can occur: the time of the first frost, the time a river first freezes, the time of a major snowfall, etc. This can give the false impression of two hard winters in a row rather than a single hard winter. For this reason, I felt it was important to tailor this chronology by separating out the winter seasons. The problem is that not every listing in the original core chronologies is dated to an exact month. As a result, I made a judgment call. And my judgment will be wrong, sometimes.

The date of these weather events can vary between different accounts. Part of this may be due to the use of different calendar systems such as the Julian calendar and the Gregorian calendar. Sometimes there is confusion between the date of the event and the date of the record. For example if a hurricane occurs in the West Indies in October in the 17<sup>th</sup> century, it might be months before the report reaches London and appears in a newspaper account. This can blur the dating. Sometimes there are no survivors or a few survivors whose sole focus is survival, not record-keeping.

The Japanese began using a Chinese style lunisolar calendar in the 7<sup>th</sup> century. To keep the solar calendar aligned with actual seasons, it was required that the winter solstice always occurs in a non-intercalary 11<sup>th</sup> month. Thus, generally in early lunar calendars, the New Year began on the second new moon following winter solstice. They adopted the Gregorian calendar in 1873. Early Japanese events presented in Aston “Chronicles of Japan” [reference 149] are given using the historical Japanese calendar system.

I have inserted supplementary material where I have felt it appropriate. These inserts are normally contained within brackets [ ]. The inserts are for clarification or to provide my best estimate of the region affected by the weather event. In many cases, when the region was not identified, I analyzed the origin of the material, such as the author’s history and location.

Generally, most famines are caused by abnormal weather such as floods, droughts, storms and frosts. Famines can be thought of as a product of abnormal weather. This is not always the case. Some famines are caused by plagues of insect or other pest, crop disease, or food shortages caused by the actions of man. *The Famines of the World, Past and Present* (Reference 57) identifies 350 famines in various parts of the world. Because of the close interrelationship between famines and weather, I have included this famine information in the chronology unless the cause of the famine was clearly not related to weather.

Since famines can span several years, I have in many instances group them together under multi-year headers.

I have recently added disease, plagues of insects and other pest, crop disease and food shortages in this chronology even though they are not weather events. This is because they are sometimes a secondary product of weather. In years of drought resulting in a severe shortage of water, combined with poor sanitation, plagues of diarrhea and dysentery ran rampant. Many times starvation caused by bad weather goes hand in hand with plagues and disease. Starvation weakens the ability of the body to fight off diseases.

One of the interesting observations noted during the compilation of this work is that hurricanes as they strike islands in the Caribbean and West Indies can sometimes spawn earthquakes or earthquake like events.

The United States [National Weather Service] issued Monthly Weather Reports beginning in 1873. These reports represent a gold standard of weather data. It is astonishing, the depth and breath of weather information contained within these monthly summaries. Because of the immense quantity of weather data contained within these report, only a small subset, which highlights the worst weather events or abnormal weather phenomena were included in this chronology. The records currently available are very incomplete. The following table identifies the reports that were currently available and as a result utilized in the chronology. Hopefully, the remainder of the missing material will surface in the future.

Available U.S. Monthly Weather Reviews

Year	Volume	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1873	1				X								
1874	2				X								
1875	3				X								
1876	4	X	X	X	X	X	X	X	X	X	X	X	X
1877	5	X	X	X	X	X	X	X	X	X	X	X	X
1878	6				X								
1879	7				X								
1880	8	X	X	X	X	X	X	X	X	X	X	X	X
1881	9				X								
1882	10	X	X	X	X	X	X	X	X	X	X	X	X
1883	11				X								
1884	12	X	X	X	X	X		X	X	X	X		X
1885	13	X	X	X	X	X	X	X		X	X	X	X
1886	14				X								
1887	15	X	X	X	X		X	X		X	X	X	X
1888	16	X	X	X	X		X	X	X	X	X	X	X
1889	17	X	X	X	X	X	X	X	X	X	X	X	X
1890	18	X		X			X	X	X	X	X	X	X
1891	19								X	X	X		
1892	20			X	X	X	X	X	X	X	X	X	X
1893	21	X	X	X	X	X	X	X	X	X	X	X	X
1894	22	X	X	X	X	X	X	X	X	X	X	X	X
1895	23	X	X	X	X	X	X	X	X	X	X	X	X
1896	24	X	X	X	X	X	X	X	X	X	X	X	X
1897	25	X	X	X	X	X	X						
1898	26	X	X	X	X	X	X						
1899	27	X	X	X	X	X	X	X	X	X	X	X	X
1900	28							X	X	X	X	X	X

If a weather event is not listed in this chronology; this doesn't mean that the event didn't happen. It just means that I have not thus far stumbled upon a historical account that describes the event. This chronology despite its size is barely scratching the surface of past weather events. It's a hit-and-miss process.

Many of these described weather events resulted in great loss in both human life and property damage. In several cases, the damage from these events was estimated in terms of U.S. dollars or British pounds. These monetary estimates relate to the year of the event and inflation can minimize the true nature of the damage unless these damage figures are adjusted for these inflation rates. Within this weather chronology, I used an Inflation Calculator [<http://www.westegg.com/inflation/>] to adjust for inflation for U.S. dollars (\$) to the year 2010. I used Measuring Worth [<http://www.measuringworth.com/ppoweruk/>] to adjust for inflation of U.K. pounds (£) to the year 2013.

Sometimes it is a little difficult to relate to these early disasters. The number of people in the world has grown over the years. A disaster of the same magnitude today could claim many more lives and cause significantly more damage because the number of people affected and the property put in risk has greatly expanded. As an example, a flood occurred on the River Thames in England in 48 A.D. that claimed 10,000 lives. The population of England increased perhaps a hundred fold from 48 A.D. and today. If a similar event happened in England today, one might expect one million deaths.

China has a long history of recording weather events. Shan-yu Yoa described 1621 flood events and 1392 drought events in China between 206 B.C. and 1911 A.D. in his doctoral thesis (Reference 153). This data was compiled from the great Chinese encyclopaedia known as *T'u-shu Chi-ch'êng*, Section IV "Strange Phenomena" chüan 86-92 and 124-130 and the *Ch'ing Shih Kao* (Draft History of the Ch'ing Dynasty), chapters 40 and 43, "Treatise on Calamities and Anomalies." Shan-yu Yoa converted all the dates from the Chinese lunisolar calendar to the Gregorian calendar within his work. When the records indicate that a certain flood or drought occurred during a certain season or even a certain month, this does not mean that the flood or drought took place over the entire season or month but simply that it fell within that timeframe. [In other words, if a flood took place in May, it did not start on the first day of the month and end on the last day of May, only that the flood took place during the month of May. The converted Chinese month might equate to a period of 27 May – 24 June in the Gregorian calendar. The flood event took place sometime during the given time period.] In cases where there were two cities by identical names within a province, the longitude/latitude location for the specific city is included for clarity. [I lost the top half of page 97. This encompasses the flood data for the time period between 19 August 1362 and 19 July 1365]

I believe other historical chronologies exist that describe weather events and natural disasters caused by weather. If you know of others that can be added to the list, please contact me, so I can expand the search of historical weather data.

This work is not perfect. If while reviewing this work, you should come across an error, please let me know and I will make a correction in the next revision. Simply send an email to [impact@hughes.net](mailto:impact@hughes.net) and tell me about the mistake.

### Important Observations

In compiling this information, I have observed several major findings:

**1. Natural Variation:** Nature can produce a diverse and brutally extreme range of weather events. Every generation experiences weather events so extreme that they are described as "in the memory of the oldest inhabitant nothing like it had ever been known". Today's weather is no exception.

**2. Little Ice Age Weather:** During past Little Ice Ages, winters can be extreme with great snowfalls, frigid cold and significant ice formation on rivers and lakes. The length of winters can increase. But summers can also be very warm.

**3. Threat from Thaws:** When extreme winters strike, there is another threat that occurs. When the great snows melt and the ice on the rivers break up and float downstream, great ice jams can develop especially around the bends of rivers. Ice dams can develop and block the flow of rivers. This process can produce great spring floods.

**4. Great Global Drought:** Droughts can become so extensive that they can grip the entire globe. An example is the global drought of 1876-1879, which struck China, India, Australia, South Africa, Morocco, French Indo-China, the Dutch East Indies, Turkey, Brazil, the United States and Canada. In general, world trade offers a large safety net against future droughts and famines. But sometimes the world gets in a cycle where the entire world is engulfed in a great drought. This can cut holes in this safety net. During 1876-1879 over 16 million people starved to death. (World population has grown 5 fold since the 1870s. An equivalent lost today would be in the order of 84 million people.) The drought not only affected crops but also livestock. In Australia, 10 million sheep died.

**5. Hurricanes:** The intensity and frequency of hurricanes increased during periods of natural global cooling (i.e. Little Ice Ages). Natural global cooling also increases the frequency and intensity of strong Atlantic gales that strike the seaboard of the United States, Canada, England and Western Europe.

**6. Effect of Volcanoes on Weather:** In reviewing the temperature record, I have come to believe most volcanic eruptions have only a minimal impact on global climate. There appears to be two exceptions: the largest volcanoes (those with a Volcanic Explosivity Index (VEI) scale of 7 or greater) and flood basalt volcanic eruption.

**Large Volcanic Eruptions:** The Tambora eruption occurred on 10 April 1815 on Sumbawa Island in Indonesia. It was rated as a 7 on the Volcanic Explosivity Index (VEI). The volcanic eruptions of this size are very rare events typically occurring on a millennium scale. The volcano erupted more than 160 cubic kilometers (38 cubic miles) of magma. This volcanic eruption caused a significant drop in temperatures in the Northern Hemisphere. It is important to note this cooling effect was delayed for almost a year. Analysis of Peirce's temperature data shows that the eruption did not begin to affect Philadelphia, Pennsylvania's weather in the United States until 11 months later in March 1816. Then, temperatures were depressed for nine months before recovering. At its greatest extent, temperatures were 7.7° F (4.3° C) colder than average Dalton Minimum monthly averages. This was also observed in Paris, France. This year was known as the "Year Without Summer". But that does not really begin to describe the event for the people of Philadelphia, the Northeast United States and Canada. It was the year when a hard killer frost occurred in every month of the year. This extreme cold year also ravaged Europe, Africa, the West Indies and Northern China. The volcanic eruption also affected the rain patterns in 1816. The cooler temperatures delayed India's summer monsoon. It brought late torrential rains to India that spawned cholera epidemics. The monsoon in China caused massive floods in the Yangtze Valley. Although the present paradigm infers that this cooling effect is driven by the volcanic release of sulfur aerosols, I will suggest that it is rather due to the ejection of water vapor into the Earth's upper atmosphere where it is reformulated into microscopic ice crystals known as "diamond dust".

**Flood Basalt Volcanic Eruption:** The Laki or Lakagígar volcanic eruption in Iceland took place over an 8-month period during 1783-1784 beginning in 8 June 1783. The eruption produced 14.7 cubic kilometers (3.5 cubic miles) of basalt. Flood volcanic events are different from typical volcanic events in two important areas. First, they generally do not include extreme explosions and as a result do not score high on the VEI scale. The Earth's crust cracks and a large fissure forms, magma oozes out of the ground

rather than released through massive explosions. (The Laki eruption scored only a 4+ on the VEI scale.) Secondly, the magma comes from very deep inside the Earth core and generally releases a richer mixture of gases at the Earth's surface. The release of basalt lava and clouds of poisonous hydrofluoric acid/sulfur-dioxide compounds killed over 50% of Iceland's livestock population, leading to famine which killed approximately 25% of the population of Iceland. It has been said that the Laki eruption killed over two million people globally. But the years 1783-1784 produced a number of extreme anomalies and the Laki eruption was only one of these events. I have provided a discussion of these events within the listing of the year 1783 under the "Fractured Comet Impact Hypothesis".

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*Notable events include:*

- \* The “Great Storm” that had the intensity of a major Category 2 hurricane which struck England in November 1703.
- \* The mega-tsunami that struck Taiwan and the 1783 comet impact hypothesis.
- \* The severity of winter in the Upper Midwest of the United States during the last Little Ice Age. Refer to the winters of 1680/1681 and 1747/1748.
- \* Massive firestorm that raced through Wisconsin, Illinois and Michigan and into Ontario, Canada in 1871.
- \* The severe winter of 1683/1684 when the English Channel froze.
- \* The drought in Egypt due to a lack of the annual inundation of the Nile River that resulted in a Great Famine of 1199-1202.
- \* The global droughts and famines of 1783-1785, 1876-1879, and 1895.
- \* The three forms of microscopic diamond dust ice crystal (hexagon plates, hexagon columns and the deadly long prisms). The latter type occurs in diamond dust icefalls called by the American Indian name “pogonip” which translates to “white death”.
- \* The tornado outbreaks that struck the United States in 1884 and 1896.
- \* The Galveston Island hurricane of September 1900.
- \* The great storms that struck the Spanish fleet in the Caribbean and the Atlantic Ocean during the summer of 1591.
- \* The severe winters of 642, 763/764, and 775 when the Black Sea froze.
- \* The effects of the Tambora volcanic eruption of 10 April 1815, which cause “a year without summer” in 1816.
- \* The great Atlantic hurricane of 9-16 October 1780.
- \* The Great September hurricanes of 1752, 1782 and 1804.
- \* The Great Storm that struck Wales during the winter of 1171/1172.
- \* The “day of darkness” in New England that occurred on 19 May 1780.
- \* The great flood of 48 A.D and the great storm of 67 A.D. that struck England.
- \* A typical winter in Boston, Massachusetts towards the end of the last Little Ice Age. (Refer to the winter of 1771/1772.)
- \* The thunderstorm that struck Greenland in 1755.
- \* The avalanche of snow in Italy in 1755.
- \* The Atlantic hurricanes of 1553, 1559, 1590, 1591, 1600, 1601, 1605, 1622, 1644, 1666, 1680, 1689, 1694, 1715, 1719, 1722, 1747, 1751, 1752, 1766, 1767, 1768, 1772, 1775, 1776, 1780, 1781, 1782, 1784, 1785, 1791, 1800, 1804, 1813, 1815, 1817, 1825, 1831, 1870, 1873, 1893, 1899, and 1900.
- \* Typhoons/Cyclones that struck
  - China in 1166, 1474, 1748, 1822, 1862, 1874, and 1881.
  - Vietnam 1881.
  - Bangladesh in 1584, 1699, 1737, 1767, 1787, 1822, 1831, 1876, 1886, and 1897.
  - India in 1737, 1749, 1782, 1789, 1833, 1839, 1854, 1864, 1867, 1875, 1876, 1882, and 1886.
  - Australia in 1795, and 1899.
  - Japan in 1828.
- \* The great lightning storm that struck southern France in 753.
- \* Powerful storms that struck the coasts of France, Spain and England in 1751.
- \* Powerful storm that struck the western coast of England in 1757.

- \* The great winter in Germany in 760/761, 1019/1020.
- \* The Canadian winter of 1741/1742.
- \* The severe European winters of 566/567, 821/822, 859/860, 874/875, 993/994, 1076/1077, 1114/1115, 1132/1133, 1149/1150, 1216, 1233/1234, 1305/1306, 1323/1324, 1363/1364, 1407/1408, 1433/1434, 1459/1460, 1490/1491, 1564/1565, 1594/1595, 1607/1608, 1620/1621, 1621/1622, 1657/1658, 1669/1670, 1680/1681, 1683/1684, 1691/1692, 1708/1709, 1739/1740, 1748/1749, 1753/1754, 1762/1763, 1766/1767, 1775/1776, 1781/1782, 1783/1784, 1784/1785, 1788/1789, 1794/1795, 1798/1799, 1812/1813, 1819/1820, 1829/1830, and 1844/1845.
- \* The Chinese winters of 1445/1446, 1510, 1574, 1627/1628, 1655, 1691, 1749, 1751/1752, and 1863/1864.
- \* The severe North American winters of 1696, 1697, 1716/1717, 1740/1741, 1742/1743, 1747/1748, 1761/1762, 1764/1765, 1765/1766, 1771/1772, 1779/1780, 1783/1784, 1786/1787, 1798/1799, 1799/1800, 1804/1805, 1806/1807, 1814/1815, 1816/1817, 1820/1821, 1830/1831, 1834/1835, 1835/1836, 1856/1857, 1863/1864, 1883/1884, 1884/1885, and 1898/1899.
- \* The winters when the Nile River froze: 829/830, 1011, and 1691/1692.
- \* The great winters of 1783/1784 and 1784/1785 in the Northern Hemisphere, followed by great spring floods as the snow melted.
- \* Mild Russian winters of 1303/1304, 1753/1754, 1758/1759, 1818/1819, and 1821/1822.
- \* This chronology is overflowing with times of Great Famines. Famines caused by excessive rainfall, droughts, hailstorms, severe winters, and summers robbed of the sun's heat. Here is but a few examples:
  - China in 463-464, 1033, 1328, 1333-1337, 1354, 1458, 1476, 1522, 1787, 1810-1811, 1846, 1849, and 1875-1878.
  - Japan in 626, 1230, and 1782-1788.
  - Korea in 1784.
  - India in 942, 1022, 1052, 1327, 1345, 1396, 1556, 1596, 1630-1631, 1661, 1769-1770, 1780-1784, 1790-1792, 1802-1807, 1810, 1812-1813, 1823, 1832-1835, 1865-1866, 1868-1870, 1873-1874, 1876-1878, and 1896-1900.
  - Bangladesh in 1780-1784, and 1873-1874.
  - Pakistan in 1780-1784.
  - North Africa in 484 and 1784-1785.
  - Egypt in 966/967, 1064-1071, 1199-1202, and 1784-1785.
  - Iran in 1870-1872.
  - Western Europe in 1033.
  - England in 310, 680, 700, 1004-1016, 1234, 1239, 1257-1259, and 1314-1316.
  - Ireland in 963-964, 1116, and 1845-1851.
  - France in 869, and 1030-1032.
  - Scotland in 936-939, 954, and 1695-1699.
  - Italy in 410, 450, 538, 776, 1230, and 1347.
  - Belgium in 1587.
  - Germany in 1310-1319, 1347, and 1772.
  - Poland and Bohemia in 1281, 1312, 1315, 1737, and 1770.
  - Hungary in 1505, 1782, and 1808.
  - Finland and Estonia in 1695-1697, and 1867-1868.
  - Russia in 1024, 1128, 1212, 1215, 1230, 1445, 1600-1602, 1701, and 1891-1892.
  - Turkey in 1873-1876.
  - Mexico in 1454, and 1785-1786.
  - Cape de Verde Island and the Island of Sumatra in 1775.
- \* The tornado that struck Charleston, South Carolina in 1761.
- \* The ice hill at Shanghai, China during the winter of 1769/1770.
- \* The dense fog in the Netherlands during the winter of 1790/1791.
- \* The great hailstorm of 13 July 1788.



- \* Many great hailstorms such as the ones that struck
  - France in 823, 1360, 1510, 1562, 1760, 1768, 1774, 1844 and 1865.
  - Italy in 1353, 1510, and 1834.
  - England in 130, 450, 459, 1479, 1697, 1765, 1784 and 1862.
  - Scotland in 1790.
  - China in 1724 and 1745.
  - Belgium in 1771.
  - Portugal in 1749.
  - Spain in 1829.
  - Mongolia in 1843.
  - Australia in 1796 and 1824.
  - The United States in 1878, 1882, 1894, and 1896.
  - Turkey in 367.
  - Hungary in 1808.
  - India in 1769, 1879 and 1888.
  - Germany in 1104, and 1767.
- \* Many great floods such as the ones that struck
  - France in 580, 1543, 1755, and 1875.
  - Italy in 590, 1165, 1530, and 1627.
  - Spain in 1617, 1787, and 1878.
  - England in 1736, and 1763.
  - Scotland in 1829.
  - China in 11 A.D., 516, 792, 1117, 1310, 1330, 1332, 1342, 1391, 1459, 1467, 1507, 1541, 1549, 1573, 1590, 1609, 1797, 1833, 1845, 1854, 1875, 1887, and 1888.
  - India in 1787-1788, and 1814.
  - Egypt in 393.
  - Belgium in 1108, 1113, and 1134.
  - Norway in 1216.
  - Denmark in 1630, and 1646.
  - The Netherlands in 1219, 1228, 1287, 1374, 1396, 1421, 1521, 1530, 1568, 1570, and 1646.
  - Germany in 1300, 1362, and 1515.
  - Poland in 1534, and 1813.
  - Austria in 1830.
  - Slovakia and Bulgaria in 1813.
  - Hungary in 1875.
  - Russia in 1777, and 1824.
  - European in 1342, 1595, 1816, and 1817.
  - Mississippi River in the United States in 1543, 1785, 1813, 1844, 1874, 1882, 1890, 1892, and 1897.
- \* The heat wave in
  - China in 1743.
  - France in 1793.
  - Italy in 1841.
  - Europe in 1817.
  - Australia in 1895/1896.
  - United States in 1896.
- \* A sandstorm that struck Syria in 1813.
- \* The tornado that struck Washington D.C. in 1814.
- \* The drought that produced great fires in the peat beds of Europe in 1834.
- \* The great brushfires in Australia known as *Black Thursday* in 1851. [Refer to Australian Drought of 1847-1860.]
- \* Violent cloudburst and flashfloods in the American West described in 1874.
- \* The great spring floods in North America in 1881 - 1884.
- \* The blizzards that struck the U.S. during the winter of 1887/1888.

- \* The severe droughts and forest fires in America in 1887, and 1889.
  - \* The great 3-day flood that struck the U.S. beginning 30 May 1889.
  - \* The electrostatic windstorms in the U.S. of December 1894, and January 1895.
  - \* Mudstorms of April 1895 & 30 April 1899; the black snowfall of 3 April 1889; and the black snow duststorm of 11/12 January 1895.
  - \* "Ignis Fatuus" (jack-o'-lantern or will-o'-the-wisp) of 1693/1694, March 1729, and 16 April 1897.
  - \* "Snow Rollers" of December 1895, and January 1898.
  - \* "Flaming Ocean" on 13 February 1785.
  - \* "Chain Lightning" (or bead lightning) on 18 August 1876 and in February 1894.
  - \* The legends of great dragons. Refer to 1189, 1214, 1221, 18 October 1224, 1452, 1512, 1519, 1605, 1608, 1609, 1660, 1667, 1735, 1739, 1749, 1773, and 1787.
  - \* "Pillar of Smoke" on 30 July 1662 and 5 May 1752.
  - \* The symbiotic relationship between reindeer and man. Refer to April 1737.
  - \* An ancient Roman castle buried under the Rhine River. Refer to 16 January 1750.
  - \* The ebony forest buried in Wales. Refer to 1171.
  - \* The ebony forest buried in the marshes of England. Refer to the summer of 1666.
  - \* The treasures from the Gothic Invasion buried in France. Refer to 1557.
  - \* The Temple of Hercules buried in Spain. Refer to 26 March 1731.
  - \* Unusual hailstorms of 25 May 1686, 14 March 1813, 26 March 1882, and 11 May 1894.
  - \* The forest that suddenly disappeared in Poland. Refer to 31 May 1783.
  - \* Meteors of 1526, 21 December 1876, and 19 March 1887
  - \* The people of France feared the millennial year 1000 A.D. marked the end of the world, so they stopped working; abandoned farming. And guess what followed!
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**2 A.D.** In 2 A.D., there was a severe drought in Shantung (now Shandong province) on the east coast of *China* at Lin-tzū during the period of 1-30 May. This also brought on a plague of locusts.<sup>153</sup>

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**6 A.D.** A famine struck Rome, *Italy*.<sup>57, 72, 91</sup>

In the 43<sup>rd</sup> year of Augustus Caesar, happened a terrible famine in Rome, on which Augustus sent away not only strangers, but most of his servants out of the city.<sup>72</sup>

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**7 A.D.** There was a great flood in the valley of Thames in southern *England*; many persons were drowned and cattle destroyed.<sup>47, 92</sup>

In *England*, there was a flood in the River Thames, fatal to men, women, children and cattle.<sup>72</sup>

[Other sources place this event in the year 9 A.D.] The Thames destroyed a great number of the inhabitants of its banks, 9 years after Christ.<sup>40, 41, 43</sup>

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**9 A.D.** There was a great overflow of River Humber in *England*, flooding the country all round.<sup>47, 92</sup>  
[The River Humber is located in northeast-central England. It is a large tidal estuary and North Sea inlet, separating Yorkshire from Lincolnshire.]

In *England*, the River Humber drowned the whole country for several miles.<sup>72</sup>

In 9 A.D., the town of Pickering in North Yorkshire, *England*, was burnt by lightning.<sup>72</sup>

In the 43<sup>rd</sup> year of Augustus Caesar, a terrible famine struck Rome, *Italy*. Augustus sent away not only strangers but also most of his servants out of the city. [Because he could no longer feed them.]<sup>72</sup>

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#### **10 A.D. – 15 A.D. Ireland. Famine**

In *Ireland*, during this 6-year period, there was a general fruitlessness [poor harvest], which gave rise to famine and great mortality.<sup>57, 91</sup>

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**11 A.D.** There was a great flood in *China*. The Yellow River [Huang He River] breached its dikes [levees], and the river changed course and forged a new path to the sea, a hundred miles away from its former mouth. Repair work took several decades.<sup>142</sup>

In 11 A.D., there was a flood in Honan (now Henan province) in central *China* at Lin-chang.<sup>153</sup>

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**14 A.D.** There was a great overflow of River Severn in *England*, causing great damage.<sup>47, 72, 92</sup> [The River Severn is the longest river in Great Britain (354 kilometers, 220 miles). The river rises in Wales and enters Bristol Channel at Gloucestershire which in turn discharges into the Celtic Sea.]

*Also refer to the section 14 A.D. – 15 A.D. for information on the famine in Ireland during that timeframe.*

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**15 A.D.** In Rome, *Italy*, the Tiber River overflowed and did such serious damage that it was proposed in the Roman Senate to diminish its waters by diverting some of the chief tributaries.<sup>47, 92</sup>

*Also refer to the section 14 A.D. – 15 A.D. for information on the famine in Ireland during that timeframe.*

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**18 A.D.** In 18 A.D., a hurricane struck England and the city of *Westminster* was shattered.<sup>72</sup>

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**24 A.D.** In 24 A.D., the city of Caerleon in south *Wales* was burnt by lightning.<sup>72</sup>

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**27 A.D.** In 27 A.D., there was a severe drought in Honan (now Henan province) in central *China* at Loyang during the period of 21 August - 19 September.<sup>153</sup>

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**28 A.D.** In 28 A.D., there was a flood in Hopei (now Hebei province) in northern *China* at P'u-yang.<sup>153</sup>

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**29 A.D.** There was a great overflow of River Trent in *England*.<sup>47, 92</sup> [The River Trent flows from Staffordshire through the Midlands to the Humber Estuary where it empties into the North Sea.]

In *England*, the River Trent in the night drowned the country many miles.<sup>72</sup>

In 29 A.D., there was a drought in *China* during the period of 3-31 May and a plague of locusts.<sup>153</sup>

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**30 A.D.** In 30 A.D., there was a drought in *China* during the period of 19 July - 17 August.<sup>153</sup>

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**31 A.D.** In 31 A.D., there was a flood in Hunan province in south-central *China* on the Lo River during the period of 9 July - 6 August. People drowned and houses were damaged.<sup>153</sup>

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**32 A.D.** In 32 A.D., there was a flood in *China* during the period 8 August - 8 November.<sup>153</sup>

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**33 A.D.** There was a great overflow of River Dee, which caused great damage at Chester in northwest *England*.<sup>47, 72, 92</sup> [The River Dee travels through Wales and England.]

In 33 A.D., there was a drought in *China* during the period of 5 February - 6 May.<sup>153</sup>

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**36 A.D.** In 36 A.D., there was a drought in *China* during the period of 13 June - 12 July.<sup>153</sup>

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**37 A.D.** There was an overflow of River Medway in southeast *England*, and many cattle drowned.<sup>47, 72, 92</sup>

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**42 A.D.** In Judea [*Israel*], the area was desolated by a famine.<sup>57, 91</sup>

Awful famine in *Egypt* in 42 A.D.<sup>90</sup>

In 42 A.D., there was a drought in *China* during the period of 13 June - 12 July.<sup>153</sup>

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**43 A.D.** In the year 43, a violent storm almost destroyed Emperor Claudius near the islands of the southern coast of *France* [Claudius sailed from Rome to visit England. He was almost shipwrecked twice, first off the Ligurian coast and then near Isles d'Hyères. The storms were caused by the penetrating cold wind, known as the mistral.]<sup>79</sup>

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**45 A.D.** In 45 A.D., there was a drought in *China* during the period of 4 July - 1 August.<sup>153</sup>

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**46 A.D.** In *Syria*, there was a very great famine.<sup>72</sup>

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**48 A.D.** The River Thames in *England* flooded and 10,000 drowned.<sup>28</sup>

The River Thames in southern *England* overflowed. The water extended through four counties. 10,000 people drowned and there was much damage to property.<sup>47, 92</sup> [The population of England increased perhaps a hundred fold from 48 A.D. and today. If a similar flood event happened in England today, one might expect one million deaths.]

The Thames in *England* drowned 10,000 people with much cattle in the night in 4 counties.<sup>72</sup>

In the year 48, there was a general [universal] famine.<sup>72</sup>

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**50 A.D.** There was a severe winter in *England* and all rivers and lakes froze from November to April.<sup>28</sup>

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**51 A.D.** A great famine in *Greece*.<sup>57, 72, 91</sup>

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**52 A.D.** A great famine struck Rome, *Italy*.<sup>72</sup>

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The city of Winchester in *England* was burnt by lightning.<sup>72</sup>

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**54 A.D.** A grievous famine struck *England*.<sup>57, 72, 91</sup>

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In 54 A.D., there was a flood in *China* during the period 25 June - 2 July.<sup>153</sup>

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**55 A.D.** In 55 A.D., there was a flood in *China* during the period 14 June - 13 July.<sup>153</sup>

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**57 A.D.** There was a great famine in *England* and dearth and plague after.<sup>72</sup>

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**58 A.D.** In 58 A.D., there was a drought in *China* during the period of 11 June - 9 July.<sup>153</sup>

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**60 A.D.** In 60 A.D., there was a flood in Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

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In 60 A.D., there was a drought in *China* during the period of 6 May - 8 August.<sup>153</sup>

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In 60 A.D., part of the city of Edinburgh, *Scotland* was burnt by lightning.<sup>72</sup>

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**65 A.D.** In 65 A.D., there was a flood in 14 Commanderies of *China* during the period of 8 August - 8 November.<sup>153</sup>

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In 65 A.D., there was a drought in *China* during the period of 8 November 65 - 5 February 66.<sup>153</sup>

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**66 A.D.** In 66 A.D. in the Oise region of *France*, the winter was very cold.<sup>171</sup>

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**67 A.D.** A hurricane blew down 15,000 houses in *England* and killed a multitude.<sup>72</sup>

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**68 A.D.** [In *England*, there was a volcanic eruption followed by an inundation of the sea [tsunami]. The Isle of Wight separated from Hampshire.<sup>92</sup>]

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In *England* by a Flood and Earthquake, Isle of Wight was torn from Hampshire.<sup>72</sup>

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In 68 A.D., there was a drought in *China* during the period of 16 September - 15 October.<sup>153</sup>

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**69 A.D.** In the year 69, part of London, *England* was burnt by lightning.<sup>72</sup>

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**70 A.D.** Tacitus reports that an unprecedented drought took place in the year 70. There was no water in the north of *Gaul* [western Europe] and the Rhine River in western *Germany* was barely seaworthy [because of the low water level].<sup>79</sup>

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**72 A.D.** In 72 A.D., there was a drought in *China* during the period of 2 September - 1 October.<sup>153</sup>

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**75 A.D.** In 75 A.D., there was a drought in *China* during the period of 5 April - 4 May.<sup>153</sup>

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**76 A.D.** A famine caused great scarcity in *Ireland*.<sup>57, 91</sup>

In 76 A.D., there was a drought in *China*.<sup>153</sup>

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**77 A.D.** In 77 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang during the period of 6 May - 8 August.<sup>153</sup>

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**79 A.D.** In 79 A.D., there was a drought in *China* during the period of 6 May - 8 August.<sup>153</sup>

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#### **79 A.D. – 88 A.D. Italy. Famine**

There was a terrible period of suffering from 79 to 88 A.D. when the Roman world seemed to be shaken to its physical foundations. A devastating drought and famine swept over the *Italian peninsula*. It is said that 10,000 citizens died in a single day at Rome during its height. Tacitus left a grim picture of the distress and suffering. Houses were filled with dead bodies and the streets with funerals.<sup>84</sup>

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**80 A.D.** There was a great overflow of River Severn in *England*; many people and cattle were drowned.<sup>40, 41, 43, 47, 72, 92</sup>

In 80 A.D., there was a drought in *China*.<sup>153</sup>

*Also refer to the section 79 A.D. – 88 A.D. for information on the drought and famine in Italy during that timeframe.*

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**84 A.D.** In 84 A.D., there was a drought in *China* during the period of 5 February - 6 May.<sup>153</sup>

In the year 84, the city of Canterbury, *England* was burnt by lightning.<sup>72</sup>

*Also refer to the section 79 A.D. – 88 A.D. for information on the drought and famine in Italy during that timeframe.*

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**85 A.D.** In 85 A.D., there was a drought in *China*.<sup>153</sup>

*Also refer to the section 79 A.D. – 88 A.D. for information on the drought and famine in Italy during that timeframe.*

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**86 A.D.** In 86 A.D., there was a great overflow of River Medway in southeastern *England*; causing a loss of life.<sup>47, 72, 92</sup> [Another source place this flood in the year 87.] In the year 87, the Medway overflowed its banks, and drowned the country.<sup>40, 43</sup>

*Also refer to the section 79 A.D. – 88 A.D. for information on the drought and famine in Italy during that timeframe.*

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**88 A.D.** In 88 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang during the period of 8 June – 6 July.<sup>153</sup>

*Also refer to the section 79 A.D. – 88 A.D. for information on the drought and famine in Italy during that timeframe.*

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**89 A.D.** In 89 A.D., there was a flood in 9 Commanderies of *China* during the period of 26 July – 24 August.<sup>153</sup>

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**90 A.D.** In 90 A.D., there was a drought in 14 Commanderies of *China*.<sup>153</sup>

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**92 A.D.** In 92 A.D., there was a drought in *China* during the period of 5 February - 8 August. This brought on a plague of locust. Crops were damaged.<sup>153</sup>

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**94 A.D.** In 94 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang during the period of 31 July - 29 August.<sup>153</sup>

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In the year 94, the city of Bangor, *Wales* was burnt by lightning.<sup>72</sup>

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**95 A.D.** The Humber River in *England* overflowed and laid the adjacent country for 50 miles (80 kilometers) under water.<sup>40, 41, 43, 47, 72, 92</sup>

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The Humber in *England* by a flood, drowned people and cattle for 50 miles.<sup>72</sup>

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**97 A.D.** In 97 A.D., there was a drought in *China* during the period of 26 June - 27 July. This brought on a plague of locust.<sup>153</sup>

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**98 A.D.** In 98 A.D., there was a flood in Honan (now Henan province) in central *China* at Loyang during the period of 18 June - 16 July. Houses were damaged.<sup>153</sup>

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In the year 98, Camelon, *Scotland*, the Picts chief town, was burnt by lightning.<sup>72</sup>

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**100 A.D.** In 100 A.D., there was a drought in *China* during the period of 5 February - 6 May. This was followed by a flood in Honan (now Henan province) in central *China* at Wu-yang and Yü during the period of 24 July - 22 August.<sup>153</sup>

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**103 A.D.** In 103 A.D., there was a drought in Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng.<sup>153</sup>

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**104 A.D.** A famine struck *England* and *Scotland*.<sup>57, 91</sup>

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There was a famine in the north of *England* and *Scotland*.<sup>72</sup>

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In 104 A.D., there was a drought in *China* during the period of 9 August - 7 September. [In order to minimize the effect,] 50% of the land tax was remitted [back to the taxpayers].<sup>153</sup>

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### **105 A.D. – 125 A.D. China. Famine**

During the reign of Emperor Ngan-Ti [105-125 A.D.] of *China*, there was a time of great scarcity. Many people must have perished.<sup>186</sup>

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**106 A.D.** In 106 A.D., there was a flood in 37 Commanderies of *China* during the period of 19 June – 18 July. It flooded again in *China* during the period of 15 October - 13 November.<sup>153</sup>

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**107 A.D.** A famine struck *Britain* after long rains.<sup>57, 72, 91</sup>

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In *England* in 107 A.D., it rained 9 months, washed corn [grain] out of the Earth, and drowned cattle.<sup>72</sup>

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In 107 A.D., there was a drought in 8 Commanderies of *China*. In the same year, there was a flood in 41 Commanderies of *China*. There was a flood in Honan (now Henan province) in central *China* at Loyang during the period of 3 November - 2 December.<sup>153</sup>

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**108 A.D.** In 108 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang during the period of 28 May - 25 June. This was followed by a flood in Honan at Loyang during the period of 26 June - 25 July. In 108 A.D., there was a flood in 40 Commanderies of *China*.<sup>153</sup>

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**109 A.D.** In 109 A.D., there was a drought in 8 Commanderies and a flood in 41 Commanderies of *China*. In the same year, there was a flood in Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

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**110 A.D.** In 110 A.D., there was a flood in 3 Commanderies of *China*. There was also drought in *China* during the period of 6 May - 8 August.<sup>153</sup>

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**111 A.D.** In 111 A.D., there was a flood in 8 Commanderies of *China*. There was also drought in *China* during the period of 6 May - 8 August.<sup>153</sup>

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In the year 111, Chester, *England* was burnt by lightning.<sup>72</sup>

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**112 A.D.** In 112 A.D., there was a drought in *China* during the period of 12 June - 11 July.<sup>153</sup>

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**113 A.D.** In 113 A.D., there was a drought in *China* during the period of 2 June - 30 July. The land tax was remitted.<sup>153</sup>

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**114 A.D.** In 114 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang and also in 5 Commanderies of *China* during the period of 6 May - 8 August. Then there was a plague of locusts.<sup>153</sup>

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**115 A.D.** There was an overflow of River Severn in *England* during the night; a great loss of life and cattle.<sup>47, 72, 92</sup>

The River Severn in *England* overflowed and drowned 5,000 head of cattle and people in their beds.<sup>40, 41, 43</sup>

In 115 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang during the period of 10 June - 9 July.<sup>153</sup>

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**116 A.D.** In 116 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang during the period of 30 April - 28 May.<sup>153</sup>

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**118 A.D.** In 118 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang and in 5 Commanderies of *China*.<sup>153</sup>

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**119 A.D.** A famine struck *Britain* “after a pillar of fire was seen for several nights in the air”.<sup>57, 72, 91</sup>

In 119 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang during the period of 27 May - 25 June.<sup>153</sup>

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**120 A.D.** In 120 A.D. the Meuse River [in *northwestern Europe*] flooded.<sup>171</sup>

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**121 A.D.** In 121 A.D., there was a drought in 4 Commanderies of *China*.<sup>153</sup>

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**122 A.D.** In 122 A.D., there was a drought in 5 Commanderies of *China*. Crops were damaged.<sup>153</sup>

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**123 A.D.** [In *England*], there was a flood which swept off much cattle.<sup>72</sup>

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**124 A.D.** In 124 A.D., there was a flood in 36 Commanderies of *China*. People drowned and crops were damaged.<sup>153</sup>

There was as terrible hurricane at Winchester, *England*.<sup>72</sup>

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**125 A.D.** There was an overflow of River Humber in *England*.<sup>41, 43, 47</sup> [Another reference give the year as 123 A.D.<sup>40</sup>]

In the year 125 [in *England*], there was a remarkable snowstorm that produced “great loads, and smothered much cattle”.<sup>72</sup>

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**126 A.D.** In 126 A.D., there was a flood in *China* during the period of 3 November - 1 December. The land tax was remitted.<sup>153</sup>

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**127 A.D.** In 127 A.D., there was a drought in *China* during the period 31 March - 28 April.<sup>153</sup>

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**128 A.D.** In 128 A.D., there was a drought in *China* during the period 15 July - 13 August.<sup>153</sup>

In the year 128, part of Edinburgh, *Scotland* was burnt by lightning.<sup>72</sup>

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**129 A.D.** In 129 A.D., there was a flood in Honan (now Henan province) in central *China* at Loyang during the period of 5 June - 3 July. During the same year, there was a flood in Hopei (now Hebei province) in northern *China* at Pai-hsiang.<sup>153</sup>

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**130 A.D.** A great hailstorm struck *England* with hailstones 12 inches (30 centimeters) in diameter.<sup>28</sup>

In *England*, there were a hailstorm with hailstones 12 inches “about”, fatal to people and cattle.<sup>57, 72, 93</sup>

In 130 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang during the period of 5 March - 4 April.<sup>153</sup>

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**131 A.D.** In Dorsetshire in southwest *England*, there was an inundation of the sea, which came 20-miles inland. Great loss of life and property.<sup>47, 72, 92</sup>

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**132 A.D.** In 132 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang during the period of 25 May - 23 June.<sup>153</sup>

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**133 A.D.** In 133 A.D., there was a drought in *China* during the period of 20 July - 18 August.<sup>153</sup>

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**134 A.D.** A severe winter struck *England* and the River Thames was frozen for 2 months.<sup>28</sup>

The River Thames in *England* frozen for two months.<sup>47, 72, 93</sup>

In 134 A.D., there was a severe drought in *China*. Crops were damaged. A drought was reported during the period of 8 November 134 – 30 March 135.<sup>153</sup>

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**136 A.D.** In 136 A.D., there was a flood in Honan (now Henan province) in central *China* at Loyang. One hundred persons drowned.<sup>153</sup>

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**139 A.D.** In 139, the River Thames in *England* was dry for 2 days.<sup>72</sup>

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In 139 A.D., there was a drought in Shansi (now Shanxi province) in northern *China* at Taiyuan during the period of 11 September - 10 October. Tax was remitted.<sup>153</sup>

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**145 A.D.** In 145 A.D., there was a severe drought in *China* during the period of 5 February - 8 August.<sup>153</sup>

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**146 A.D.** In 146 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang during the period of 1-29 March.<sup>153</sup>

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In 146 A.D., there was a flood in Shantung (now Shandong province) on the east coast of *China* at Po-hsiang during the period of 28 May - 26 June. People drowned.<sup>153</sup>

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**147 A.D.** In 147 A.D., there was a drought in *China*.<sup>153</sup>

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**148 A.D.** In 148 A.D., there was a flood in Honan (now Henan province) in central *China* at Loyang during the period of 3 August - 31 August.<sup>153</sup>

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**149 A.D.** In 149 A.D., there was a flood in Honan (now Henan province) in central *China* at Loyang during the period of 20 September - 19 October.<sup>153</sup>

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**151 A.D.** A grievous famine struck *Wales*.<sup>57, 72, 91</sup>

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In 151 A.D., there was a severe drought in Honan (now Henan province) in central *China* at Loyang during the period 4 May - 1 June. [The resulting famine was so severe that] cannibalism was practiced.<sup>153</sup>

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**153 A.D.** *England* experienced three months of frost and the River Thames froze.<sup>28</sup>

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The River Thames and all rivers in *England* frozen nearly three months.<sup>47, 72, 93</sup>

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In 153 A.D., there was a flood in Hopei (now Hebei province) in northern *China* at Pai-hsiang during the period of 8 August - 5 September. This resulted in a famine.<sup>153</sup>

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**154 A.D.** In Rome, *Italy* in 154, during the 16<sup>th</sup> year of the reign of the emperor Antoninus, the city suffered from the following calamities. First the Tiber River overflowed its banks. Then a fire destroyed a greater part of the city. Then a famine swept away a great number of its citizens.<sup>92</sup>

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**155 A.D.** In Edinburgh, *Scotland*, there was considerable damage from a flood.<sup>47, 92</sup>

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In 155 A.D., a flood drowned several people in Edinburgh, *Scotland*.<sup>72</sup>

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In 155 A.D., there was a flood in Honan (now Henan province) in central *China* at Nan-yang during the period of 17 June - 15 August.<sup>153</sup>

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**158 A.D.** In 158 A.D., there was a drought in *China*.<sup>153</sup>

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**159 A.D.** There was a hurricane at Chester, *England*.<sup>72</sup>

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**160 A.D.** A great famine struck *England*; multitudes starved.<sup>57, 72, 91</sup>

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**161 A.D.** In 161 A.D., there was a drought in *China* during the period of 8 August - 8 November.<sup>153</sup>

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**164 A.D.** There was a hurricane at Edinburgh, *Scotland*.<sup>72</sup>

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**167 A.D.** A great inundation of the Tiber River in *Italy*.<sup>72</sup>

In the year 167 or 170, there was a famine in *England*.<sup>72</sup>

In 167 A.D., there was a flood in the Gulf of Chihli [now Bohai Sea] at Hopei (now Hebei province) in northern *China* and Shantung (now Shandong province) on the east coast of *China* during the period of 2 September - 1 October. People drowned.<sup>153</sup>

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**171 A.D.** In 171 there was a general plague [*Europe?*], which was fatal to most nobility. It was attended with a famine followed by floods.<sup>72</sup>

In 168 or 171 A.D., there was a great flood.<sup>72</sup>

In 171 A.D., there was a flood in *China* during the period of 24 March - 22 April.<sup>153</sup>

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**173 A.D.** In *England*, three month's frost followed by dearth.<sup>47, 72, 93</sup> [A dearth is a scarcity and dearness of food, a famine.]

[In *England*], there was a great snowstorm that produced "a heavy load, lay 13 weeks, and frost".<sup>72</sup>

A famine struck *England* after severe frost and snow.<sup>57, 72, 91</sup>

In 173 A.D., there was a flood in Shantung (now Shandong province) on the east coast of *China* at Yeh during the period of 28 June - 27 July.<sup>153</sup>

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**174 A.D.** In 174 A.D., there was a flood in Hunan province in south-central *China* on the Lo River.<sup>153</sup>

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**175 A.D.** A famine struck Rome, *Italy*.<sup>57, 72, 91</sup>

In 175 A.D., there was a flood in 7 Commanderies of *China* during the period of 8 May - 6 June.<sup>153</sup>

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**176 A.D.** In 176 A.D., there was a drought in *China* during the period of 6 May - 8 August.<sup>153</sup>

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**177 A.D.** In 177 A.D., there was a severe drought in *China* during the period of 16 May - 13 June.<sup>153</sup>

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**182 A.D.** In 182 A.D., there was a drought in *China* during the period of 6 May - 8 August.<sup>153</sup>

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**183 A.D.** In 183 A.D., there was a severe drought in *China* during the period of 6 May - 8 August. This was followed by a flood in Kansu (now Gansu province) in northwest *China* at Lanchow during the period of 8 August - 8 November. It flooded a distance of 20 li [about 7 miles].<sup>153</sup>

During the reign of Emperor Whan-Ti [167-189 A.D.], there happened such a dreadful famine in several parts of the empire of *China*, that the people were driven to feed on human flesh.<sup>186</sup>

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**188 A.D.** [In 188 A.D. swarms of locusts filled the air and covered the ground in the Roman province of Apulia [in southeastern *Italy*]. These locusts destroyed the crops and ushered in a famine. Sicinius was dispatched with an army to try to battle the winged pests. Thousand of peasants lay down to die on the highroads, and so dire was the pestilence, which accompanied the famine that even the vultures refused to feed upon the fallen.]<sup>84</sup>

In Rome, *Italy* in 188, a fire caused by lightning utterly destroyed a great part of the Capitol, a famous library, and several contiguous buildings. Eusebius says it consumed whole quarters of the city, and in them the libraries.<sup>92</sup>

In 188 A.D., several regions of *China* experienced flooding during the period of 12 July - 11 August.<sup>153</sup>  
 — Shantung (now Shandong province) on the east coast of *China* at Chin-hsiang, T'an-ch'êng, and Chu-ch'êng experienced flooding.  
 — Honan (now Henan province) in central *China* at Shang-ch'iu experienced flooding.  
 — Anhwei (now Anhui province) in eastern *China* at Su experienced flooding.  
 — Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow and P'ei experienced flooding. [P'ei is located at 118.03 E. longitude and 34.30 N. latitude.]

**189 A.D.** A famine struck Rome, *Italy*.<sup>72</sup>

**191 A.D.** A famine struck Rome, *Italy*.<sup>72</sup>

**192 A.D.** A famine struck *Ireland*. Bad harvest caused general scarcity, mortality and immigration – “so the lands and houses, territories and tribes, were emptied.”<sup>57, 91</sup>

A famine afflicted the city of Rome, *Italy*.<sup>72</sup>

**194 A.D.** In 194 A.D., there was a severe drought in the central part of Shensi (now Shaanxi province) in central *China* during the period of 8 May - 2 September. [The resulting famine was so severe that] cannibalism was practiced. Innumerable people died.<sup>153</sup>

**195 A.D.** In 195 A.D., there was a severe drought in *China* during the period of 28 April - 26 May.<sup>153</sup>

**197 A.D.** In 197 A.D., there was a flood on the Han River (Yangtze River tributary) at Shensi (now Shaanxi province) in central *China* during the period of 30 September - 28 October. During the same year, there was a flood on the Han River at Hupeh (now Hubei province) in central *China*.<sup>153</sup>

**201 A.D.** Toward the end of 201 A.D., the Empress of Japan traveled across the sea and invaded *Korea*. A tide-wave following her ships reached far up into the interior of the country of Silla so by that the water of the sea encroached upon the land. [Silla was one of the Three Kingdoms of Korea, the southeast area of the Korean peninsula. The tide-wave might be the result of a tsunami or less likely the storm surge from a great typhoon.] The King of Silla took this tide-wave as an omen and surrendered his kingdom.<sup>149</sup>

**202 A.D.** In the year 202, the city of Bath in southwestern *England* was partly burnt by lightning.<sup>72</sup>

**207 A.D.** In *England*, hail, “bigger than ducks’ eggs.”<sup>57, 72, 93</sup>

In 207 A.D., there was a flood in *China* during the period of 11 August - 9 September.<sup>153</sup>

**212 A.D.** In 212 A.D., there was a flood at Honan (now Henan province) in central *China* on the Wei River and the Ying River during the period of 15 August - 13 September.<sup>153</sup>

In the year 212 at Leicester in the east Midlands of *England*, there was a thunder and lightning storm that was fatal to people and cattle.<sup>72</sup>

**213 A.D.** In 213 A.D., there was a flood in *China* during the period of 6 July - 4 August.<sup>153</sup>

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**214 A.D.** The River Trent in *England*, flooded and overflowed its banks 20 miles (32 kilometers) on each side and drowned many people.<sup>28, 40, 41, 43</sup>

The River Trent flooded and drowned much people and cattle on both sides.<sup>72</sup>

In *England*, the Trent valley [in the Midlands] overflowed. Great destruction, extending 20 miles from normal course of stream.<sup>47</sup>

In 214 A.D., there was a drought in *China* during the period of 27 April - 26 May.<sup>153</sup>

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**218 A.D.** In Northumberland, northern *England*, there was a great flood of the River Tweed; much damage.<sup>47, 92</sup> [The River Tweed flows through the Borders region of Great Britain.]

In *England*, the River Tweed had a sudden inundation, and destroyed a considerable number of the inhabitants on its banks.<sup>40, 41, 43</sup>

In *England* in 218 A.D., a great flood in Tweed, destroyed very much people and cattle.<sup>72</sup>

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**219 A.D.** In 219 A.D., the Han River (Yangtze River tributary) flooded at Shensi (now Shaanxi province) in central *China* and at Hupeh (now Hubei province) in central *China* during the period of 28 August - 26 September.<sup>153</sup>

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**220 A.D.** The winter was very severe in *England* in 220 A.D. with a frost lasting five months.<sup>28, 40, 41, 42, 43</sup>

In *Britain*, frost lasted five months continuously.<sup>47, 72, 92</sup>

In 220 A.D., there was a great frost in *England*, which lasted for 5 months.<sup>212</sup>

[Another source places this event in the year 202, which I believe is a misprint.] The winter in 202 was intensely cold for four months. The River Thames in *England* was frozen for 9 weeks.<sup>1</sup>

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**223 A.D.** In 223 A.D., the I River and the Lo River flooded at Hunan province in south-central *China* during the period of 16 July - 13 August. People were drowned and houses damaged.<sup>153</sup>

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**228 A.D.** A famine struck *Scotland*; thousands were starved.<sup>57, 72, 91</sup>

In 228 A.D., there was a severe drought in *China* during the period of 20 June - 18 July.<sup>153</sup>

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**230 A.D.** In 230 A.D., there was a drought in *China* during the period of 23 November 230 - 8 May 231.<sup>153</sup>

In 230 A.D., there was a great frost in *England*. The River Thames at London was frozen over for 6 weeks (some sources give the date as 250 A.D.)<sup>212</sup>

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**233 A.D.** In 233 A.D. in *Scotland*, it rained 7 months together causing a famine.<sup>72</sup>

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**234 A.D.** In Canterbury in southeast *England*, a storm threw down 200 houses, and killed several families.<sup>40, 41, 43, 56, 72</sup>

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**235 A.D.** In 235 A.D., there was a drought in *China* during the period of 8 August - 29 October.<sup>153</sup>

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**237 A.D.** In 237 A.D., several areas of *China* were flooded during the period of 7 October - 5 November. As a result people were drowned and houses damaged. Hopei (now Hebei province) in northern *China* at Chi was flooded. [Chi is located at 115.34 E. longitude and 37.34 N. latitude.] Shantung (now Shandong province) on the east coast of *China* at P'u was flooded. Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow was flooded. Anhwei (now Anhui province) in eastern *China* at Po was flooded.<sup>153</sup>

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**238 A.D.** A most grievous famine struck *Scotland*.<sup>57, 72, 91</sup>

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**240 A.D.** In 240 A.D., there was a drought in *China* during the period of 12 January - 9 April.<sup>153</sup>

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**242 A.D.** In *England* in the year 242, there was a great snowstorm. "Very deep, Northampton and neighbouring Shires, much Cattle and Sheep loft [lost] in it."<sup>72</sup>

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**245 A.D.** In Lincolnshire in northeast-central *England*, an eruption of the sea laid underwater many thousands of acres, which have not been recovered to this time.<sup>40, 41, 43, 47, 72, 90, 212</sup>

In 245 A.D., there was a flood at Hunan province in south-central *China* at Ch'a-ling during the period of 6 May - 8 August. Two hundred families were flooded.<sup>153</sup>

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**250 A.D.** In southeast *England*, the River Ouse [now called the Great Ouse] in Bedfordshire overflowed and drowned many people and cattle.<sup>40, 41, 43, 47</sup>

In 250 A.D., several regions of *China* experienced flooding.<sup>153</sup>

During the period of 8 August - 8 November, the following area was affected:

— Hunan province in south-central *China* at Ch'a-ling experienced flooding.

During the period of 14 September – 13 October, the following area was affected:

— Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking experienced flooding.

— Chekiang (now Zhejiang province) on the east coast of *China* at An-chi experienced flooding.

The winter was very similar to the winter of 220 A.D. and the River Thames in *England* was frozen for approximately the same length of time.<sup>1</sup>

The River Thames in *England* frozen nine weeks.<sup>2, 40, 41, 43, 47, 93</sup> [Another account places this event in 252 A.D.]<sup>72</sup>

Severe winter struck *England*. The River Thames was frozen for 9 weeks.<sup>28</sup>

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**251 A.D.** In 251 A.D., there was a flood in *China* during the period of 4 September - 2 October.<sup>153</sup>

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**253 A.D.** A hurricane blew down 900 houses in London, *England*.<sup>72</sup>

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**254 A.D.** In 254 A.D., there was a flood in *China* during the period of 6 May – 8 August.<sup>153</sup>

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**255 A.D.** In 255 A.D., there was a severe drought in *China* that led to a famine.<sup>153</sup>

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**257 A.D.** In 257 A.D., there was a drought in *China* during the period of 8 August 257 - 22 March 258.<sup>153</sup>

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**258 A.D.** In 258 A.D., there was a drought in *China* during the period of 16 September - 14 October.<sup>153</sup>

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**259 A.D.** A famine struck *Wales*. Thousands were “pined to death”.<sup>57, 72, 91</sup>

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**261 A.D.** In 261 A.D., there was a flood in *China* during the period of 16 June – 14 July.<sup>153</sup>

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**262 A.D.** A famine at Rome, *Italy* attended by a plague.<sup>90</sup>

In 262 A.D., there was a flood in *China* during the period of 2 September - 30 September.<sup>153</sup>

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**264 A.D.** In *Britain*, hail; each stone one pound or above in weight.<sup>57, 72, 93</sup>

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**266 A.D.** In 266 A.D., there was a drought in *China* during the period of 5 February - 8 August.<sup>153</sup>

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**268 A.D.** In *England*, the River Humber overflowed and did great damage.<sup>47, 92</sup> [Other sources place this flood in the year 269.<sup>40, 43</sup> In 269, Humber, in the night, carried down much people and cattle.<sup>72</sup>]

In the year 268, part of Worcester, *England* was burnt by lightning.<sup>72</sup>

In 268 A.D., several regions of *China* experienced flooding during the period of 23 October - 21 November. Shantung (now Shandong province) on the east coast of *China* at Lin-tzū and Fan was flooded. Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow was flooded. Honan (now Henan province) in central *China* at Hsiang-ch'êng was flooded.<sup>153</sup>

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**269 A.D.** In 269 A.D., several regions of *China* experienced flooding during the period of 20 March - 18 May. Shantung (now Shandong province) on the east coast of *China* at Lin-tzū and Fan was flooded. Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow was flooded.<sup>153</sup>

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**271 A.D.** Of Rome in 484, or in the year 271 of the Christian era, the winter was so severe, that the snow covered the square in Rome, *Italy* to a height of several feet for 40 days.<sup>80</sup>

In 271 A.D., there was a drought in *China* during the period of 25 June - 23 July. Then several rivers in *China* flooded during the period 24 July - 22 August. As a result, 4,000 families were flooded and 300 persons drowned. The I River and the Lo River in Hunan province in south-central *China* flooded. The Yellow River flooded. The Ch'in River at Shansi (now Shanxi province) in northern *China* and at Honan (now Henan province) in central *China* flooded.<sup>153</sup>

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**272 A.D.** A famine struck *Britain*. People ate bread made from the bark of trees and roots.<sup>57, 72, 90, 91</sup>

In 272 A.D., there was so grievous a famine in *Britain*, that people were forced to eat the bark from trees.<sup>212</sup>

In 272 A.D., there was a drought in *China* during the period of 10 June - 12 July.<sup>153</sup>

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**273 A.D.** In 273 A.D., there was a drought in *China* during the period of 5 February - 1 July.<sup>153</sup>

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**274 A.D.** In 274 A.D., there was a drought in *China* during the period of 23 May - 21 June.<sup>153</sup>

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**275 A.D.** In 275 A.D., there was a flood at Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow during the period of 7 October - 5 November.<sup>153</sup>

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**276 A.D.** In the year 276, the climate in *Britain* was significantly warmer than present. Wines were first made in *Britain* in this year.<sup>128</sup>

In 276 A.D., there was a drought in *China* during the period of 5 February - 8 August.<sup>153</sup>

In 276 A.D., there were floods in several regions of *China*. Honan (now Henan province) in central *China* at Lin-chang during the period of 28 July - 26 August experienced flooding. Hupeh (now Hubei province) in central *China* at Hsiang-yang during 25 October - 22 November experienced flooding. As a result, 4,000 families were flooded and 100 persons drowned.<sup>153</sup>

**277 A.D.** In London, *England*, a storm killed several people.<sup>40, 41, 43, 56</sup>

In the year 277, London, *England* was partly burnt by lightning.<sup>72</sup>

In 277 A.D., there were floods in several regions of *China* during the period of 16 August - 14 September. Szechwan (now Sichuan province) in southwest *China* at Chungking experienced flooding. Shensi (now Shaanxi province) in central *China* at Nan-chêng experienced flooding. As a result, 300 persons were drowned.<sup>153</sup>

In 277 A.D., there were floods in several regions of *China* during the period of 14 October - 11 November.<sup>153</sup>

— Shensi (now Shaanxi province) in central *China* at Hsing-p'ing was flooded.

— Shantung (now Shandong province) on the east coast of *China* at Lin-tzũ and Fan was flooded. Crops were damaged.

— Honan (now Henan province) in central *China* at Hsiang-ch'êng was flooded. Crops were damaged.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow was flooded. Crops were damaged.

— Hupeh (now Hubei province) in central *China* at Hsiang-yang was flooded. Crops were damaged.

— Szechwan (now Sichuan province) in southwest *China* at Chungking was flooded. Crops were damaged.

— Shensi (now Shaanxi province) in central *China* at Nan-chêng was flooded. Crops were damaged.

**278 A.D.** In 278 A.D., there were floods in several regions of *China* during the period of 6 August – 3 September. As a result people were drowned and crops damaged.<sup>153</sup>

— Shantung (now Shandong province) on the east coast of *China* at Fan was flooded.

— Honan (now Henan province) in central *China* at Hsiang-ch'êng and Loyang were flooded.

— Anhwei (now Anhui province) in eastern *China* at Shou was flooded.

— Hupeh (now Hubei province) in central *China* at Hsiang-yang was flooded.

— Hopei (now Hebei province) in northern *China* at Kao-i was flooded.

**280 A.D.** In 280 A.D., the city of Lyon, *France* flooded.<sup>171</sup>

**281 A.D.** In 281 A.D., there were floods in several regions of *China* during the period of 4 July – 1 August. Hupeh (now Hubei province) in central *China* at An-lu experienced flooding. Shantung (now Shandong province) on the east coast of *China* at T'aian experienced flooding. As a result, 300 families were flooded and 60 persons were drowned. Then there was a drought in *China* during the period of 8 November 281 - 6 May 282.<sup>153</sup>

**282 A.D.** In 282 A.D., there was a drought in *China* during the period of 8 November 282 - 5 February 283. The land tax was remitted.<sup>153</sup>

**283 A.D.** In 283 A.D., several regions of *China* experienced flooding. These included: Honan (now Henan province) in central *China* at Loyang, Hupeh (now Hubei province) in central *China* at Hsiang-yang, and Anhwei (now Anhui province) in eastern *China* at Shou.<sup>153</sup>

In 283 A.D., Shantung (now Shandong province) on the east coast of *China* at Fan experienced flooding during the period of 11 August - 8 September.<sup>153</sup>

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**284 A.D.** In 284 A.D., there was a drought in *China* during the period of 30 June – 29 July. Then Kansu (now Gansu province) in northwest *China* at Lung-hsi and 4 Commanderies experienced flooding during the period of 27 September - 25 October.<sup>153</sup>

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**285 A.D.** In 285 A.D., 10 Commanderies in *China* experienced flooding during the period of 21 May - 19 June. Houses were damaged. During this same time period, several other regions of *China* experienced droughts. These included: Shantung (now Shandong province) on the east coast of *China* at Lin-tzū, Hopei (now Hebei province) in northern *China* at Cho and Kao-i, and Shensi (now Shaanxi province) in central *China* at Nan-ch'êng. Following this during the period of 19 July - 17 August the following areas experience drought, which damaged crops: Shantung province at Ting-t'ao and Hunan province in south-central *China* at Ch'ang-tê.<sup>153</sup>

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**286 A.D.** In 286 A.D., 13 Commanderies in *China* experienced severe droughts during the period of 9 June - 8 August.<sup>153</sup>

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**287 A.D.** In 287 A.D., there were floods in *China* during the period of 2 January - 30 January. Then there was a flood in Shantung (now Shandong province) on the east coast of *China* at Lin-tzū during the period of 30 April - 28 May. During the same period of time, there was a drought in Hopei (now Hebei province) in northern *China* at Kao-i. Then there were floods in 8 Commanderies of *China* during the period of 28 June - 27 July.<sup>153</sup>

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**288 A.D.** A famine struck all through *Britain*.<sup>57, 72, 91</sup>

In 288 A.D., there was a severe drought in several regions of *China* during the period of 16 July - 13 August. This led to crop damage. These regions included: Shensi (now Shaanxi province) in central *China* at Ching-yang and Hsing-p'ing, Kansu (now Gansu province) in northwest *China* at Chên-yüan, and Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

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**289 A.D.** In 289 A.D., there was a drought in *China* during the period of 9 March - 7 April.<sup>153</sup>

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**290 A.D.** In 290 A.D., there was a drought in *China* during the period of 28 March - 27 April.<sup>153</sup>

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**Winter of 290 / 291 A.D.** The winter was very similar to the winter of 220 A.D. and the River Thames in *England* was frozen for approximately the same length of time.<sup>1</sup>

Most of the rivers in *Britain* frozen six weeks.<sup>2, 40, 41, 43, 47, 93</sup>

The frost in 290 A.D. lasted 6 weeks and was severe over all of *Britain*.<sup>72</sup>

In 291 A.D., there was a frost in *England*. Most rivers were frozen for six weeks.<sup>212</sup>

The winter in *England* was very cold. Most rivers froze for 6 weeks.<sup>28</sup>

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**291 A.D.** In 291 A.D., there was a severe drought in Anhwei (now Anhui province) in eastern *China* at Shou during the period of 12 August - 10 September. This led to a famine. [Some uncertainty exist in the name Shou which appeared as Yung-chou.]<sup>153</sup>

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**Winter of 291 / 292 A.D.** The winter of 292 A.D. was very severe. The rivers in northern *France* froze.<sup>171</sup>

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**292 A.D.** In 292 A.D., there were floods in *China*.<sup>153</sup>

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**295 A.D.** In 295 A.D., there were floods in several regions of *China*.<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Hsiang-yang was flooded.
- Anhwei (now Anhui province) in eastern *China* at Shou was flooded.
- Shantung (now Shandong province) on the east coast of *China* at Lin-tzū and Fan was flooded.
- Honan (now Henan province) in central *China* at Hsiang-ch'êng was flooded.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow was flooded.

In 295 A.D., several regions of *China* experienced flooding.<sup>153</sup>

During the period of 30 May - 29 June, the following areas were affected:

- Honan (now Henan province) in central *China* at Hsü-ch'ang experienced flooding.
- Anhwei (now Anhui province) in eastern *China* at Shou experienced flooding.

During the period of 30 June - 28 July, the following area was affected:

- Honan (now Henan province) in central *China* at Têng-fêng experienced flooding. People drowned.
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**296 A.D.** In 296 A.D., there were floods in several regions of *China* during the period of 18 June - 16 July. Hupeh (now Hubei province) in central *China* at Hsiang-yang experienced flooding. Anhwei (now Anhui province) in eastern *China* at Shou experienced flooding.<sup>153</sup>

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**297 A.D.** In 297 A.D., there was a severe drought in Shensi (now Shaanxi province) in central *China* at Sian and Nan-ch'êng during the period of 5 August - 3 September. This led to a famine.<sup>153</sup>

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**298 A.D.** In *Wales*, there was a great drought.<sup>47</sup>

A famine struck *Wales*.<sup>57, 91</sup> . . . after a comet.<sup>72</sup>

In 298 A.D., there were floods in several regions of *China* during the period of 22 October - 20 November.<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Hsiang-yang was flooded.
  - Anhwei (now Anhui province) in eastern *China* at Shou was flooded.
  - Hopei (now Hebei province) in northern *China* at Kao-i was flooded.
  - Honan (now Henan province) in central *China* at Hsiang-ch'êng was flooded.
  - Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow was flooded.
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**Winter of 298 / 299 A.D.** Towards 299, the winter was very harsh in the north of *Gaul* [During the time of Ancient Rome, Gaul was a region of Western Europe encompassing present day *France*, *Luxembourg* and *Belgium*, most of *Switzerland*, the western part of Northern *Italy*, as well as the parts of the *Netherlands* and *Germany* on the left bank of the Rhine.].<sup>62</sup>

The winter of 299 A.D. was very severe in the north of *France*.<sup>171</sup>

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**300 A.D. - 336 A.D. Cyprus. Famine**

In *Cyprus*, there was a thirty-six year drought; expelled all the inhabitants.<sup>47</sup>

In *Cyprus*, there was 36 years of drought from 300 to 336 which expelled the poor surviving inhabitants.<sup>72</sup>

The great island of *Cyprus* was 36 years without rain. A great famine ensued. Inhabitants forsook the island and fled.<sup>72</sup>

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**301 A.D.** In the winter, the *Black Sea* was frozen entirely over.<sup>1</sup>

In Winchester in southeast *England*, there was a major storm.<sup>40, 41, 56</sup>

There was a great hurricane at Winchester, *England*.<sup>72</sup>

In 301 A.D. during the period between 6 May and 8 November, there was a drought in several regions of *China*.<sup>153</sup>

- Drought struck in Shantung (now Shandong province) on the east coast of *China* at Lin-tzū.
- Drought struck in Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow.
- Drought struck in Hopei (now Hebei province) in northern *China* at Cho.
- Drought struck in Shansi (now Shanxi province) in northern *China* at Taiyuan.

In 301 A.D. during the period between 21 August and 18 September, several regions of *China* experienced floods. These included Honan (now Henan province) in central *China* at Nan-yang and Shantung (now Shandong province) on the east coast of *China* at T'an-ch'êng.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**302 A.D.** In 302 A.D. during the period between 10 August and 8 September, several regions of *China* experienced floods. These included Shantung (now Shandong province) on the east coast of *China* at Fan; Honan (now Henan province) in central *China* at Hsiang-ch'êng; Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow; and Hopei (now Hebei province) in northern *China* at Kao-i.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**305 A.D.** In the year 305, the town of Dunbarton in *Scotland* was burnt by lightning.<sup>72</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**306 A.D.** A famine prevailed in *Scotland* beginning in 306 and lasting four years. Thousands died; “most grievous and fatal.”<sup>57, 72, 91</sup>

A famine in *Scotland* in 306. Thousands died.<sup>90, 212</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**307 A.D.** In 307, a famine prevailed in Cappadocia, *Turkey*.<sup>57, 91</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought in Cyprus during that timeframe.*

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**309 A.D.** In 309 A.D. during the period between 28 March and 25 April, a severe drought struck *China*. Many rivers dried up.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**310 A.D.** In 310, a famine prevailed in *England*; 40,000 people perished.<sup>57, 90, 91, 212</sup> [Other sources place this event in the year 338.]

In 310 A.D. during the period between 15 May and 13 June, several regions of *China* experienced floods. These included Kiangsu (now Jiangsu province) on the east coast of *China* and Anhwei (now Anhui province) in eastern *China*.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**311 A.D.** During the period between 8 November 311 and 6 May 312, a drought struck *China*.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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### **313 A.D. – 315 A.D. Japan. Famine**

From 313 A.D. – 315 A.D., there was a famine in *Japan*. In 316 A.D. during spring on the 6<sup>th</sup> day of the 2<sup>nd</sup> month, the Emperor of Japan addressed his ministers, saying, “We ascended a lofty tower and looked far and wide, but no smoke arose in the land. From this we gather that the people are poor, and that in the houses there are none cooking their rice. We have heard that in the reigns of the wise sovereigns of antiquity, from every one was heard the sound of songs hymning their virtue, in every house there was the ditty, ‘How happy we are.’ But now when we observe the people, for three years past, no voice of eulogy is heard; the smoke of cooking has become rarer and rarer. By this we know that the five grains (hemp, millet, rice, wheat & barley, and pulse) do not come up, and that the people are in extreme want. Even in the home provinces there are some who are not supplied; what must it be in the provinces outside of our domain?” [The home provinces is the territory around the capital ruled immediately by the Emperor.]<sup>149</sup>

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**316 A.D.** [In *England*], there was a famine.<sup>72</sup>

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**317 A.D.** In southeast *England*, on the Isle of Thanet (Kent), there was a flood with loss of life and property.<sup>47, 92</sup> [Isle of Thanet lies at the most easterly point of Kent, England. While in the past it was separated from the mainland by the nearly 2,000 feet (610 m) wide River Wantsum, it is no longer an island.]

In *England*, on the Isle of Thanet, there was an inundation.<sup>43</sup>

Thanet flooded, people and cattle lost.<sup>72</sup>

In 317 A.D. during the period between 26 June and 24 July, there was a severe drought in Anhwei (now Anhui province) in eastern *China* at Shou.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**318 A.D.** In 318 A.D. during the period between 15 July and 12 August, there was a drought in *China*.<sup>153</sup>



*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**319 A.D.** In 319 A.D., there was a severe drought in *China*.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**320 A.D.** In 320 A.D., *China* experienced floods during the period between 22 July and 20 August.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**321 A.D.** In 321 A.D. during the period between 12 June and 10 July, there was a drought in *China*.<sup>153</sup>

In 321 A.D., *China* experienced floods during the period between 10 August and 7 September.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**322 A.D.** In 322 A.D., *China* experienced floods during the period between 5 February and 6 May.<sup>153</sup>

In 322 A.D. during the period 1-29 July, there was a severe drought in *China*. Then during the period between 25 December 322 and 22 January 323 there was a severe drought in Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking and rivers dried up.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**323 A.D.** In northeast *England*, the inhabitants of Ferne Island off the coast of Northumberland were destroyed by an inundation of the sea.<sup>47</sup> [Ferne Island is now called Farne Island.]

In *England* in 323, there was a flood that destroyed all the inhabitants in Ferne Island, 7 miles southwest of Holy Island.<sup>40,43</sup> [Holy Island is now called Lindisfarne.]

In 323 A.D. during the period between 20 June and 19 July, several regions of *China* experienced floods. These included Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking; Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou; and Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng and Shou.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**325 A.D.** A severe famine struck *Britain*.<sup>57</sup>

In 325 A.D. during the period between 31 January and 26 July, there was a severe drought in *China*.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**326 A.D.** In 326 A.D., *China* experienced floods during the period between 17 June and 15 July.<sup>153</sup>



During the period between 16 July 326 and 8 January 327, there was a severe drought in *China*.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**327 A.D.** In 327 A.D. during the period between 8 May and 5 June, there was a drought in *China*.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**329 A.D.** The winter was severe in *England*. Most rivers were frozen for 6 weeks and there was deep snow in Wales.<sup>28</sup>

In 329 A.D., there was a frost in *Britain*. Most rivers were frozen for six weeks.<sup>212</sup>

In *Wales*, there was a great snowstorm “so much cattle smothered [smothered] in Wales as caused [caused] a Dearth.”<sup>72</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**330 A.D.** In northwest *England*, there was an irruption of the sea in Lancashire.<sup>40, 41, 43, 47</sup>

In 330 A.D. during the period between 3 June and 1 July, there was a drought in *China* followed by a famine and a plague.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**331 A.D.** A famine struck Antioch, *Turkey*. This city was afflicted by so terrible a famine that a bushel of wheat was sold for 400 pieces of silver. During this grievous distress, Constantine sent to the Bishop 30,000 bushels of corn [grain], besides an immense quantity of all kinds of provisions, to be distributed among the ecclesiastics, widows, orphans, etc.<sup>57</sup>

In 331 A.D. during the period between 23 May and 21 June, there was a drought in *China*.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**332 A.D.** In 332 A.D., *China* experienced floods during the period between 10 June and 9 July.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**333 A.D.** In 333, there was a great famine and pestilence in *Syria*.<sup>128</sup>

In 333 A.D. during the period between 28 June and 26 August, there was a drought in *China*.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**334 A.D.** In *England*, hail, “stones like goose eggs; fatal to people and cattle.”<sup>57, 93</sup>

In 334 A.D. during the period between 18 July and 15 August, there was a severe drought in *China*.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**335 A.D.** In 335 A.D. during the period between 7 July and 5 August, there was a severe drought in Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing and Yü-yao.<sup>153</sup>

In 335 A.D., *China* experienced floods during the period between 3 September and 3 October in Hunan province in south-central *China* at Changsha and Ch’ang-tê.<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**336 A.D.** In northern *England*, there was a great flood and overflowing of the River Tweed.<sup>40, 41, 47</sup>

In *England*, there was an inundation of the River Tweed.<sup>43</sup>

In *England*, there was a flood in the River Tweed that carried down many families and much cattle.<sup>72</sup>

A famine struck *Syria* along with a plague.<sup>57, 72, 91</sup>

Famine and plague depopulated *Syria* and *Cilicia* [Southeastern Anatolia].<sup>72</sup>

In 336 A.D. during the period between 29 March and 26 April, there was a drought in *China*. As a result, the corvée was remitted. [Corvée, under the feudal system, is compulsory, unpaid labor demanded by a lord or king.]<sup>153</sup>

*Also refer to the section 300 A.D. – 336 A.D. for information on the drought and famine in Cyprus during that timeframe.*

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**337 A.D.** In 337 A.D. during the period between 14 July and 12 August, there was a drought in *China*.<sup>153</sup>

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**338 A.D.** There was a famine in *Britain* and *Wales*. 40,000 people starved.<sup>72</sup>

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**341 A.D.** The snow in *Britain* was 15 feet (4.6 meters) deep and stayed on the ground for 6 weeks.<sup>28</sup>

In 341 there was a great snowstorm [in *England*]. “It fell and lay 15 Foot deep, 6 Weeks; many people and Cattle loft [lost].”<sup>72</sup>

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**343 A.D.** In 343 A.D. during the period between 9 June and 8 July, there was a drought in *China*.<sup>153</sup>

In the year 343 [in *England*], there was terrible thunder continuous for 8 hours.<sup>72</sup>

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**344 A.D.** In *England*, hailstorm, “stones much bigger than hens’ eggs.”<sup>41, 43, 56, 57, 93</sup>

[In *England*], there were hailstones like goose eggs, fatal to people and cattle.<sup>72</sup>

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**345 A.D.** In 345 A.D. during the period between 16 June and 15 July, there was a drought in *China*.<sup>153</sup>

[In *England*] it rained five months continuously and was followed by a dearth.<sup>72</sup>

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**346 A.D.** In March 346 A.D., after 20 days of continuous rain, there were floods in *France*.<sup>171</sup>

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**348 A.D.** In 348 A.D., *China* experienced floods during the period between 15 May and 12 June.<sup>153</sup>

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**349 A.D.** In northwest *England*, 420 houses in Carlisle [now Carlisle-Cumbria], blown down by a storm and many people killed.<sup>40, 41, 43, 56, 72</sup>

In 349 A.D. during the period between 31 July and 26 November, there was a drought in *China*.<sup>153</sup>

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**350 A.D.** In 350 A.D. during the period between 6 May and 8 August, there was a drought in *China*.<sup>153</sup>

In 350 A.D., *China* experienced floods during the period between 21 June and 20 July.<sup>153</sup>

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**351 A.D.** In 351 A.D., *China* experienced floods during the period between 9 August and 6 September. Several hundred persons drowned.<sup>153</sup>

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**352 A.D.** In *England*, the Severn valley flooded; great loss.<sup>47, 92</sup> [Other sources place this flood in the year 350.<sup>40, 43</sup>]

In 352, Severn carried off much people and cattle.<sup>72</sup>

On 5 August 352 A.D., it snowed on the Esquiline (seven hills of Rome, *Italy*), in the heart of the Roman summer.<sup>171</sup>

In 352 A.D. during the period between 28 July and 26 August, there was a drought in *China*.<sup>153</sup>

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**353 A.D.** In 353, there was an inundation in Cheshire, *England* by which 3,000 persons and an innumerable quantity of cattle perished.<sup>90</sup>

In 353 A.D., there was a great flood in Cheshire, *England*. Five thousand people and an innumerable quantity of cattle perished.<sup>212</sup>

In 353 A.D. during the period between 20 April and 18 May, there was a drought in *China*.<sup>153</sup>

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**354 A.D.** In 354 in northern *Gaul*, the spring rains, were more frequent than usual, causing the streams to swell.<sup>79</sup>

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**Winter of 354 / 355 A.D.** The harsh winter of 355 in northern *Gaul* caused a large number of people to freeze to death.<sup>79</sup>

The winter of 355 A.D. was very severe [in *France*]. Many dead.<sup>171</sup>

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**Winter of 356 / 357 A.D.** During the winter of 356-357 in northern *Gaul*, the Meuse River was frozen during the months of December and January. The winter had been preceded by a hot, dry summer.<sup>79</sup>

The winter of 357 A.D. was very hard from December to January. The Meuse River [in *northwestern Europe*] froze.<sup>171</sup>

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**357 A.D.** The summer drought of 357 allowed individuals to ford and cross the Rhine River in *Germany*.<sup>79</sup>

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**Winter of 357 / 358 A.D.** The winter of 358 A.D. was very hard. The Seine River in *France* carried ice the size of “blocks of marble”.<sup>171</sup>

In 358, the winter in Paris, *France* was extraordinarily cold.<sup>79</sup>

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**358 A.D.** In Cheshire *England*, there was an irruption of the sea; several thousand (about 5,000) people drowned, and much damage.<sup>47, 72, 92</sup> [Other sources place this flood in the year 353.<sup>40, 43</sup>]

In 358 A.D., *China* experienced floods during the period between 23 June and 21 July.<sup>153</sup>

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**Winter of 358 / 359 A.D.** The winter of 359 A.D. was very hard. Ice formed on the Seine River in *France*.<sup>171</sup>

The winter in *Scotland* produced a severe frost lasting 14 weeks.<sup>28, 40, 41, 43, 212</sup>

The winter in *Scotland* produced fourteen weeks of frost. The frost was also very severe in *England*.<sup>47, 93</sup>

The frost lasted 14 weeks in *Britain*, chiefly *Scotland* and was severe.<sup>72</sup>

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**Winter of 359 / 360 A.D.** The winter of 360 A.D. in *France* was very harsh in the north.<sup>171</sup>

The winter of 360 in northern *Gaul* was much harsher than usual.<sup>79</sup>

During the period between 8 November 359 and 5 February 360, there was a severe drought in *China*.<sup>153</sup>

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**Winter of 360 / 361 A.D.** During the period between 8 November 360 and 5 February 361, there was a severe drought in *China*.<sup>153</sup>

**361 A.D.** In 361 A.D., *China* experienced floods during the period between 21 May and 18 June.<sup>153</sup>

In the year 361, part of Dunbarton, *Scotland* was burnt by lightning.<sup>72</sup>

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**362 A.D.** In *England*, “a prodigious drought.”<sup>47, 72</sup>

In 362, a prodigious drought and heat killed all the fruits of the earth. Hence people were forced to eat the flesh of uncommon and filthy beast.<sup>72</sup> [Another source indicated there was a great drought that was universal over all the world in the year 360.]

In 362 A.D. during the period between 10 May and 8 June, there was a drought in *China*.<sup>153</sup>

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**365 A.D.** [In 365 in *Egypt*, there was an inundation consequent upon an earthquake [tsunami] destroyed many of the inhabitants.<sup>92</sup>]

In 365, there was a tempest in *Italy*.<sup>72</sup>

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**Winter of 365 / 366 A.D.** The winter was extremely harsh in January 366 in northern *Gaul*.<sup>79</sup>

The winter of 366 A.D. in *France* was very harsh in the north during January.<sup>171</sup>

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**366 A.D.** In 366 A.D. during the period between 26 April and 25 May, there was a drought in *China*.<sup>153</sup>

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**367 A.D.** A shower of hail fell at Constantinople [Istanbul, *Turkey*] on July 2<sup>nd</sup>. The hailstones were so large that it filled a man's hand and each as solid as a stone. The hail killed many people and cattle.<sup>72</sup>

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**368 A.D.** In Sicily *Italy*, there was an irruption of the sea; great destruction.<sup>47, 72, 92</sup>

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**369 A.D.** During the period between 8 November 369 and 5 February 370, there was a drought in Kansu (now Gansu province) in northwest *China* at Wu-wei.<sup>153</sup>

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**370 A.D.** An awful famine struck Phrygia [*Turkey*].<sup>57, 90, 91</sup>

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**371 A.D.** In 371 A.D. during the period between 29 June and 28 July, several regions of *China* experienced floods. These included Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking, Wu-chin and Soochow; and Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Taichow. Crops were damaged and famine followed.<sup>153</sup>

In 371, there was a tempest of hail that struck Byzantium [Constantinople or Istanbul, *Turkey*].<sup>72</sup>

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**372 A.D.** In 372 A.D. during the period between 22 January and 20 February, *China* experienced floods. "Great waves cutting into stone."<sup>153</sup>

In 372 A.D. during the period between 12 November and 11 December, there was a severe drought in *China* resulting in a famine.<sup>153</sup>

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**373 A.D.** In 373 A.D. during the period between 7 June and 6 July, there was a drought in *China*.<sup>153</sup>

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**374 A.D.** In *England*, there was a drought that was followed by a famine.<sup>47, 72</sup>

In Caesarea [*Palestine*], there was a great drought followed by a famine.<sup>72</sup> [During the Byzantine era Palestine was region between the Mediterranean Sea and the Jordan River and various adjoining lands. Caesarea is located mid-way between Tel Aviv and Haifa, Israel]

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**375 A.D.** A most grievous famine afflicted Phrygia [*Turkey*], so as the inhabitants were obligated to shift their habitations elsewhere.<sup>72</sup>

During the period between 8 November 375 and 5 February 376, there was a drought in *China*.<sup>153</sup>

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**377 A.D.** In February 377 in northern *Gaul*, the barbarians cross the Rhine River on the ice.<sup>79</sup>

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**378 A.D.** In 378 A.D., *China* experienced floods during the period between 11 July and 9 August.<sup>153</sup>

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**379 A.D.** In 379 A.D. during the period 1-29 July, there was a severe drought in *China*.<sup>153</sup>

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**380 A.D.** In 380 A.D. during the period between 21 May and 18 June, there was a severe drought in *China*. This was then followed by floods during the period between 19 June and 18 July.<sup>153</sup>

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**381 A.D.** A famine struck Antioch, *Turkey*. During the reign of Theodosius the Great, the country was again visited by a famine; which was accompanied by grievous plagues. There was also a terrible famine amongst the Goths [East Germanic tribes].<sup>57</sup>

There was a terrible famine among the Goths.<sup>72, 91</sup>

In 381 A.D. during the period between 8 July and 6 August, several regions of *China* experienced floods. These included Hupeh (now Hubei province) in central *China* at Hsiang-yang; Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang; and Anhwei (now Anhui province) in eastern *China* at Shou.<sup>153</sup>

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**383 A.D.** In 383 A.D. during the period between 19 April and 17 May, several regions of *China* experienced floods. These included Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ü-chiang; and Kiangsi (now Jiangxi province) in southern *China* at Nan-k'ang and Chi-an.<sup>153</sup>

In 383 A.D. during the period between 16 July and 14 August, there was a drought in *China*.<sup>153</sup>

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**384 A.D.** In 384 A.D. during the period between 13 January and 11 February, *China* experienced floods. "Great waves cutting into stone."<sup>153</sup>

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**385 A.D.** In 385 A.D., *China* experienced floods during the period between 24 June and 23 July. Then during the period between 22 August and 20 September, there was a drought that resulted in a famine.<sup>153</sup>

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**387 A.D.** In Cheshire, *England*, there was an overflowing of the River Dee, and great destruction.<sup>47, 92</sup> drowned much people and cattle.<sup>72</sup>

There was an inundation of the River Dee in *England*.<sup>40, 41, 43</sup>

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**388 A.D.** In 388 A.D. during the period 2-31 July, there was a drought in *China*.<sup>153</sup>

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**390 A.D.** In 390 A.D. during the period between 28 July and 26 August, there was a drought in *China*. Then *China* experienced floods during the period between 27 August and 25 September in Shensi (now Shaanxi province) in central *China* at Mien and in Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.<sup>153</sup>

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**392 A.D.** In 392 A.D., there was a flood in Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou. People were killed by a tidal flow.<sup>153</sup>

In 392 A.D. during the period between 6 July and 4 August in Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang, ships were destroyed by waves.<sup>153</sup>

During the period between 8 August 392 and 5 February 393, there was a drought in *China*.<sup>153</sup>

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**393 A.D.** In 393 in *Egypt*, there was a great inundation of the Nile River, which threatened ruin to Alexandria and Libya.<sup>72</sup>

In 393 in *Egypt*, there was an unusual overflow of the Nile River; great damage.<sup>92</sup> [Another source places this event in the year 398.<sup>47</sup>]

In 393 A.D., *China* experienced floods during the period between 26 June and 24 July in Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ü-chiang and in Kiangsi (now Jiangxi province) in southern *China* at Nan-k'ang and Chi-an.<sup>153</sup>

In 393 A.D. during the period between 25 July and 23 August, there was a drought in *China*.<sup>153</sup>

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**394 A.D.** In 394 A.D., *China* experienced floods during the period between 13 August and 11 September in Hupeh (now Hubei province) in central *China* at Hsiang-yang and in Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow. Crops were damaged.<sup>153</sup>

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**395 A.D.** In 395 A.D., *China* experienced floods during the period between 4 July and 1 August in Hupeh (now Hubei province) in central *China* at Hsiang-yang and in Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow.<sup>153</sup>

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**396 A.D.** In 396 A.D., *China* experienced floods during the period between 22 June and 21 July.<sup>153</sup>

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**397 A.D.** The weather [in *France*] between 8-11 November 397 A.D. was very gentle. It was the origin of “Summer of Saint Martin”. [The period following the first autumn frosts, where the climate offered a short glimpse of pleasant warm summer-like weather before the harshness of winter returns. In Anglo-Saxon countries, it is often called an “Indian Summer”. In Slavic countries, it goes by the name “Summer of Grandmothers”.]<sup>171</sup>

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**399 A.D.** In 399 A.D., *China* experienced floods during the period between 20 May and 18 July in Hupeh (now Hubei province) in central *China* at Hsiang-yang.<sup>153</sup>

During the period between 8 November 399 and 5 February 400, there was a drought in *China*.<sup>153</sup>

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**Winter of 399 / 400 A.D.** The winter in 400 A.D. was very severe, even in Provence in southeastern *France*. The Rhône River froze along its entire length.<sup>171</sup>

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**400 A.D.** In 400 A.D. during the period between 8 July and 5 August, there was a drought in *China*.<sup>153</sup>

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**Winter of 400 A.D. / 401 A.D.** In the winter of 401, the *Pontus Sea* (Black Sea) was frozen over, also the Sea between Constantinople (now Istanbul) and Scutari (Üsküdar) [inlet to the *Sea of Marmara* from the *Black Sea*] in *Turkey*.<sup>1</sup>

In the year 401, the Pontus Sea was entirely frozen over for the space of 20 days, and the sea between Constantinople and Scutari, *Turkey*.<sup>2, 41, 42, 43</sup>

The winter of 401 was very cold in *Asia Minor*. The *Black Sea* froze over and there was sea ice near Constantinople.<sup>28</sup>

In the year 401 in *Europe*, the Euxine Sea (*Black Sea*) was frozen and also parts of the *Bosphorus* (*Bosphorus* is the strait between the *Black Sea* and the *Sea of Marmara*).<sup>47, 93</sup>

In the year 400, the *Black Sea* froze completely. The Rhône River in *France* was frozen firm across its entire width.<sup>60, 62</sup>

In the year 401, the *Black Sea* was frozen over for twenty days, and men crossed from *Asia Minor* to the *Crimea*.<sup>63</sup>

In the year 401, the Euxine Sea (*Black Sea*) was frozen over for 20 days.<sup>90</sup>

In the year 401, there was a great frost in the reign of Phocas it was the severest.<sup>72</sup>



The *Black Sea* was frozen for 20 days, and when the thaw came, such mountains of ice passed by Constantinople [Istanbul, *Turkey*] that they frightened the citizens.<sup>72</sup>

In the year 400, the cold was so severe that on January 28, the Rhône River in *France* was frozen over its entire width and the passengers on foot and horseback went on the ice, without running any risk, between Dauphine (in the Alps) and Vivarais.<sup>61</sup>

In 400 the Rhône River in Provence, *France* froze across its width.<sup>79</sup>

In the year 400, the winter in *Provence* and along the coast of the *Black Sea* was very severe.<sup>62</sup>

The winter of 401 A.D. was very severe in Provence, *France*.<sup>171</sup>

In the year 401, the River Thames in *England* was frozen over for two months.<sup>29</sup>

**401 A.D.** In 401 A.D. during the period between 6 May and 8 August, there was a severe drought in *China*.<sup>153</sup>

In 401 A.D., *China* experienced floods during the period between 29 May and 26 June.<sup>153</sup>

**402 A.D.** In 402 A.D. during the period between 13 October and 10 December, there was a drought in *China*.<sup>153</sup>

**403 A.D.** During the period between 8 November 403 and 5 February 404, there was a drought in *China*.<sup>153</sup>

**404 A.D.** In 404 A.D. during the period between 27 February and 26 March, *China* experienced floods. “Great waves cutting into stone.”<sup>153</sup>

In 404 A.D. during the period between 20 September and 19 October, there was a drought in *China*.<sup>153</sup>

**406 A.D.** In 406 A.D. during the period between 6 January and 3 February, *China* experienced floods. “Great waves cutting into stone.” Flooding also occurred between 30 August and 28 September and at the end of the year between 26 December 406 and 24 January 407.<sup>153</sup>

**407 A.D.** In 407 A.D., *China* experienced floods during the period between 21 June and 20 July.<sup>153</sup>

**408 A.D.** During the period between 8 November 408 and 8 February 409, there was a drought in *China*.<sup>153</sup>

**409 A.D.** In 409 A.D. during the period between 2 and 31 January, *China* experienced floods. “Great waves cutting into stone.”<sup>153</sup>

**410 A.D.** In Rome, *Italy*, there was a famine followed by a plague.<sup>57, 72, 91</sup>

Under the Emperor Honorius (who reigned from 395 to 414), so great was the scarcity and dearth of victuals in Rome, *Italy*, that in the open marketplace, this voice was heard – set a price on man’s flesh. St. Jerome alluding to this plague, says: the rage of the starved with hunger broke forth into abominable excess, so as people mutually devoured the members of each other. Nay, even the tender mother spared not the flesh of her sucking child, but received him again into her bowels whom she had brought forth a little before.<sup>72</sup>

In Rome, *Italy*, when Lucius Minutius was first made overseer of the grain, many commoners left so that they should not be tortured with a long famine, covered their faces and cast themselves headlong into the Tiber River.<sup>72</sup>

In 410 A.D., *China* experienced floods during the period between 18 June and 17 July. Then during the period between 14 October and 12 November, *China* experienced a drought.<sup>153</sup>

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**Winter of 410 / 411 A.D.** The winter of 411 was very cold [in *France*] from 30 November to 10 February.<sup>171</sup>

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**412 A.D.** In 412 A.D., *China* experienced floods. Then during the period between 20 November and 18 December, *China* experienced a drought.<sup>153</sup>

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**413 A.D.** In 413 A.D., *China* experienced floods.<sup>153</sup>

During the period between 8 August 413 and 5 February 414, *China* experienced a drought.<sup>153</sup>

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**414 A.D.** In 414 A.D., *China* experienced floods during the period between 4 June and 3 July. Then between 30 September and 29 October, *China* experienced a drought. Then between 28 December 414 and 25 January 415, *China* was again in a drought.<sup>153</sup>

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**415 A.D.** In *England*, an inundation of the River Dee drowned 40 families.<sup>40, 41, 43</sup>

In 415 A.D., *China* experienced floods during the period between 21 August and 19 September in Hopei (now Hebei province) in northern *China* at Chiao-ho [location possibly a misprint].<sup>153</sup>

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**416 A.D.** In *England*, a great part of Colchester destroyed, and several people killed by a storm.<sup>40, 41, 43, 56</sup> [Colchester is located in Essex, in the east coast of England.]

In *England*, part of Colchester was burnt by lightning and people were burnt by it.<sup>72</sup>

In 416 A.D., *China* experienced floods during the period between 13 April and 12 May in Hopei (now Hebei province) in northern *China* at Cho.<sup>153</sup>

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**418 A.D.** In 418 A.D., *China* experienced floods during the period between 16 September and 15 October in Honan (now Henan province) in central *China* at Wu-chin.<sup>153</sup>

In 418 or 421 [in *England*], there was earthquakes, rain, snow, floods, meteors, hailstorms, cold, famine and plague.<sup>72</sup>

In 418 or 421 [in *England*], there was a very great snowstorm.<sup>72</sup>

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**419 A.D.** In Hampshire in southeast *England*, there was an inundation of the sea and great destruction, near Southampton.<sup>40, 41, 47, 92</sup> drowned many people.<sup>72</sup>

In 419, there was an irruption of the sea in Hampshire, *England*.<sup>43</sup>

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**421 A.D. – 422 A.D. Turkey. Famine**

During 421-422 in the provinces of Pontus and Paphlagonia [currently located in northeastern and north central *Turkey* respectively] on the coast of the Black Sea, because of the severity of the famine, many

parents had their children castrated and sold as eunuch slaves.<sup>86</sup>

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**425 A.D.** In 425 A.D. during the period between 6 May and 8 August, *China* experienced a drought.<sup>153</sup>

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**426 A.D.** In 426 A.D. during the period between 8 August and 8 November, *China* experienced a drought.<sup>153</sup>

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**427 A.D.** In 427 A.D. during the period between 8 August and 8 November, there was a drought in Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

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**428 A.D.** In 428 A.D., *China* experienced floods during the period between 28 June and 27 July in Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

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**430 A.D.** In 430 A.D., *China* experienced floods in Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and in Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin and I-hsing.<sup>153</sup>

In 430 A.D., there was a plague in *Britain*, in which so many people died that the living were scarcely sufficient to bury the dead.<sup>212</sup>

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**431 A.D.** In 431 A.D. during the period between 26 July and 23 August, there was a drought in Anhwei (now Anhui province) in eastern *China* at Tang-t'u.<sup>153</sup>

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**432 A.D.** In 432 A.D., *China* experienced floods during the period between 14 July and 11 August in Honan (now Henan province) in central *China* at Loyang. Several houses were damaged.<sup>153</sup>

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**434 A.D.** In *Italy*, there was a famine.<sup>57, 72, 91</sup>

In 434 A.D., *China* experienced floods during the period between 23 June and 21 July in Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

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**435 A.D.** In 435 A.D., *China* experienced floods during the period between 12 July and 9 August at several locations. Floods occurred in Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking, and I-hsing; in Anhwei (now Anhui province) in eastern *China* at Shou; and in Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou.<sup>153</sup>

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**439 A.D.** In *England*, there was a drought.<sup>47</sup>

In *England*, there was a famine after the comet.<sup>57, 72, 91</sup>

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**440 A.D.** In 440 A.D., *China* experienced floods during the period between 12 September and 11 October in Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow and in Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing, I-tu, and Tsinan.<sup>153</sup>

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**441 A.D.** In *Wales*, the sea made great inroads, both north and south coasts, many people and much cattle drowned.<sup>47, 72, 92</sup>

In north and south *Wales*, an irruption of the sea.<sup>40, 41, 43</sup>

In 441 A.D., *China* experienced floods during the period between 5 June and 4 July in Hupeh (now Hubei province) in central *China* on the Mien River.<sup>153</sup>

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**442 A.D.** In 442 A.D., floods occurred in Honan (now Henan province) in central *China* at Loyang. Floods also struck during the period between 24 June and 23 July in Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

In 442 A.D., there was a drought in Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and in Anhwei (now Anhui province) in eastern *China* at Shou.<sup>153</sup>

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**443 A.D.** There was an extraordinary severe winter [in England]. There was so much snow that covered the ground for such a long time (scarcely dissolved in six months after) that it cause great destruction of people and cattle.<sup>72</sup>

[In *England*] during the winter of 443, there was the deepest snowstorm.<sup>72</sup>

In 443 A.D., floods struck *China* and resulted in a famine.<sup>153</sup>

In 443 A.D., there was a drought in Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and in Anhwei (now Anhui province) in eastern *China* at Shou. The crops were damaged and there was a great famine.<sup>153</sup>

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**444 A.D.** In 444 A.D., floods struck *China*.<sup>153</sup>

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**446 A.D.** In Constantinople [Istanbul], *Turkey*, there was a severe famine.<sup>57</sup>

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**447 A.D.** In 447 A.D., floods occurred in Anhwei (now Anhui province) in eastern *China* at Fêng-yang and in Shantung (now Shandong province) on the east coast of *China* at Tzū-yang, I-tu, and Tsinan. During the period between 29 July and 26 August, floods struck Hopei (now Hebei province) in northern *China* at Lu-lung.<sup>153</sup>

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**449 A.D.** In 449, there was a great famine in *Italy*.<sup>128</sup>

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**450 A.D.** In *Gaul* in the year 450, the weather seasons were extraordinary.<sup>79</sup>

In Rome, there was a famine followed by a plague.<sup>72</sup>

In *Italy*, there was a severe famine – so severe that parents ate their children.<sup>57, 90, 91</sup>

During the severe famine of 450 in *Italy*, the Roman emperor decreed that parents who sold their children into slavery had the right to purchase them back with a 20% surcharge.<sup>86</sup>

A grievous famine afflicted *Italy*, so that many people sold their children to buy food. This was followed by a plague.<sup>72</sup>

During the reign of Turgina about 450 A.D. there was a great famine in Kashmir region of *India*. This famine was attributed to frost.<sup>179</sup>

During the period between 24 August 450 and 16 May 451, there was a severe drought in *China*.<sup>153</sup>

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**451 A.D.** The years 451 and 452 A.D. in *Britain* were terrible drought years. They were followed by floods.<sup>171</sup>

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**452 A.D.** In 452 A.D., *China* experienced floods during the period between 3 June and 2 July in Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

The years 451 and 452 A.D. in *Britain* were terrible drought years. They were followed by floods.<sup>171</sup>

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**454 A.D.** In what is now present-day *Turkey*, in the former regions called Phrygia, Galatia, Cappadocia, and others, there was a great drought, followed by famine and then the plague struck.<sup>47, 72</sup> . . . from January to September a famine and a plague of locust from 2 to 5 years.<sup>72</sup>

Under Martianus, the Emperor of the East, happened a great drought in both Phrygia [*Turkey*], in both Galatias, in Cappadocia and in Cilicia, followed by a famine. This compelled men to eat uncommon and hurtful food. From this drought and bad food, ensued a plague. It caused inflammation for the first two days, so as the bodies of the sick swelled, they lost their eyes, had a cough at the same time which killed them the third day. For no cure could be found; delirium and watchings attended it. This calamity laid wastes *Palestine* and many other provinces; for famine and pestilence overspread the earth.<sup>72</sup>

In *England*, there was a drought from July to September followed by a famine.<sup>47</sup>

[In *England*] in the year 454, there was a plague preceded by drought and famine.<sup>72</sup>

In 454 A.D., *China* experienced floods during the period between 8 September and 7 October in Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing.<sup>153</sup>

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**457 A.D.** In 457 A.D., *China* experienced floods during the period between 8 June and 7 July in Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and in Kiangsu (now Jiangsu province) on the east coast of *China* at I-hsing.<sup>153</sup>

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**458 A.D.** In 458 A.D., *China* experienced floods during the period between 24 September and 22 October in Hupeh (now Hubei province) in central *China* at Hsiang-yang.<sup>153</sup>

In York in northeast *England*, a storm blew down several houses, and killed many people.<sup>40, 41, 43, 56</sup>

In York, *England*, a hurricane ruined many houses and killed people.<sup>72</sup>

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**459 A.D.** In *Britain*, hail in many parts of the country; stones 3 inches in diameter. "Killed many men and much cattle."<sup>40, 41, 43, 56, 57, 72, 93</sup>

A great hailstorm struck *Britain* in 459 A.D. with hailstones 3 inches (8 centimeters) in diameter. Killed many people and cattle.<sup>28</sup>

[Another source identifies this year as 450.] A great hailstorm was recorded in *England* with hailstones measuring three inches (8 centimeters) in diameter. The hailstones killed many men, beasts, fowls and birds.<sup>1</sup>

During the period between 8 November 459 and 5 February 460, there was a drought in several regions of *China*. Regions affected included:<sup>153</sup>

- Suiyuan province (now part of *Inner Mongolia*).
- Chahar province (now eastern *Inner Mongolia*).
- Shansi (now Shanxi province) in northern *China* at Kuo.
- Kansu (now Gansu province) in northwest *China* at Ku-yüan.
- Shensi (now Shaanxi province) in central *China* at Sian, Hua, and T'ien-shui.

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**460 A.D.** The Ardèche and the Durance rivers in *France* were entirely frozen. The winter was very severe.<sup>61</sup> [The Ardèche River is located in southcentral France and the Durance River is located in southeastern France.]

In 460 A.D. during the period between 6 May and 4 June, there was a drought in *China*. In the same year, floods struck several regions of *China* including Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang and in Shantung (now Shandong province) on the east coast of *China* at Tzū-yang (where the land tax was deferred). Floods also struck during the period between 2 and 30 September in Hupeh (now Hubei province) in central *China* at Hsiang-yang.<sup>153</sup>

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**Winter of 461 / 462 A.D.** Danube River was frozen.<sup>1</sup>

Theodimir (King Theodimir of the Ostragoths Amal) with his army crossed the ice on the frozen Danube River to avenge his brother's death. The Var River in southeast *France* was frozen.<sup>60, 62</sup>

The winter in Swabia (currently a region of Bavaria, *Germany*) and Provence (a region of southeastern *France*) was very severe.<sup>62</sup>

In 462, the Var River in southeast *France* also froze completely.<sup>79</sup>

The winter of 462 A.D. was very severe in Province, *France*. The Var River was frozen.<sup>171</sup>

The *Black Sea* froze completely. The Rhône River in *France* was frozen across its width.<sup>61</sup>

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**463 A.D.** In 463 A.D., in the Eastern Commanderies of *China* there was a severe drought during the period of 30 August and 28 September. The drought was very severe and caused a great famine. 60% to 70% of the people died of starvation.<sup>153</sup>

In 463 A.D., floods struck 13 districts in *China*.<sup>153</sup>

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**464 A.D.** In 464 A.D., in the Eastern Commanderies of *China* there was a severe drought during the period of 22 May and 19 June. The drought was very severe and caused a great famine. 60% to 70% of the people died of starvation.<sup>153</sup>

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**466 A.D.** In *Britain*, there was a famine “and bad fatal air”.<sup>57, 72, 91</sup>

A grievous famine prevailed in *Britain*; and a pestiferous smell in the air [plague] killed both man and beast.<sup>72</sup>

In 466 A.D., there was a drought in 11 districts of *China* that led to a famine.<sup>153</sup>

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**Winter of 467 / 468 A.D.** During the period between 12 December 467 and 10 January 468, floods struck 27 districts in *China*.<sup>153</sup>

The winter of 468 A.D. was very severe [in *France*]. There was an unusual “reversal of the seasons”.<sup>171</sup>

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**468 A.D.** The extreme rigor of the year 468 in *Gaul* was due solely to the complete reversal of the four seasons and their weather.<sup>79</sup>

In 468 A.D. during the period between 6 July and 4 August, floods struck Hopei (now Hebei province) in northern *China* at Mi-yün. Then during the period between 3 and 31 October, floods struck 11 districts of *China*. Then during the period 1-29 December, drought struck in 27 districts of *China*.<sup>153</sup>

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**469 A.D.** In Constantinople (Istanbul, *Turkey*), there was much flooding, consequence of four days of incessant rain.<sup>47, 72, 92</sup>

Terrible rains fell in Constantinople and Bythina, which ceased not for four days. Floods turned mountains to a plain. Towns were drowned.<sup>72</sup> [Bythina is the Sea of Marmara region south of Istanbul, Turkey.]

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**470 A.D.** In the year 470 in *Scotland*, there were 10 months of rain together. This caused the death of beast [livestock] and a dearth.<sup>72</sup>

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**472 A.D.** In 472 A.D., there was a great fall of black dust in the neighborhood of Constantinople [now Istanbul, *Turkey*].<sup>205</sup>

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**473 A.D.** In 473 A.D., during the period between 11 July and 8 August, floods struck Anhwei (now Anhui province) in eastern *China* at Shou. Then during the period between 8 September and 6 October, a drought struck Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking. Eleven districts of *China* were affected. As a result, the land tax was remitted and 2,845 persons died.<sup>153</sup>

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**Winter of 473 / 474 A.D.** In the year 473 in north and south *Wales*, there was a great snowstorm. Snow lay 4 months and caused the destruction of much cattle.<sup>72</sup>

The winter of 474 in *Britain* was very cold. There was 4 months of frost and great snow.<sup>28</sup>

In the year 474, frost with great snow for four months in *England*.<sup>47, 72, 93</sup>

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**475 A.D.** Famine oppressed the Gallicans, Rhaetians, Noricans, and other Northern Nations [most of *Europe*].<sup>72</sup> [The Gallicans refers to the people from Gaul. Rhaetians refers to the people from an ancient Roman province that included present-day eastern Switzerland and western Austria. Noricans or Noricum refers to the people from mostly modern day Austria.]

There was a famine in the Northern Nations [of *Europe*].<sup>72</sup>

In 475, there was a famine in the Northern Nations [of *Europe*], partly caused by locusts.<sup>91</sup> [Under certain weather related conditions, solitary grasshoppers can undergo a physical transformation into a locust, develop swarming behavior. Swarms of locust can travel great distances, rapidly stripping fields and greatly damaging crops.]

In 475 A.D., *China* experienced floods during the period between 22 April and 20 May in Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

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**476 A.D.** In Rome, *Italy*, there was a plague from rains, thunder and lightning.<sup>72</sup>

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**477 A.D.** In 477 A.D. during the period between 26 July and 24 August, floods struck Anhwei (now Anhui province) in eastern *China* at Shou [possibly a misprint for Yung-chou].<sup>153</sup>

In 477, there was a famine in *Britain* from locust.<sup>72</sup>

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**478 A.D.** In 478 A.D., during the period between 20 January and 17 February, a drought struck 8 districts of *China* resulting in famine and locusts. Also in 478 A.D., floods struck over 20 districts of *China* causing a famine. During the period between 20 March and 17 April, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Yü-ch'ien. During the period between 18 April and 17 May, a drought struck Honan (now Henan province) in central *China* at Loyang producing a famine. During the period between 18 May and 15 June, floods struck Anhwei (now Anhui province) in eastern *China* at Ho [possibly Nan-yü]; Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow; and Shantung (now Shandong province) on the east coast of *China* at Tzū-yang. Flooding also struck *China* between 14 August and 12 September.<sup>153</sup>

In the year 478, great damage was done to the city of Winchester in *England* from lightning.<sup>72</sup>

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**479 A.D.** In London *England*, the River Thames for many miles above and below much flooded; great damage.<sup>47, 92</sup>

Thames 10 miles above and 10 miles below London, *England*, drowned much people and cattle.<sup>72</sup>

In 479 A.D. during the period between 6 June and 4 July, a drought struck *China*. Then during the period between 2 and 30 October, floods struck several regions of *China* including in Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and I-hsing, and in Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou. As a result of these floods, the land tax was remitted.<sup>153</sup>

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**480 A.D.** The Tiber River in Rome, *Italy* froze over.<sup>33</sup>

In *Scotland*, there was a drought.<sup>47</sup>

In *Scotland*, there was a famine after the appearance of a comet.<sup>57, 72, 91</sup>

In 480 A.D. during the period between 26 February and 26 March, a drought struck *China*.<sup>153</sup>

In 480 A.D., several regions of *China* experienced flooding. Eighteen districts of *China* were affected and the flooding resulted in famine.<sup>153</sup>

During the period of 6 May – 8 August, the following area was affected:

— Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking and Soochow experienced flooding.

During the period of 31 July – 29 August, the following areas were affected:

— Shantung (now Shandong province) on the east coast of *China* at I-tu experienced flooding.

— Hupeh (now Hubei province) in central *China* at Hsiang-yang experienced flooding.

During the period of 30 August – 27 September, the following areas were affected:

— Shantung (now Shandong province) on the east coast of *China* at Tzū-yang, Chi-ning, Yeh, An-ch'iu, and Chang-ch'iu experienced flooding.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow and Su-ch'ien experienced flooding.

— Hopei (now Hebei province) in northern *China* at Lu-lung and Lung-p'ing experienced flooding.

— Honan (now Henan province) in central *China* at Ju-nan and Chün experienced flooding.

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**481 A.D.** In 481 A.D. during the period between 5 February and 6 May, a drought struck *China*.<sup>153</sup>

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**482 A.D.** In 482 A.D. during the period between 4 May and 1 June, a drought struck *China*. Then during the period between 2 and 30 July, floods struck several regions of *China* including in Kiangsu (now Jiangsu province) on the east coast of *China* at I-hsing, and in Chekiang (now Zhejiang province) on the

east coast of *China* at Hu-chou. As a result of these floods, the land tax and the corvée was reduced. [Corvée, under the feudal system, is compulsory, unpaid labor demanded by a lord or king.]<sup>153</sup>

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**484 A.D.** In *Africa*, there was a terrible drought.<sup>47, 72</sup>

In *Africa*, there was a famine caused by drought.<sup>57, 72, 91</sup>

There was such a drought as dried up all springs and rivers. Rational and brute animals strove for the withered grass roots in the open fields. So great was the famine; that men died on heaps. All roads were lined with their dead carcasses, without anybody to bury them. This laid waste to *Africa* and the *Vendals*. There was neither dew nor rain. The earth was parched. There was no corn [grain], vines, olives, or other fruits, nor leaves on any trees. Hence there came a grievous plague.<sup>72</sup> [During this period of time, *Africa* generally referred to North Africa (north Tunisia and eastern Algeria). *Vendals* were Germanic people who crossed into North Africa from Spain in the year 429.]

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**485 A.D.** In 485 A.D., during the period 2-31 January, drought struck 15 districts of *China*. In 13 of these districts the crops were damaged. The drought struck Honan (now Henan province) in central *China* at Loyang. A severe drought struck Shantung (now Shandong province) on the east coast of *China* at Lin-i [located at 118.24° East longitude and 35.07° North latitude.] Then during the period between 28 June and 27 July, floods struck Shansi (now Shanxi province) in northern *China* at Fan-chih. Houses were damaged.<sup>153</sup>

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**486 A.D.** In 486 A.D., floods struck 13 districts of *China*. Floods struck Honan (now Henan province) in central *China* at Loyang. During the period between 24 October and 11 November, Anhwei (now Anhui province) in eastern *China* at Ho [uncertainty in location name Nan-yü] experienced flooding and 1,000 persons were drowned.<sup>153</sup>

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**487 A.D.** In *England*, the Severn valley overflowed; great damage.<sup>40, 41, 47, 92</sup>

In 487, there was an inundation of the Severn.<sup>43</sup>

In the year 487 in *England*, the River Severn carried down much people and cattle in a flood.<sup>72</sup>

In 487 A.D. during the period between 5 February and 4 August, there was a drought in Kansu (now Gansu province) in northwest *China* at T'ien-shui, which caused a famine. Then during the period between 6 May and 8 August, floods struck on the east coast of *China* in Chekiang (now Zhejiang province) at Hu-chou and in Kiangsu (now Jiangsu province) at I-hsing. As a result of these floods, crops were damaged, the land tax and the corvée was reduced. [Corvée, under the feudal system, is compulsory, unpaid labor demanded by a lord or king.]<sup>153</sup>

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**488 A.D.** In 488 A.D. during the period between 23 August and 21 September, floods struck on the east coast of *China* in Chekiang (now Zhejiang province) at Hu-chou and in Kiangsu (now Jiangsu province) at I-hsing.<sup>153</sup>

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**490 A.D.** The heavy rains and flooding of the year 490 in *Gaul* caused the plague.<sup>79</sup>

In 490 A.D. during the period between 8 August and 8 November, there was a drought in *China*.<sup>153</sup>

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**491 A.D.** In 491 A.D. during the period between 26 January and 23 May, there was a drought in *China*. Then during the period between 19 September and 18 October, floods struck on the east coast of *China* in Chekiang (now Zhejiang province) at Hu-chou and in Kiangsu (now Jiangsu province) at I-hsing.<sup>153</sup>

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**492 A.D.** Stamford, *England* was burnt down from lightning.<sup>72</sup>

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**493 A.D.** In 493 A.D. during the period between 31 May and 29 June, there was a drought in Kiangsu (now Jiangsu province) at Nanking. As a result, the making of wine was prohibited.<sup>153</sup>

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**495 A.D.** In 495 A.D., there was a severe drought in *China*. Then during the period between 8 November 495 and 5 February 496, floods struck on the east coast of *China* in Kiangsu (now Jiangsu province) at Soochow and Wu-chin. As a result of these floods, crops were damaged.<sup>153</sup>

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**496 A.D.** In 496 A.D. during the period between 26 July and 24 August, there was a drought in *China*.<sup>153</sup>

In 496 A.D. during the 7<sup>th</sup> moon, began violent storms in the vicinity of Shanghai, *China*. This and the two years following, violent wind, destroyed houses, broke trees and killed people.<sup>166</sup>

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**499 A.D.** In 499 A.D., floods struck in 18 districts of *China* resulting in a famine. Flooding occurred in Shantung (now Shandong province) on the east coast of *China* at I-tu, Tsinan, Yeh, I-shui, and Tzū-yang. Flooding occurred in Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow. Flooding occurred in Honan (now Henan province) in central *China* at Ju-nan and Hsi. During the period between 24 July and 21 August, floods also struck in Kiangsu at Nanking where many people drowned.<sup>153</sup>

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**500 A.D.** In 500 A.D. during the period between 11 August and 8 September, floods struck several regions of *China* damaging houses. Floods struck Shantung (now Shandong province) on the east coast of *China* at I-tu, Tsinan, Yeh, I-shui, and Tzū-yang. Flooding occurred in Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow. Flooding occurred in Honan (now Henan province) in central *China* at Ju-nan, Hsi, Huang-ch'uan, and Chi.<sup>153</sup>

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**502 A.D.** In 502 A.D., a severe drought struck *China*. Many people died of starvation. A drought occurred in the period between 23 February and 23 March.<sup>153</sup>

In 502 A.D. in the vicinity of Shanghai, *China*, there was a great drought; the five grains all failed. Rice sold for 5,000 cash a *tau*. Many starved to death. [The source also lists this event as occurring in 504 A.D.]<sup>166</sup>

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**503 A.D.** In 503 A.D. during the period between 12 May and 9 June, a severe drought struck *China*. Then during the period between 10 July and 7 August, floods struck in Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua and Ch'ü and in Anhwei (now Anhui province) in eastern *China* at Shou.<sup>153</sup>

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**504 A.D.** In 504 A.D. during the period between 28 June and 27 July, a drought struck *China*.<sup>153</sup>

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**505 A.D.** In 505 A.D., floods struck in Shantung (now Shandong province) on the east coast of *China* at Po-hsing. One hundred fifty two people drowned.<sup>153</sup>

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**507 A.D.** In 507 A.D., a drought struck *China*.<sup>153</sup>

In 507 A.D. during the period between 28 April and 26 May, floods struck in Honan (now Henan province) in central *China* at Pi-yüan. Then during the period between 24 August and 21 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

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**Winter of 507 / 508 A.D.** Danube River was frozen over and more or less all the rivers of *Europe* were frozen.<sup>1</sup>

So severe a frost all over *Britain* that the rivers were frozen up for about two months.<sup>2, 40, 41, 42, 43, 47, 93</sup>

In the year 507, the frost [in *Britain*] was the severest for 2 months.<sup>72</sup>

In 508 A.D., there was a frost in *Britain*. All the rivers in *Britain* were frozen for over 2 months.<sup>212</sup>

It was very cold in *Britain* and the rivers were frozen for 2 months.<sup>28</sup>

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**508 A.D.** In 508 A.D. during the period between 14 June and 13 July, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking. During the same time period, there were also droughts in *China*.<sup>153</sup>

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**509 A.D.** In 509 A.D. during the period between 3 June and 2 July, a drought struck *China*.<sup>153</sup>

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**510 A.D.** In 510 A.D. during the period between 24 May and 21 June, droughts struck in Shantung (now Shandong province) on the east coast of *China* at Tsinan and in Hopei (now Hebei province) in northern *China* at Ting. Then during the period between 20 August and 18 September, floods struck 20 districts of *China*.<sup>153</sup>

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**512 A.D.** In 512 A.D., during the period between 3 February and 3 March, a drought struck *China* and produced a famine. During the period between 22 March and 20 April, drought struck in Anhwei (now Anhui province) in eastern *China* at Tang-t'u and in Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow. Then floods struck in Honan (now Henan province) in central *China* at Loyang. During the period of 4 March and 1 April, floods struck 11 districts of *China*.<sup>153</sup>

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**513 A.D.** In 513 A.D. during the period between 6 May and 8 August, floods struck 13 districts of *China*. During the period between 20 May and 18 June, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking. During the period between 19 June and 18 July, floods struck in Anhwei (now Anhui province) in eastern *China* at Shou.<sup>153</sup>

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**514 A.D.** In 514, during the reign of Cissa, King [of Sussex] of the *West Saxons*, reigned so severe a famine, that both men and women in great flocks and companies cast themselves from the rocks into the sea.<sup>72</sup> [In the Anglo-Saxon Chronicle, Cissa is identified as one of the three sons of Ælle, who arrived in Britain in the year 477, at Cymenshore (traditionally thought to have been in the Selsey area of Sussex).]

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**515 A.D.** *England* was most afflicted by a famine.<sup>57, 72, 91</sup>

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**516 A.D.** In 516 A.D. during the period between 16 June and 14 July, a drought struck *China*.<sup>153</sup>

In 516 A.D., there was a flood in Kiangsu (now Jiangsu province) on the east coast of *China* during the period 15 July - 13 August.<sup>153</sup>

In 516 A.D., there was a flood in *China* during the period 12 October - 9 November. As a result 10,000 persons drowned.<sup>153</sup>

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**517 A.D.** Beginning in 517, there were five years of drought and pestilence in *Palestine*.<sup>128</sup>

In 517 A.D. during the period 1-30 October, floods struck Hopei (now Hebei province) in northern *China* at Chi', Ho-chien, and Nan-p'i.<sup>153</sup>

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**518 A.D.** In 518 A.D. during the period between 27 January and 22 July, a drought struck *China*.<sup>153</sup>

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**519 A.D.** In 519 A.D. during the period between 17 March and 14 April, a drought struck *China*.<sup>153</sup>

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**520 A.D.** In Venice, *Italy*, there was a famine. The city received relief from Theodoric the Great.<sup>57, 91</sup>

In 520 A.D. during the period 2-30 June, a drought struck *China*. Then during the period between 31 July and 28 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* and in Anhwei (now Anhui province) in eastern *China*.<sup>153</sup>

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**521 A.D.** In 521 A.D. during the period between 6 May and 8 August, floods struck Hopei (now Hebei province) in northern *China* at Ting, Chi [located at 115.34° East longitude and 37.34° North latitude], and Ho-chien and in Honan (now Henan province) in central *China* at Lin-chang. Then during the period between 19 August and 16 September, a drought struck *China*.<sup>153</sup>

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**522 A.D.** In 522 A.D. during the period between 9 July and 7 August, a drought struck *China*.<sup>153</sup>

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**523 A.D.** In *Scotland*, a terrible famine struck.<sup>57, 72, 91</sup>

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**525 A.D.** In *England*, the River Thames hard frozen for six weeks.<sup>47, 72, 93</sup>

In *England*, the River Trent overflowed. Great number of cattle drowned.<sup>47, 92</sup>

In *England*, the River Trent flooded and drowned 6,000 cattle.<sup>72</sup>

In Edessa, Mesopotamia, (now Şanlıurfa, *Turkey*), sometimes called “Antioch of the Fair Streams”, a destructive flood did considerable damage to the city.<sup>47, 92</sup>

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**526 A.D.** In 526 A.D., there was a dry fog in *England*. This was accompanied by an earthquake and volcanic eruptions.<sup>212</sup>

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**527 A.D.** A famine struck in *North Wales*.<sup>57, 72, 91</sup>

In 527 A.D. during the period between 8 August and 8 November, floods struck Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

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**529 A.D.** In *England*, the River Humber overflowed.<sup>40, 41, 43</sup> Many people and cattle drowned.<sup>47, 72, 92</sup>

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**530 A.D.** The town of Colchester, Essex, *England* was burnt by lightning.<sup>72</sup>

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**531 A.D.** A famine struck in *South Wales* and a small plague.<sup>57, 72, 91</sup>

In 531 A.D. during the period between 30 June and 27 August, a drought struck *China*.<sup>153</sup>

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**532 A.D.** In 532 A.D. during the period between 18 July and 16 August, floods struck Honan (now Henan province) in central *China* at Loyang. Three hundred houses were damaged.<sup>153</sup>

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**533 A.D.** In 533 A.D. during the period between 8 June and 7 July, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

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**534 A.D.** A sore famine struck in *Italy*.<sup>72</sup>

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**535 A.D.** A famine struck *Ireland*. It was caused by the destruction of food and scarcity. The famine last four years.<sup>57, 91</sup>

An extreme weather event took place in 535-536. The effects were widespread. It caused unseasonable weather, crop failures and famines worldwide. The Byzantine historian Procopius recorded of 536, in his report on the wars with the Vandals, "during this year a most dread portent took place. For the sun gave forth its light without brightness...and it seemed exceedingly like the sun in eclipse, for the beams it shed were not clear." There were low temperatures during the summer. Snow reportedly fell in August in *China* delaying the harvest. There was a dense dry fog in the *Middle East, China* and *Europe*. Droughts occurred in *Peru*, which affected the Moche culture.<sup>73</sup>

During the reign of Emperor Justinian [Justinian the Great who ruled the Roman (Byzantine) Empire from 527 to 565], the sun for the greatest part of the year, gave so little light, that it was but equal to the light of the moon, the sky being clear, without clouds or any interposing bodies, after which followed a great famine.<sup>72</sup> [The source indicated this event took place in the year 564. I have placed it in this year because it appears to align with the account by Procopius.]

In 535 A.D. during the period between 16 June and 15 July, a severe drought struck *China*.<sup>153</sup>

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**536 A.D.** In Northumberland *England*, the River Tweed overflowed. People and cattle drowned.<sup>47, 72, 92</sup>

In the years 536 and 537 A.D., there was a persistent dry mist on the *Mediterranean Sea*. This caused rotten cold summers and snowy cold winters.<sup>171</sup>

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**537 A.D.** A dearth struck *Scotland* and *Wales*.<sup>57, 72, 91</sup>

In the years 536 and 537 A.D., there was a persistent dry mist on the *Mediterranean Sea*. This caused rotten cold summers and snowy cold winters.<sup>171</sup>

In 537 A.D. during the period between 26 April and 24 May, a severe drought struck many regions of *China*. This drought was accompanied by a frost and caused a famine. Regions affected were:<sup>153</sup>

- Shansi (now Shanxi province) in northern *China* at Taiyuan, Hsin, Hsi, Chin-ch'êng, Lin-fên, and Chi.
- Shensi (now Shaanxi province) in central *China* at Sian.
- Kansu (now Gansu province) in northwest *China* at T'ien-shui.
- Honan (now Henan province) in central *China* at Shan.

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**538 A.D.** The land of *Italy* lay uncultivated last year, hence a great famine. Such as dwelt in the region of Emilia in northern *Italy* left their seats and goods, and went into the region of Picenum in east-central *Italy* and even there no less than 50,000 died of famine. Then the starved throwing off all humanity killed and ate one another. Delicate mothers eat their tender babes. Two women killed 17 men and ate them. A woman in Milan in northern *Italy* ate her dead son. People kneeling down on their knees and hands to eat grass and herbs, fell down with weakness and died. Nor was there any to bury them. Others eat dogs, mice, cats and the vilest animals. The Tuscans [from Tuscany in north-central Italy] were also starved, but bread made of earthnuts was a help to them. Far greater still were the numbers of starved beyond the Ionian borders. When they had nothing to eat, they became extenuated and pale, their flesh withered away and became black. The disease spread as among great herds of cattle. Their bile was redundant,



there was no juice left in their bodies. Their skin was hardened, and became dried like leather, and clave to the bones. Their livid color became black. Men looked like charcoal wood, their countenance was senseless and stern. They died everywhere, partly from hunger and partly from too great satiety. Having been burnt up within, after the natural heat was extinguished. For having been starved, if they had any opportunity to feed freely, being not able to digest their food, they died so much sooner. The famine was so great in the region of Liguria in the coastal region of northwestern *Italy* that many mothers ate their own dearest children. The west coast region of Campania in southern *Italy* also suffered. Nor did Picenum's being a seacoast save it. In the following year, 539, the grain sprang up by themselves, without the labor of farmers and oxen. They shook in the wind because there was no one left to reap them.<sup>72</sup>

In 538 in *Italy* there was a great famine.<sup>57, 72, 91</sup>

In 538 A.D., floods struck Hopei (now Hebei province) in northern *China* at Ting, Chi [located at 115.34° East longitude and 37.34° North latitude], Ho-chien, and Nan-p'i. During the period between 6 May and 8 August, floods struck Shantung (now Shandong province) on the east coast of *China*.<sup>153</sup>

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**540 A.D.** In *France* and *Italy*, there were great floods from rain.<sup>47, 72, 92</sup>

There were great inundations in *France*, from excessive rains. The Tiber River in central *Italy* overflowed and caused a terrible slaughter.<sup>57</sup>

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**542 A.D.** In 542 A.D., floods struck Hopei (now Hebei province) in northern *China* at Nan-p'i. Then during the period between 8 November 542 and 6 May 543, a drought struck *China*.<sup>153</sup>

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**543 A.D.** During the period between 8 November 543 and 7 May 544, a drought struck *China*.<sup>153</sup>

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**Winter of 543 / 544 A.D.** The winter [in Gaul – *Western Europe*] was so severe because of the ice and snow that the birds and other wild animals that one could catch them by hand.<sup>62</sup>

The winter of 544 A.D. was very cold and there was an extreme abundance of ice and snow [in *France*]. It was so cold that many wild animals could be approached and picked up by hand.<sup>171</sup>

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**Winter of 544 / 545 A.D.** The winter of 545 A.D. was very cold [in *France*] similar to the winter of 544.<sup>171</sup>

During the winter of 545 A.D. [in *England*], the cold was so intense that birds allowed themselves to be caught by hand.<sup>212</sup>

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**545 A.D.** In 545, there was the greatest famine of grain, wine and oil. Then came the terriblest and greatest plague over all the world that ever was paralleled or recorded in history. It spared neither age, sex, rank, nor place. God only could afford the least help, not man or art. It began among the Egyptians at Pelusium, *Egypt*; thence it spread over the globe, not missing one corner, nor did it seize the same person twice. It began thus: Demons in human shape appeared to many, and when they fell upon them, they imagined themselves struck by some man, and disease quickly fell on them. Some from the beginning, as they were able, prayed that the distemper might be removed; and as if agitated by some evil spirit, did not hear their friends calling on them. They were shut up in close places. The same happened to some in their sleep, for they were quickly taken with a fever, both heat and color of the body continuing the same, nor was there any inflammations, as is common with feverish people, but a cough from the first evening of the fever. No medicines were given, none being suspicious of the danger. The same day in some, although in others later, a tuber appeared in one place or another [on their body].



Moreover, some were lethargic, or comatose. Others were foolish, some lost all memory, neglecting even their food, and they died. In their foolishness, they imagined themselves caught by someone and cried out they were assaulted and turning from they fled. Their servants and nurses suffered severe and intolerable things from them. So that they as well as the sick challenged compassion, not that they were affected with the disease, for that at present hurt none by contagion. But being furious, they either leaped out of bed, or hurried to the rivers to quench their thirst. They could hardly be restrained by force. Some died the same day, others several days after. This plague raged three months in Constantinople, [Istanbul, *Turkey*]. At first only a few died. After five or ten thousand were carried out daily. Many rich men, having all their servants dead, died rather from want of assistance than of the disease, and laid unburied.<sup>72</sup> [Pelusium is located in the easternmost mouth of the Nile River. Today it is called Tell el-Farama, located in the extreme northwestern Sinai not really very far to the east of Port Said, Egypt.]

In 545, there was a grievous famine.<sup>72</sup>

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**Winter of 545 / 546 A.D.** In winter 545 A.D. in the 11<sup>th</sup> month, the southwest region of *Korea* experienced a heavy snowfall along the coast.<sup>149</sup>

— On the 3<sup>rd</sup> month of 545 A.D., Hasuhi, Kashihade no Omi was sent on a mission [by the Japanese emperor] to Pekché. [Pekché or Baekje was a kingdom located in southwest Korea.] On the 11<sup>th</sup> month, Hasuhi, Kashihade no Omi began his return journey back to Japan. He departed with his family and arrived at the seashore of Pekché. The sun went down and they took lodging for the night. One of his children suddenly disappeared, and they could not tell where he had disappeared. That night there had been a great fall of snow, and they could not search for him until the morning. In the morning, they found the footprints of a tiger in a row one after another. Hasuhi, Kashihade no Omi put on his armor and sword and went out to search. He loved his child and wanted the child to succeed to his father's office. But now this child was gone and he went out to seek his revenge upon the tiger that killed him. The tiger attacked and he stabbed it to death and stripped off its skin and returned with it.

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**Winter of 546 / 547 A.D.** The winter of 547 A.D. was very cold, like the year 544. The frozen rivers of *France* could be traversed as if it was on dry land.<sup>171</sup>

In 547, this was the time in Gaul [*Western Europe*] that was so very cold that the [ice on the frozen] rivers carried [the weight of] people.<sup>62, 79</sup>

In 547, the winter was very harsh in Gaul [*Western Europe*]. The birds were so weak from hunger and cold that a person could easily reach and pick them up with their hands from the snow.<sup>62</sup>

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**547 A.D.** In 547, there was a famine in *Italy*.<sup>57, 72, 91</sup>

During the period between 8 November 547 and 5 February 548, a drought struck *China*. Another account gives this period as 8 November 547 and 23 April 548.<sup>153</sup>

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**Winter of 547 / 548 A.D.** In the year 548, the winter in *France* was very cold and produced deep snow.<sup>28</sup>

**549 A.D.** A terrific storm struck London, *England* blowing down many houses and killing two hundred and fifty persons.<sup>1, 40, 41, 43, 56</sup> [Another account places this event in the year 548 A.D. In 548, a hurricane struck London, *England*. Two hundred and fifty people were killed and many houses were blown down.<sup>72</sup>]

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**550 A.D.** In *Scotland*, hail, “like pullets’ eggs.”<sup>57, 72, 93</sup>

In 550 A.D., there was a severe drought in Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking during the period of 5 February and 8 August. [The resulting famine was so severe that] cannibalism was practiced.<sup>153</sup>

During the period between 8 August 550 and 5 February 551, floods struck Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

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**552 A.D.** In *Greece*, there was an inundation from the sea; part submerged.<sup>47, 92</sup> [This inundation was likely caused by a tsunami from a massive earthquake. Thomas Short has the following entry for the year 552 A.C.: “There was a great Earthquake in *Greece* which overturned many towns, as Naupaictum, Petra, Corona, and others. The sea also broke in and overflowed many places in *Greece*, and on its going back left innumerable unknown fishes on the shore.”<sup>72</sup> Robert A. Juhl believes this event occurred in 551. An earthquake generated tsunami struck *Greece* on 7 July 551. It destroyed and temporarily submerged the Temple of Olympus in Etolia, *Greece*. A second tsunami struck Beirut, *Lebanon* two days later on 9 July.]

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**553 A.D.** It rained most of the year in *Scotland*.<sup>1</sup>

The rainstorms were violent in *Scotland* for five months.<sup>2, 40, 41, 47, 92</sup> [Another source places this event in the year 552. It rained five months incessantly in Scotland producing a dearth.<sup>72</sup>]

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**Winter of 553 / 554 A.D.** The winter is recorded in Holland [now *the Netherlands*] as very severe.<sup>62</sup>

In the year 554, there was a frost [in *Britain*].<sup>72</sup>

The winter of 554 A.D. was very cold. The rivers [of *France*] could be traversed on foot as if on dry land.<sup>171</sup>

[In *Western Europe*] the winter was so severe that wild fowl and great wild beast might be caught [by hand].<sup>72</sup>

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**555 A.D.** In the year 555, there was a frightful thunder and lightning storm over all of *England* and *Scotland*.<sup>72</sup>

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**556 A.D.** In the year 556, a hurricane did infinite damage both by land and sea [near *England*].<sup>72</sup>

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**557 A.D.** During the period between 8 November 557 and 3 April 558, a drought struck *China*.<sup>153</sup>

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**558 A.D.** In 558 A.D. during the period between 3 May and 1 June, a severe drought struck *China*. As a result, the land tax was remitted. Then during the period between 30 August and 27 September, floods struck on the east coast of *China* in Kiangsu (now Jiangsu province) at Chinkiang and in Shantung (now Shandong province) at T'êng.<sup>153</sup>

In 558 A.D., there was a dreadful plague that extended all over *Europe*, *Asia* and *Africa*, and did not cease for many years.<sup>212</sup>

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**Winter of 558 / 559 A.D.** In 558, the Danube River was frozen over and more or less all the rivers of *Europe* were frozen.<sup>1</sup>

In 558, in *Eastern Europe*, the frost was so great that the Danube River was quite frozen over.<sup>2, 39, 40, 41, 42, 43, 47, 93</sup>

In 559, the Danube River was frozen this winter.<sup>62</sup>

In the year 559, the Bulgarians crossed the frozen Danube River, spread over the *region of Thrace*, and were close to the suburbs of Constantinople.<sup>62</sup>

The winter of 559 A.D. [in *France*] was very severe in the south.<sup>171</sup>

In 558, the River Thames in *England* was frozen for six weeks.<sup>29</sup>

**559 A.D.** In 559 A.D. during the period between 22 May and 20 June, a drought struck *China*.<sup>153</sup>

Both July and August of 559 in *Western Europe*, were terribly agitated from east to west by an overflow of the sea, and by storms and earthquakes.<sup>79</sup>

**560 A.D.** In 560 A.D. during the period between 5 February and 6 May, a drought struck *China*.<sup>153</sup>

**561 A.D.** In 561 A.D. during the period between 28 July and 25 August, a drought struck *China*.<sup>153</sup>

**562 A.D.** In 562 A.D. during the period between 19 May and 17 June, a drought struck *China*.<sup>153</sup>

**563 A.D.** In 563 A.D. during the period between 8 May and 6 June, a drought struck in Shansi (now Shanxi province) in northern *China* at Taiyuan, His, and Chi and in Shensi (now Shaanxi province) in central *China* at Sian. This drought was accompanied by locust and caused crop damage. During the same period, other regions of *China* were affected by the drought. During the period between 31 December 563 and 28 January 564, floods struck in Shantung (now Shandong province) on the east coast of *China* at Tzū-yang and in Hopei (now Hebei province) in northern *China* at Chao and Ta-ming.<sup>153</sup>

**564 A.D.** In *England*, great rain floods.<sup>47, 72, 92</sup>

After long continued rains, followed a great inundation of the Tiber River in *Italy*, which overflowed the whole low country. Then came a sweeping epidemic.<sup>72</sup>

**565 A.D.** There was a plague in Rome, *Italy* from the rains and floods of 564.<sup>72</sup>

In 565 A.D. during the period between 16 April and 15 May, floods struck several regions of *China* including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Hua.
- Shensi (now Shaanxi province) in central *China* at Nan-chêng.
- Hopei (now Hebei province) in northern *China* at Nan-p'i, Chao, Ch'ing-ho and Chi [located at 115.34° East longitude and 37.34° North latitude].
- Shantung (now Shandong province) on the east coast of *China* at Kuan-t'ao.
- Kansu (now Gansu province) in northwest *China* at Wu-tu.

**566 A.D.** On the coast of Kent, Sussex and Hampshire in southern and southeastern *England*, there was a great storm.<sup>40, 41, 43</sup>

In 566 A.D. during the period between 5 April and 3 June, a drought struck *China*.<sup>153</sup>

**Winter of 566 / 567 A.D.** In the year 566, the winter was very severe in Gaul [*Western Europe*]. The Earth was covered with snow for more than five months. A large amount of animals were killed.<sup>62</sup>

The winter of 566 was very rigorous in southern *France*. The large amount of snow covered the earth for more than five months. The intensity of the cold destroyed many animals.<sup>79</sup>

The winter of 567 was called the “Winter of the Comet”. [In *France*] there was a huge abundance of ice and snow. Wild animals could be taken by hand. It snowed for five months. There were many dead birds.<sup>171</sup>

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**567 A.D.** In 567 A.D., there were floods in the districts and provinces of *Japan*. These produced famines. In some cases men ate each other. Mutual assistance was rendered by transporting grain from the neighboring districts.<sup>149</sup>

In 567 A.D., floods struck Shansi (now Shanxi province) in northern *China* at Taiyuan. During the period between 8 August and 8 November, floods struck Shantung (now Shandong province) on the east coast of *China* causing a famine.<sup>153</sup>

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**568 A.D.** In 568 A.D. during the period between 14 February and 9 July, a drought struck *China*.<sup>153</sup>

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**569 A.D.** In 569 A.D. during the period between 29 July and 27 August, a drought struck Hopei (now Hebei province) in northern *China*. As a result, the land tax was remitted.<sup>153</sup>

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**570 A.D.** In *Italy*, great rain and floods.<sup>47, 72, 92</sup>

In 570 A.D., envoys from Koryō [*Korea*], suffered by reason of the winds and waves, lost their way, and missing their harbor and drifted by the mercy of the current, until they suddenly reached the shore of Koshi [a historic province of *Japan*]. The damage from the storm must have been severe because the Emperor of Japan remarked, “though suffering from being cast away and submerged, yet their lives have been preserved”. [This seems to indicate that their ships had been destroyed and they were cast away.]<sup>149</sup>

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**571 A.D.** In 571 A.D. (or 511), heavy rainfall in central *France* caused flooding of the Allier River and its tributaries. There were epidemics.<sup>171</sup>

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**572 A.D.** In 572 A.D., there were torrential rains [in *France*] that caused floods and destroyed roads.<sup>171</sup>

In 572 A.D. during the period between 28 May and 26 June, a severe drought struck *China*.<sup>153</sup>

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**573 A.D.** In 573 A.D. during the period between 5 February and 12 September, a drought struck *China*.<sup>153</sup>

In 573 A.D. during the summer on the 5<sup>th</sup> month, 2<sup>nd</sup> day, Koryō [*Korea*] envoys anchored on the coast of the sea of Koshi [a historic province of *Japan*]. Their ship was wrecked and a great many were drowned. [This damage likely occurred from a great storm although the passage does not specifically state that.]<sup>149</sup>

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**574 A.D.** In 574 A.D. during the period between 5 June and 4 July, a severe drought struck *China*.<sup>153</sup>

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**575 A.D.** In the coastal regions of southeastern *England*, parts of Essex, Suffolk, and Norfolk inundated from the sea.<sup>40, 41, 43, 47, 92</sup> . . . sea drowned much people and cattle.<sup>72</sup>

In 575 A.D. during the period between 21 September and 19 October, floods struck Hopei (now Hebei province) in northern *China* at Chi [located at 115.34° East longitude and 37.34° North latitude], Ting, Chao, Ta-hsing, Nan-p’i, and Ho-chien.<sup>153</sup>

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**576 A.D.** A fatal famine struck *Scotland*.<sup>57, 72, 91</sup>

In 576 A.D., the Loire River in *France* flooded.<sup>171</sup>

In 576 A.D. during the period between 11 August and 8 September, a drought struck Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

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**579 A.D.** In *France* and *Italy*, there were great rain and floods.<sup>47, 72, 92</sup>

In 579, there were terrible rains that lasted 20 days together.<sup>72</sup>

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**580 A.D.** In Anglesea, *Wales*, there was much damage by the sea.<sup>47, 92</sup>

Great many people and cattle drowned in Anglesea.<sup>72</sup>

In 580 A.D. during the period between 30 April and 29 May, a drought struck *China*.<sup>153</sup>

In the year 580, a great flood occurred in east-central *France*. This was the oldest recording of an overflow of the Rhône River. The plain of Brotteaux in Lyon, was changed into a huge lake, and the damage was considerable. The Rhône and the Saône rivers, which formed a junction, towards St. Nizier; waters rose to such heights that many of the walls of the city (Lyon) was taken and many buildings destroyed. The water, after four days of flooding, seemed finally to begin retreating, when the sky again was covered with dark clouds and heavy rain fell. All the inhabitants of the plain before this calamity, fled with their wives, their children and their most valuable property to the hills of Saint-Just and Saint Sebastian. There, night and day they spent in prayer.<sup>61</sup>

The people of *France*, lying near the Liger [now Loire River] and Phadan [now Rhône River], were almost swallowed up by inundations, from great rains, which poured down continuously for 20 days. *Italy* suffered prodigiously from inundations; the whole wall of Lyons was thrown down by one.<sup>72</sup> [This source identified the year of this flood as 570 and also stated that the flood occurred during the third year of the reign of Flavius Tiberius Constantinus Augustus. But Tiberius Constantine ruled the Eastern Roman (Byzantine) Empire from 574 to 582.]

In 580, the fifth year of the reign of Childebert [Childebert II, King of *Austrasia*] huge rains swelled prodigiously all the rivers of *France*. Terrible floods followed, especially in Lyon and Limagne [large plain in the Auvergne region of *France*]. The violence of the waters submerged the herds, destroyed crops, and ruined many homes. In Auvergne in south-central *France*, they could not sow the land. In Lyon, where the Rhône and Saône rivers joined together, the rivers overflowed their banks and destroyed many buildings, and even overturned a portion of the city walls. The terrified inhabitants, fearing a new flood, took refuge with their wives, their children and what they value most in the hills of Saint-Just and Saint Sebastian. Hail, earthquakes, explosions of lightning and a terrible storm came and add to the spectacle of desolation. This upheaval broke out towards the beginning of autumn. Once the rain had ceased, the trees flowered a second time during the year. The rain fell in torrents for twelve consecutive days in the Auvergne, and for twenty days in Lyon.<sup>79</sup> [Austrasia formed the northeastern portion of the Kingdom of the Merovingian Franks, comprising parts of the territory of present-day eastern France, western Germany, Belgium, Luxembourg and the Netherlands. Metz served as its capital, although some Austrasian kings ruled from Rheims, Trier, and Cologne.]

In 580 in *France*, the trees flowered a second time during September and October. Heavy rains and flooding preceded this terrible unusual flowering, and heat. It was later accompanied by earthquakes, fires and hailstorms, especially in Bordeaux in southwestern France, Arles in southeastern France and Bourges in central France.<sup>79</sup>

In September 580 A.D., it was unusually warm and trees blossomed in *France*. In October, the Rhône and Saône rivers flooded and rose much higher than usual.<sup>171</sup>

In 580 in *Western Europe*, there was the earthquake, large hail, fierce storms and rains.<sup>79</sup>

**Winter of 581 / 582 A.D.** In 582 in *Western Europe*, the heat during the winter caused the trees to bloom in the month January. This month also was filled with violent rain, lightning and thunder.<sup>79</sup>

January 582 produced heavy rains accompanied by lightning and thunder in *Western Europe*.<sup>79</sup>

The winter of 582 A.D. was very soft and gentle [in *France*]. Many trees flowered. There were frequent storms.<sup>171</sup>

**582 A.D.** In 582 A.D. during the period between 6 June and 6 July, a drought struck *China*.<sup>153</sup>

**Winter of 582 / 583 A.D.** The winter of 583 A.D. was very severe [in *France*]. Disasters on the Seine, Marne and Yonne rivers caused many deaths. Wolves entered Bordeaux.<sup>171</sup>

**583 A.D.** In 583 A.D., a storm struck near the Japanese coast. Eun-sol and Associate conspired to kill Illa. Illa was slain during the 12<sup>th</sup> month. His body was removed for interment at Ashigita, *Japan*. [Ashigita in the province of Higo, which was an old province of Japan in the area that is today Kumamoto Prefecture on the island of Kyūshū.] Later the coast people reported that the Eun-sol ship had met with a storm and foundered, and that the Associate's ship had not been able to return until it had first drifted to Tsushima. [Tsushima Island is an island of the Japanese archipelago situated between Japan and Korea.]<sup>149</sup>

In 583 A.D. during the period between 28 April and 26 May, a drought struck *China*.<sup>153</sup>

**Winter of 583 / 584 A.D.** The winter [in *Europe*] was of such persistent gentleness; that in the month of January one could see roses.<sup>62</sup>

The winter of 584 A.D. was very gentle and sweet [in *France*]. Roses bloomed in January. Then there was a hailstorm and a drought.<sup>171</sup>

In 584 the month of January in *Western Europe* produced roses. This was followed by a white frost, a hurricane and several disastrous incidents of hail that ravaged successive harvests of crops and vineyards. At the same time there was an excessive drought. The year produced almost no grapes. Desperate farmers delivered their vines at the mercy of the herds. But the trees, which had already borne fruit in July, producing a new crop in September, and some even bore again in December, and the vines offered at the same time well-formed clusters.<sup>79</sup>

**584 A.D.** In 584 there were roses in the month of January in *Western Europe*. Frosts followed soon after and damaged the [grape] vines. Then storms ravaged the crops and vineyards. Later came a terrible drought to destroy what the hail had left. But the fruit trees, which had borne fruit in July, blossomed a second time three months later, [and bore fruit] in December. The [grape] vine in turn pushed new jets, and new grapes formed.<sup>79</sup>

In Gaul [*Western Europe*], the trees bore fruit in July and then again in September. The drought was very great.<sup>62</sup>



In 584 in *Western Europe*, an immense drought finally ruined the vineyards and the harvest, which was already compromised by earlier hailstorms and frosts.<sup>79</sup>

In 584 A.D. during the period between 17 February and 16 March, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan. Then during the period between 14 July and 11 August, droughts struck in Shensi (now Shaanxi province) in central *China* at Sian, Ta-li, Hua, and Fêng-hsiang and in Hupeh (now Hubei province) in central *China* at I-ch'ang. As a result of the droughts, one year's land tax was remitted.<sup>153</sup>

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**585 A.D.** The spring and summer of 585 in *Western Europe* was so rainy, that it could be confused with winter. The bulk of the rains this year caused rivers to overflow their banks and flood the fields and meadows. These floods seriously compromised the crop yields.<sup>79</sup>

In 585 A.D., the Loire River in *France* flooded. There were floods and famines.<sup>171</sup>

During the autumn of 585 A.D. and the winter of 585-586 A.D. [in *France*], the weather produced extreme sweetness. The trees bloomed again in September and again before Christmas and bore fruit.<sup>171</sup>

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**586 A.D.** [Because of the warm weather] in *Western Europe* the trees blossomed in the month of July 585 [586?], bloom again in September 586 and a large number of these who had already borne fruit produced a second crop of fruit until the Christmas holidays.<sup>79</sup>

During the autumn of 586 A.D. and the winter of 586-587 A.D. [in *France*], the weather produced a strange new sweetness. The [grape] vines bloomed twice.<sup>171</sup>

There was extensive flooding in 586 in the north of *Western Europe*.<sup>79</sup>

In 586 A.D. during the period between 24 February and 26 March, floods struck in Hupeh (now Hubei province) in central *China* at Chiang-ling and in Chekiang (now Zhejiang province) on the east coast of *China*. Then during the period between 22 July and 19 August, floods struck in Honan (now Henan province) in central *China* at Loyang. Then during the period between 19 September and 17 October, a drought struck 7 districts in Shensi (now Shaanxi province) in central *China*. As a result of the drought, the [land] tax was remitted.<sup>153</sup>

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**587 A.D.** In 587 the great rainfalls caused the rivers to swell prodigiously. This flood was especially severe in Burgundy in east-central *France*.<sup>79</sup>

[In *France*] in October, after the harvest, new vines covered with grapes appeared and on the trees, new leaves and new fruit.<sup>62</sup>

In October 587 after the harvest in *Western Europe*, the vines grew new shoots and new grapes formed.<sup>79</sup>

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**Winter of 587 / 588 A.D.** [In *France*], the trees were blooming in the fall and gave fruit a second time after already being harvested once. Roses appeared in December.<sup>62</sup>

The winter of 588 A.D. [in *France*] had an unusual sweetness. Trees flowered in autumn. Roses bloomed in December.<sup>171</sup>

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**588 A.D.** In 588 A.D. during the period 2-30 July, floods struck *China*.<sup>153</sup>

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**Winter of 588 / 589 A.D.** The winter of 589 A.D. was mild [in *France*]. The roses bloomed in November.<sup>171</sup>

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**589 A.D.** After Easter 589, rain with hail fell in *Western Europe*. In less than two hours, smaller streams were turned into major rivers. These rivers rose to unprecedented heights and overflowed their banks.<sup>79</sup>

The trees bloomed again in the autumn of 589 in *Western Europe*, and then they produced other fruit. The fruit was pink in November.<sup>79</sup>

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**590 A.D.** In *Italy*, there were great floods from tempest; followed by a plague.<sup>47, 72, 92</sup>

In 590, there were long rains and a plague after.<sup>72</sup>

In 590, there was a famine from a tempest that raised a great flood.<sup>57, 72, 91</sup>

Rain fell in the months of September and October incessantly for many days and raised such floods in all rivers and lakes in *Italy*, as to overflow their banks and drown an infinite number of people and cattle. The rain was accompanied by tremendous tempest of thunder and lightning. The river Tiber swelled so high that all the fields, which were not hilly and mountainous, were overflowed. Many people believed it was a second great flood. In Rome, *Italy*, the Tiber swelled so high that in some places it reached to, and in other places overflowed the cities high walls. And the water rushed in with such fury that it spoiled and defaced the greatest part of the buildings that were near the river. When the floods ceased, the fields were so soft and covered with slime and mud, that they could not be tilled or sown, hence a general famine. The flood not only demolished many stately buildings and ancient monuments, but also got into the church granaries, and carried away many thousand measures of wheat. After the flood, the river brought down innumerable multitude of serpents, and among them a monstrous great one as big as a great beam. All these serpents were swimming down the river into the sea, where they choked, and their carcasses being cast on the shore. There they rotted and by the stench of the slime and mud and excessive moisture, and the air was so corrupted, that a most desolating plague ensued over all *Italy*, *Spain* and *France*. The plague raged and laid waste to many towns. In many 2/3 of the people died. It was most severe at Rome, followed by Liguria [in the coastal region of northwestern Italy] and the Venetian territories [in northeastern Italy], both by floods, famine and plague.<sup>72</sup> [The source identified this flood in the year 588 or 589.]

Powerful rains with violent thunder produced severe flooding in *Western Europe*. These heavy rains reigned in the fall of 590.<sup>79</sup>

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**591 A.D.** Following the heavy rains, and disastrous floods of 590, the year 591 produced a drought in *Western Europe*.<sup>79</sup>

The summer of 591 was unusually hot [in *France*].<sup>171</sup>

The year 591 in *Western Europe* was divided as it were between an excessive droughts, which ruined all the meadows, and heavy rainfalls followed by floods, which destroyed much of the hay harvest.<sup>79</sup>

The excessive dryness of 591 in *Western Europe* consumed all the fields.<sup>79</sup>

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**592 A.D.** There was a drought that lasted from 10 January to September, along with a plague of locust. This produced a famine.<sup>57, 72, 91</sup>

There was a remarkably great drought from January to September, attended with a grievous famine and great swarms of locusts, which for two years ate up every green thing and caused a terrible famine in *Italy*. But they continued for 5 years in Capitanéo, then shifted to another province.<sup>72</sup> [Capitanéo may have been end of the Italian peninsula near Bari in the southern Adriatic.]

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**Winter of 592 / 593 A.D.** It was in southern Gaul [*Western Europe*] such a severe winter that no one living ever remembered a similar winter.<sup>62</sup>

The winter of 593 was “unprecedented” and extremely harsh in Provence, *France*.<sup>171</sup>

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**594 A.D.** In 594 A.D. during the period between 25 May and 19 September, a severe drought struck Shensi (now Shaanxi province) in central *China* producing a famine.<sup>153</sup>

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**595 A.D.** In 595 A.D. during the period between 15 February and 16 March, a drought struck *China*.<sup>153</sup>

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**598 A.D.** In 598 A.D., floods struck several regions of *China* including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Ch’i, Shang-ch’iu, Huai-yang, K’ao-ch’êng, and Hsü-ch’ang.

— Anhwei (now Anhui province) in eastern *China* at Fêng-yang.

— Shantung (now Shandong province) on the east coast of *China* at Ts’ao.

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**600 A.D. – 604 A.D. France. Famine**

In *France*, there was a famine.<sup>57, 72, 91</sup>

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**601 A.D.** In 601 A.D. in summer, the 5<sup>th</sup> month, heavy rains caused a flood in the Palace of Miminashi in *Japan* causing the rivers to overflow and fill the Court of the Palace.<sup>149</sup>

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**Winter of 601 / 602 A.D.** The winter of 602 A.D. was very severe [in *France*]. The sea froze in places normally sheltered. Many fish were decimated. As a result, there was a famine.<sup>171</sup>

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**602 A.D.** In 602 A.D. during the period between 27 February and 28 March, floods struck in Honan (now Henan province) in central *China* at Loyang and in Shansi (now Shanxi province) in northern *China* at P’ing-lu [located at 111.00° East longitude and 34.51° North latitude].<sup>153</sup>

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**Winter of 602 / 603 A.D.** The winter of 603 A.D. was unusually cold and destroyed the vineyards [in *France*].<sup>171</sup>

The unusual cold of the year 603 in *Western Europe* killed much of the vineyards.<sup>79</sup>

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**Winter of 603 / 604 A.D.** In 604 in *Scotland* there was four months of frost, followed by dearth [famine]. The frost was also severe in *England*.<sup>47, 93</sup>

In the year 604, there was the severest frost for 4 months, chiefly in *Scotland*, followed by a dearth.<sup>72</sup>

[In *Europe*] in 604, there was the most severe rigorous winter. The [grape] vines mostly died in all places. The *Sea* was frozen, and killed the fishes in it. This produced a great famine.<sup>72</sup>

The winter of 604 A.D. was very cold [in *France*] and then there was a famine.<sup>171</sup>

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**604 A.D.** In 604 A.D. during the period between 7 January and 5 February, floods struck in Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

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**Winter of 604 / 605 A.D.** The winter of 605 A.D. was very severe in Oise region of *France*. It destroyed the [grape] vines.<sup>171</sup>

Due to a harsh winter in *France*, a very large portion of the (grape) vines were lost.<sup>62</sup>

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**605 A.D.** In *England*, there was a drought with scorching heat.<sup>47, 72</sup>

In *England*, there was heat and drought that caused a famine.<sup>57, 72, 91</sup>

In *Italy* there was extraordinary heat and drought.<sup>62</sup>

There was excessive heat and drought, hence a famine and plague on man and beast in *Italy*.<sup>72</sup>

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**Winter of 606 / 607 A.D.** The winter of 607 A.D. was very cold in Oise region of *France*.<sup>171</sup>

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**607 A.D.** There was extensive flooding in 607 in the north of *Western Europe*.<sup>79</sup>

In 607 A.D., floods struck in Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

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**Winter of 607 / 608 A.D.** The winter of 608 A.D. was very cold in Oise region of *France*. It destroyed the [grape] vines.<sup>171</sup>

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**608 A.D.** In 608 A.D., a drought struck in Hopei (now Hebei province) in northern *China* at Shun-i and in Shansi (now Shanxi province) in northern *China* at Tai.<sup>153</sup>

In the year 608, part of Edinburgh, *Scotland* was burnt by lightning.<sup>72</sup>

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**611 A.D.** In 611 A.D. during the period between 8 August and 8 November, floods struck *China*.<sup>153</sup>

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**612 A.D.** In 612 A.D., a severe drought struck Shantung (now Shandong province) on the east coast of *China*. Many people died from the drought and the plague.<sup>153</sup>

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**Winter of 615 A.D. / 616 A.D.**

In 616 A.D. in spring, the 1<sup>st</sup> month, in *Japan*, the peach trees and plum trees bore fruit. [This might come about if the winter was exceeding warm.]<sup>149</sup>

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**617 A.D.** In 617 A.D., a severe drought struck *China*.<sup>153</sup>

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**620 A.D.** In 620 A.D. during the period between 6 May and 1 October, a drought struck *China*.<sup>153</sup>

In 620 A.D. during the spring, summer and autumn, there was a drought in *China*.<sup>165</sup>

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**621 A.D.** In 621 A.D. during the period between 5 February and 22 August, a drought struck *China*.<sup>153</sup>

In 621 A.D. during the spring, summer and autumn, there was a drought in *China*.<sup>165</sup>

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**622 A.D.** In 622 A.D. in *Japan*, there were heavy rains and floods from spring to autumn. The rains caused the five type of grain grown in *Japan* to not reach maturity.<sup>149</sup>

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**624 A.D.** In 624 A.D. during the period between 8 August and 8 November, a drought struck Shensi (now Shaanxi province) in central *China*.<sup>153</sup>

In 624 A.D. during the autumn, there was a drought in Shantung and Shensi provinces in *China*.<sup>165</sup>

**625 A.D.** In *Britain*, there was a grievous famine.<sup>57, 72, 91</sup>

**626 A.D.** In 626 A.D. in *Japan*, during spring, 1<sup>st</sup> month, peach and plum trees blossomed but in the 3<sup>rd</sup> month it was cold and hoarfrost fell. [Winter was warm but during the end of spring the weather turned remarkably cold.] During the 6<sup>th</sup> month, snow fell. From the 3<sup>rd</sup> to the 7<sup>th</sup> month there were continual rains, and great famine in the Empire. The old ate the roots of herbs, and died by the roadside. Infants at the breast died with their mothers. Thieves and robbers sprang up in great numbers, and could not be put down.<sup>149</sup>

**627 A.D.** In 627 A.D. during the period between 6 May and 8 August, a drought struck in Shantung (now Shandong province) on the east coast of *China*; in Shensi (now Shaanxi province) in central *China* at Sian; and in Shansi (now Shanxi province) in northern *China* at Yung-chi. As a result, this year's land tax was remitted.<sup>153</sup>

In 627 A.D. during the summer, there was a drought in Shantung province in *China*. The land tax was remitted.<sup>165</sup>

**628 A.D.** In 628 A.D. during the summer, on the 15<sup>th</sup> day of the 4<sup>th</sup> month in *Japan*, hail fell of the size of peaches. Then on the 16<sup>th</sup> day, hail fell that was the size of plums. There was a drought, which lasted from spring till summer.<sup>149</sup>

In 628 A.D. during the period between 10 April and 8 May, a drought struck *China* and was accompanied by locusts.<sup>153</sup>

In 628 A.D. during the spring, there was a drought in *China*. The drought was accompanied with a plague of locusts.<sup>165</sup>

[In 629 A.D.], during the second year of the reign of Emperor Tay-Tsong, devouring locusts plagued *China*.<sup>186</sup>

**629 A.D.** In 629 A.D., during the period between 30 January and 25 July, a very severe drought struck Shensi (now Shaanxi province) in central *China*.<sup>153</sup>

In 629 A.D. during the spring and summer, there was a very severe drought in Shensi province in *China*.<sup>165</sup>

In 629 A.D. during the period between 8 August and 8 November, floods struck several regions of *China* including:<sup>153</sup>

- Hopei (now Hebei province) in northern *China* at Ch'ing-ho.
- Anhwei (now Anhui province) in eastern *China* at Po.
- Shantung (now Shandong province) on the east coast of *China* at Yün-ch'êng and Lin-i [located at 118.24° East longitude and 35.07° North latitude].
- Kiangsu (now Jiangsu province) on the east coast of *China* at Su-ch'ien, Suchow, and Soochow.
- Shensi (now Shaanxi province) in central *China* at Lung.

In the year 629, there was a great snowstorm in *Scotland*. "It lay a Fortnight 5 Foot in Scotland."<sup>72</sup>

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**630 A.D.** In 630 A.D. during the period between 20 March and 17 April, a drought struck *China*.<sup>153</sup>

In 630 A.D. during the period between 8 August and 8 November, floods struck several regions of *China* including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Hsü-ch'ang and K'ao-ch'êng.

— Szechwan (now Sichuan province) in southwest *China* at Nan-chiang.

In 630 A.D. during the spring, there was a drought in *China* along with floods.<sup>165</sup>

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**633 A.D.** In 633 A.D. during the period between 9 September and 8 October, floods struck Shantung (now Shandong province) on the east coast of *China*.<sup>153</sup>

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**634 A.D.** There were great snows in the Country of Berg (*Germany*) that killed many people. [The Country of Berg today is within the Nordrhein-Westfalen State in western Germany, east of Rhine river, south of the Ruhr.]

In southwestern *Ireland*, there were floods in Munster.<sup>47, 92</sup>

In 634 A.D. during the period between 31 July and 28 August, floods struck Shantung (now Shandong province) on the east coast of *China*, Kiangsu (now Jiangsu province) on the east coast of *China*, and Anhwei (now Anhui province) in eastern *China*.<sup>153</sup>

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**635 A.D.** In 635 A.D. during the period between 8 August and 8 November, a drought struck in Szechwan (now Sichuan province) in southwest *China*, in Honan (now Henan province) in central *China*, and in Shantung (now Shandong province) on the east coast of *China*. During the period between 8 November 635 and 16 July 636, a drought struck several regions of *China*.<sup>153</sup>

In 635 A.D. during the autumn, there was a drought in Shansi and Sze-ch'wan provinces in *China*.<sup>165</sup>

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**636 A.D.** In 636 A.D. during the summer in the 5<sup>th</sup> month in *Japan*, there were great rains and floods.<sup>149</sup>

In 636 A.D. in *Japan*, the year produced a great drought and there was famine throughout the Empire.<sup>149</sup>

In 636 A.D., floods struck in Shantung (now Shandong province) on the east coast of *China* and in Honan (now Henan province) in central *China*.<sup>153</sup>

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**637 A.D.** In 637 A.D. during the period between 27 July and 25 August, floods struck in Honan (now Henan province) in central *China* at Loyang. Then during the period between 24 September and 23 October, floods struck Honan at Shan.<sup>153</sup>

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**638 A.D.** In 638 A.D. during the autumn in the 7<sup>th</sup> month and 19<sup>th</sup> day in *Japan*, there was a great storm, which broke trees and tore up houses.<sup>149</sup>

In 638 A.D. during the 9<sup>th</sup> month in *Japan*, there were continuous rains, and peaches and plums blossomed. [This passage implies a second blossoming during the year.]<sup>149</sup>

During the period between 8 November 638 and 5 July 639, a drought struck in Szechwan (now Sichuan province) in southwest *China*, in Hunan province in south-central *China*, in Hupeh (now Hubei province) in central *China*, and in Kiangsu (now Jiangsu province) on the east coast of *China*.<sup>153</sup>

In 638 A.D. during the summer, there was a drought in Hunan, Hupeh, Kiangsu and Sze-ch'wan provinces in *China*.<sup>165</sup>

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**639 A.D.** In 639 A.D. during the summer, there was a drought in Hunan, Hupeh, Kiangsu and Sze-ch'wan provinces in *China*.<sup>165</sup>

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**641 A.D.** In 641 A.D. during the period between 8 August and 8 November, floods struck in Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow and in Honan (now Henan province) in central *China* at K'ao-ch'êng.<sup>153</sup>

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**642 A.D.** The winter in *Europe* was severe. The *Black Sea* was frozen. There were snowdrifts 90 feet (27 meters) deep.<sup>28</sup>

In 642 A.D. in *Japan*, there were continuous rains during the 3<sup>rd</sup> and 4<sup>th</sup> month. But during the 6<sup>th</sup> month there was a great drought. On the 16<sup>th</sup> day of the 6<sup>th</sup> month, fine rain fell and on the 28<sup>th</sup> slight rain fell. On the 1<sup>st</sup> day of the 8<sup>th</sup> month [August 1<sup>st</sup>], there was thunder and a great rain that fell continuously for 5 days. As a result, the nine types of grain grown in Japan ripened. On the 6<sup>th</sup> day of the 8<sup>th</sup> month, the Pekché Envoys, viz. the Associate Official and the rest [Pekché or Baekje was a kingdom located in southwest Korea.] took their departure [to return to *Korea*]. They were given a large ship and three boats. Around midnight, it thundered in the southwest corner and there was wind and rain. The ship in which the Associate Official and his companions were embarked ran ashore and was wrecked. On the 9<sup>th</sup>, 11<sup>th</sup>, 16<sup>th</sup> of November, and the 1<sup>st</sup> and 30<sup>th</sup> of December the weather was mild as in the spring.<sup>149</sup>

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**643 A.D.** In 643 A.D. in *Japan*, there was a great storm on the 10<sup>th</sup> day of the 1<sup>st</sup> month. The peach blossoms first appeared on the 20<sup>th</sup> day of the 2<sup>nd</sup> month. The leaves and flowers of herbs and trees were injured by hail on the 25<sup>th</sup> day of the 2<sup>nd</sup> month. During the 2<sup>nd</sup> month, there were wind, thunder, and ice rain. On the 25<sup>th</sup> day of the 3<sup>rd</sup> month, the flowers and leaves of the herbs were injured by frost. On the 7<sup>th</sup> day of the 4<sup>th</sup> month, there was a great storm with rain. On the next day, the 8<sup>th</sup>, the wind sprang up and the weather was chilly. On the 20<sup>th</sup> day of the 4<sup>th</sup> month, there was a west wind and hail. The weather was cold and people wore three wadded garments. On the 25<sup>th</sup> day of the 4<sup>th</sup> month, hail one inch in diameter fell in the province of Ohomi. On the 19<sup>th</sup> day of the 9<sup>th</sup> month, there was a great rain with hail.<sup>149</sup>

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In 643 A.D. during the period between 5 February and 19 August, a severe drought struck *China*. Then during the period between 8 August and 8 November, floods struck several regions of *China* including:<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Ku-ch'êng, Hsiang-yang, and Chiang-ling.
- Honan (now Henan province) in central *China* at Ju-nan and Shang-ch'iu.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow.
- Anhwei (now Anhui province) in eastern *China* at Po.
- Szechwan (now Sichuan province) in southwest *China* at San-t'ai, Chung, and Mien-yang.

In 643 A.D. during the spring and summer, there was a great drought in *China*.<sup>165</sup>

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**644 A.D.** In 644 A.D. during the period between 8 August and 8 November, floods struck in northern *China* in Shansi (now Shanxi province) at Ch'in-yüan and in Hopei (now Hebei province) at I. Crops were damaged.<sup>153</sup>

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**646 A.D.** In 646 A.D., floods struck Fukien (now Fujian province) on the southeast coast of *China* at Foochow. During the period between 15 September and 14 October, floods struck in Hopei (now Hebei province) in northern *China* at Ta-ming and in *Indochina*.<sup>153</sup>

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**647 A.D.** In 647 A.D. during the period between 8 August and 8 November, a drought struck in Honan (now Henan province) in central *China* at Shan; in Shansi (now Shanxi province) in northern *China* at Yung-chi and Chiang; and in Szechwan (now Sichuan province) in southwest *China* at Fêng-chieh.<sup>153</sup>

In 647 A.D. during the autumn, there was a drought in Shansi, Shensi and Sze-ch'wan provinces in *China*.<sup>165</sup>

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**648 A.D.** In 648 A.D. during the period between 6 May and 8 August, floods struck several regions of *China* including:<sup>153</sup>

- Szechwan (now Sichuan province) in southwest *China* at Lu and Chungking.
- Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow.
- Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton.

In 648 A.D. during the period between 8 August and 8 November, a drought struck Szechwan (now Sichuan province) in southwest *China* at K'ai and Wan. Then during the period between 8 November 648 and 16 May 649, a drought struck the central part of Shansi (now Shanxi province) in northern *China*.<sup>153</sup>

In 648 A.D. during the autumn and winter, there was a drought in Sze-ch'wan province in *China*.<sup>165</sup>

In 648, there was a tempest of wind at Byzantium [Constantinople or Istanbul, *Turkey*].<sup>72</sup>

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**649 A.D.** In Cheshire and Lancashire, *England*, there was great damage from an inundation of the sea.<sup>40, 41, 43, 47, 72, 92</sup>

In 649 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**650 A.D.** In 650 A.D. during the period between 6 May and 31 August, a drought struck Shensi (now Shaanxi province) in central *China* at Sian, Ta-li, and Hsin-chiang.<sup>153</sup>

In 650 A.D. during the spring, summer and autumn, there was a drought in Shansi and Shensi provinces in *China*.<sup>165</sup>

In 650 A.D., floods struck several regions of *China*. As a result several hundred people drowned. The regions affected include:<sup>153</sup>

- Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng and Hsi.
- Kiangsi (now Jiangxi province) in southern *China* at P'o-yang.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin.

During the period between 4 July and 2 August, floods struck Shansi (now Shanxi province) in northern *China* at Lin-t'ung and Wei-nan. Houses were damaged. During the period between 8 August and 8 November, floods struck in Shantung (now Shandong province) on the east coast of *China* at Tsinan and in Hopei (now Hebei province) in northern *China* at Ting.

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**651 A.D.** In 651 A.D. during the period between 8 August and 8 November, floods struck several regions of *China* including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Kaifeng.
- Hopei (now Hebei province) in northern *China* at Ting.
- Shantung (now Shandong province) on the east coast of *China* at P'u.
- Anhwei (now Anhui province) in eastern *China* at Po.



During the period of 20 September 651 and 13 April 652, there was a drought in *China*. The period was unusual because of the lack of snowfall.<sup>153</sup>

In 651 A.D. during the autumn and winter, there was a drought in *China*.<sup>165</sup>

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**652 A.D.** In 652 A.D. in summer in the 20<sup>th</sup> day of the 4<sup>th</sup> month in *Japan*, rain fell continuously for 9 days. It demolished buildings and destroyed young rice plants in the fields. Many men, horses, and oxen were drowned.<sup>149</sup>

In 652 A.D. during the period between 15 February and 13 May, there was a drought in *China*.<sup>153</sup>

In 652 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**653 A.D.** In 653 A.D. in autumn in the 7<sup>th</sup> month, Takada no Nemaro and his colleagues, the Ambassadors sent to Great Thang, were drowned by the sinking of their ship in the Gate of Takashima, off the coast of Satsuma. [The Great Thang probably relates to the Tang Dynasty, centered near Laichou, later called Shantung, but now called Shandong Province, *China*. Tsushima Island is an island of the Japanese archipelago situated between *Japan* and *Korea*.] Only five men who lashed themselves to plank floated ashore on the island of Takashima. On the island they gathered bamboos and made a raft, with which they anchored at the island of Shitoji-shima. These five men passed six days and six nights without any food whatsoever. [I have included this account because the sinking was likely caused by a storm although the account does not specify the cause.]<sup>149</sup>

In 653 A.D., floods struck several regions of *China* including:<sup>153</sup>

- Szechwan (now Sichuan province) in southwest *China* at Fêng-chieh and Chung.
- Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow.
- Shensi (now Shaanxi province) in central *China* at Nan-chêng.

In 653 A.D. during the period between 6 May and 8 November, droughts struck several regions of *China* including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Huang-ch'uan.
- Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua.
- Anhwei (now Anhui province) in eastern *China* at Ch'u and Fou-yang.

In 653 A.D. during the summer and autumn, there was a very severe drought in Anhwei and Honan provinces in *China*.<sup>165</sup>

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**654 A.D.** In 654 A.D. during the summer in the 4<sup>th</sup> month, two men and two women of the Land of Tukhara and one woman from S'râvastî were driven by a storm to Hiuga.<sup>149</sup> [The Land of Tukhara is the region around Badakhshan. This historical region today comprises northeastern *Afghanistan* and southeastern *Tajikistan*. S'râvastî is an ancient city of *India* situated near Fuzabad (Faizabad). Hiuga or Hyuga is a city located in the northern part of Miyazaki Prefecture, *Japan* and faces the Sea of Hyuga.]

In 654 A.D. during the period between 24 January and 21 February, a drought struck *China*. Then during the period between 22 May and 19 June, floods struck in Shensi (now Shaanxi province) in central *China* at Lin-yu. Then during the period between 20 July and 17 August, floods struck in Hopei (now Hebei province) in northern *China* at Ta-ming and in Shansi (now Shanxi province) in northern *China* along the Hu-t'o River where 5,000 families were flooded.<sup>153</sup>

In 654 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**655 A.D.** In 655 A.D., several regions of *China* experienced flooding.<sup>153</sup>

During the period between 9 July and 7 August, the following area was affected:

— Shensi (now Shaanxi province) in central *China* at Shang experienced flooding.

During the period of 8 August – 8 November, the following areas were affected:

— Hopei (now Hebei province) in northern *China* at Chi [located at 115.34° East longitude and 37.34° North latitude] experienced flooding and crops were damaged.

— Shantung (now Shandong province) on the east coast of *China* at Lin-i [located at 118.24° East longitude and 35.07° North latitude], Chu-ch'êng and Tzū-yang experienced flooding and crops were damaged.

— Honan (now Henan province) in central *China* at Hua, Chêng, and Kaifeng experienced flooding and crops were damaged.

— Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua experienced flooding and crops were damaged.

During the period between 6 October and 3 November, the following areas were affected:

— Shensi (now Shaanxi province) in central *China* along the Lo River experienced flooding.

— Honan (now Henan province) in central *China* along the Lo River experienced flooding.

During the period between 4 November and 3 December, the following area was affected:

— Shantung (now Shandong province) on the east coast of *China* at Tsinan experienced flooding.

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**659 A.D.** In 659 A.D. during the period between 25 July and 22 August, a drought struck *China*.<sup>153</sup>

In 659 A.D. during the autumn, there was a drought in *China*.<sup>165</sup>

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**660 A.D.** In 660 A.D. during the period between 5 February and 6 May, a drought of long duration struck Hopei (now Hebei province) in northern *China* at Ta-ming. There was no snowfall.<sup>153</sup>

In 660 A.D. during the spring, there was a drought in Chihli [now Hebei province] in *China*.<sup>165</sup>

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**Winter of 661 / 662 A.D.** In 661 A.D. in the 12<sup>th</sup> month, the cold was so intense in Koryö [*Korea*] that the River Phè-kang was frozen.<sup>149</sup>

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**Winter of 662 / 663 A.D.** The winter of 663 A.D. was very cold in Oise region of *France*.<sup>171</sup>

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**664 A.D.** In *Ireland*, a great famine preceding second appearance of *Buidhe Chonail* [yellow pestilence].<sup>57, 91</sup>

In 664 A.D. during the period between 31 May and 29 June, a drought struck *China*.<sup>153</sup>

In 664 A.D., there was a drought of long duration during the summer in *China*. There had been no snowfall during the winter.<sup>165</sup>

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**665 A.D.** In 665 A.D., there was a flood in Hopei (now Hebei province) in northern *China* at Chi [located at 117.24 E. longitude and 40.03 N. latitude]. As a result 10,000 families flooded.<sup>153</sup>

In 665 A.D. during the period between 18 July and 16 August, floods struck several regions of *China* including:<sup>153</sup>

— Shensi (now Shaanxi province) in central *China* at Fu. Houses were damaged.

— Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui, Wên-chou and Shui-an. Nine thousand seventy houses were damaged.

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**666 A.D.** In 666 A.D. during autumn in the 7<sup>th</sup> month, there were great floods in *Japan*.<sup>149</sup>

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**667 A.D.** A grievous famine struck *Scotland*.<sup>57, 72, 91</sup>

In 667 A.D. during the period between 30 January and 28 February and during the period between 27 July and 24 August, a drought struck *China*.<sup>153</sup>

In 667 A.D. during the summer, there was a great drought of long duration in the Chihli and Honan provinces in *China*.<sup>165</sup>

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**668 A.D.** In 668 A.D., a severe drought struck several regions of *China* including:<sup>153</sup>

- Shensi (now Shaanxi province) in central *China* at Sian.
- Shantung (now Shandong province) on the east coast of *China*.
- Kiangsu (now Jiangsu province) on the east coast of *China*.
- Anhwei (now Anhui province) in eastern *China*.

In 668 A.D., there was a great drought in Kiangsu, Shantung and Shensi provinces in *China*.<sup>165</sup>

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**669 A.D.** In Kent, *England*, the River Medway overflowed; great damage.<sup>40, 41, 47, 92</sup>

During the flood, Medway carried down much cattle.<sup>72</sup>

In 669, there was an inundation of the Medway.<sup>43</sup>

In the year 669 [in *England*], twenty-five houses in the bishoprick were burnt from lightning.<sup>72</sup>

A great famine struck *France*.<sup>57, 72, 91</sup>

There was a great famine in *France*. The king sold his jewels to relieve the poor.<sup>62</sup>

In *Ireland* there was a great scarcity in 669 and in the following year.<sup>57, 91</sup>

In 669 A.D. during the period 2-31 August, a drought struck 19 cities in Szechwan (now Sichuan province) in southwest *China*. Also there had been no snowfall.<sup>153</sup>

In 669 A.D. during the autumn, there was a drought in Sze-ch'wan province in *China*. No snowfall during the winter.<sup>165</sup>

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**Winter of 669 / 670 A.D.** A fatal frost in *England*.<sup>47, 72, 93</sup>

The winter on the Coast of Constantinople [now Istanbul, *Turkey*] was very severe and long and a large number of people and animals perished.<sup>62</sup>

The winter of 670 A.D. produced an abundance of snow and ice [in *France*]. As a result, wildlife could be picked up by hand.<sup>171</sup>

The winter was most severe and long. It killed many people and cattle.<sup>72</sup>

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**670 A.D.** In 670 A.D. during summer in the 4<sup>th</sup> month, there was great rain with thunder in *Japan*.<sup>149</sup>

In 670 A.D., there was a flood in *China* during the period 25 May - 22 June, resulting in 9,000 persons drowned.<sup>153</sup>

In 670 A.D. during the period between 23 July and 17 December, droughts struck in Shensi (now Shaanxi province) in central *China* at Sian, Hua and Ta-li and in Shansi (now Shanxi province) in northern *China* at Yung-chi. This drought caused a great famine.<sup>153</sup>

In 670 A.D. during the spring and autumn, there was a very severe drought in Shansi and Shensi provinces in *China*.<sup>165</sup>

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**671 A.D.** In 671 A.D. during the period between 12 July and 9 August, a drought struck *China*. Then during the period between 9 September and 8 October, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow. One hundred families were flooded.<sup>153</sup>

In 671 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

[In *England*], there was a tempest causing a great slaughter of men.<sup>72</sup>

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**673 A.D.** In 673 A.D. during the period between 18 August and 15 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua. Five thousand persons drowned.<sup>153</sup>

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**675 A.D.** In 675, there were three months without rain. The drought was extreme. The wells were completely dry at Chalons in *Austrie* [*Austria*] until early August.<sup>79</sup>

The summer of 675 A.D. was unusually hot [in *France*].<sup>171</sup>

In 675 A.D. during the autumn on the 22<sup>nd</sup> day of the 8<sup>th</sup> month in *Japan*, there was a storm, which made the sand to fly, and damaged houses.<sup>149</sup>

In 675 A.D. during the period 1-30 May, a drought of long duration struck *China*.<sup>153</sup>

In 675 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**676 A.D.** In 676 A.D. on the 7<sup>th</sup> day of the 5<sup>th</sup> month, the Governor of the province of Shimotsuke represented to the Emperor of Japan that, owing to a bad year, the peasantry in his domain were starving and wished to sell their children. The Court refused permission. During the 6<sup>th</sup> month, the summer produced a great drought. Still there was no rain and therefore the five grains did not grow, and the peasants were starving.<sup>149</sup>

In 676 A.D., floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan and Tzū-ch'uan. During the period between 13 September and 12 October, flooding occurred in Shantung at I-tu where five thousand families drowned.<sup>153</sup>

In the year 676 in Rome and *Italy*, there was 4 months of constant rain, thunder, lightning, fatal to people and grains.<sup>72</sup>

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**677 A.D.** In 677 A.D. in the 5<sup>th</sup> month, there was a drought in the capital of *Japan* and the home provinces. [The home provinces is the territory around the capital ruled immediately by the Emperor.]<sup>149</sup>

During the period between 6 May 677 and 5 February 678, a severe drought struck Honan (now Henan province) in central *China* at Loyang and Hopei (now Hebei province) in northern *China* at Ta-ming. There was no snowfall.<sup>153</sup>

In 677 A.D. during the summer, there was a great drought of long duration in Chihli and Honan provinces in *China*.<sup>165</sup>

**678 A.D.** In 678 A.D. during the 12<sup>th</sup> month, the King of Silla [one of the Three Kingdoms of *Korea*] dispatched Kim Syo-mul and Kim Syé-syé as envoys to bring this year's tribute to Japan. Chyöng-san was sent to escort Syo-mul and colleagues to *Japan*. In mid-ocean, however, they ran into a storm. Chyöng-san alone with difficulty succeeded in reaching [the shore of Tsushima Island in the archipelago situated between *Japan* and *Korea*.] Syo-mul and his colleagues never arrived.<sup>149</sup>

In 678 A.D. during the period between 27 April and 25 May, a drought struck *China*.<sup>153</sup>

In 678 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

**679 A.D.** In 679 A.D. in the 1<sup>st</sup> day of the 6<sup>th</sup> month, hail fell in *Japan* as big as peaches.<sup>149</sup>

**Winter of 679 / 680 A.D.** In 680 A.D. on the 20<sup>th</sup> day of the 1<sup>st</sup> month, it was reported from the Province of Settsu, *Japan* that at the village of Ikuta, peach trees and plum trees had borne fruit. [An unusually warm winter]<sup>149</sup>

**680 A.D.** In *England*, there was famine from a drought that lasted for three years.<sup>47, 57, 72, 91</sup>

In the days of Ethelwald, King of Saxons, was a great drought for three years. This drought caused such a famine that people pined with hunger and long fasting, went in companies, and climbing some precipice, joining hand in hand, threw themselves either over a rock or into the sea.<sup>72</sup> [Æthelwold, a 7th century king of East Anglia, the long-lived Anglo-Saxon kingdom which today includes the English counties of Norfolk and Suffolk.]

In 680 A.D. on the 8<sup>th</sup> day of the 6<sup>th</sup> month, there was a rain of ashes [Oshima volcanic eruption?] in *Japan*. On the 14<sup>th</sup> day, there was a great thunderstorm. On the 5<sup>th</sup> day of the 8<sup>th</sup> month, there were 3 days of rain with floods. On the 14<sup>th</sup> day, there was a storm, which broke trees and damaged houses.<sup>149</sup>

In 680 A.D. during the period between 28 September and 27 October, floods struck in Honan (now Henan province) in central *China* at Loyang and in Hopei (now Hebei province) in northern *China* at Ta-ming. Many people drowned.<sup>153</sup>

**681 A.D.** In 681 A.D. during the period between 25 January and 23 February, a drought struck in Shensi (now Shaanxi province) in central *China* at Sian, Fêng-hsiang, Hua and Ta-li. As a result, two years' land tax was remitted. Then during the period between 18 September and 16 October, floods struck Honan (now Henan province) in central *China* at Loyang and in Hopei (now Hebei province) in northern *China* at Ta-ming.<sup>153</sup>

In 681 A.D. during the spring, there was a drought in Shansi and Shensi provinces in *China*. Two years' land tax was remitted. Also during this time, there was a great flood in Chihli province and as a result, one year's land tax was remitted.<sup>165</sup>

**682 A.D.** In 682 A.D. on the 27<sup>th</sup> day of the 7<sup>th</sup> month in *Japan*, the provinces of Shinano and Kibi reported hoarfrost had fallen, moreover that owing to the storms, the five grains had not formed.<sup>149</sup>

In 682 A.D., a severe drought struck Shensi (now Shaanxi province) in central *China* producing a famine.<sup>153</sup>

In 682 A.D., floods struck several regions of *China*:<sup>153</sup>

— During the period between 11 June and 9 July, floods struck Honan (now Henan province) in central *China* at Loyang. One thousand persons drowned.

— During the period between 10 July and 8 August, floods struck Shensi (now Shaanxi province) in central *China* at Sian.

— During the period between 8 August and 8 November, floods struck Shantung (now Shandong province) on the east coast of *China*. These floods produced a famine.

In 682 A.D., there was a great drought in Shensi province in *China*.<sup>165</sup>

**683 A.D.** There was a famine in *Syria* and *Libya*.<sup>57,91</sup> [Another source places this famine in 682 and also caused a plague.]<sup>72</sup>

[Another source cites this as the year 689] In 689 a famine afflicted *Syria* that many removed out of it into Romania.<sup>72</sup>

In 683 A.D. during the 7<sup>th</sup> and 8<sup>th</sup> month, there was a drought in *Japan*. On the 2<sup>nd</sup> day of the 9<sup>th</sup> month, there was a great storm.<sup>149</sup>

In 683 A.D. during the period between 6 May and 8 August, a drought struck in Honan (now Henan province) in central *China* at Loyang and in Hopei (now Hebei province) in northern *China* at Ta-ming. During the period between 29 July and 27 August, floods struck *China*. Then during the period between 28 August and 25 September floods struck in Hopei (now Hebei province) in northern *China* at Hua-lu and in Shansi (now Shanxi province) in northern *China* along the Hu-t'o River causing crop damage.<sup>153</sup>

In 683 A.D. during the summer, there was a drought in Chihli and Honan provinces in *China*.<sup>165</sup>

**684 A.D.** The winter in *Scotland* was very cold. Many lakes, rivers and the sea froze.<sup>28</sup>

In 684, there was a famine and plague in *Syria* and *Libya*.<sup>72</sup>

[On 26 November 684 (Julian calendar) or 29 November 684 (Gregorian calendar), a massive earthquake magnitude 8.4 struck the Hakuhou Nankai region of *Japan*. In 684 on the 14<sup>th</sup> day of the 10<sup>th</sup> month (ancient Japanese calendar) at the hour of the boar (10 p.m.), there was a great earthquake. Throughout the country men and women shrieked aloud, and knew not East from West. Mountains fell down and rivers gushed forth; the official buildings of the provinces and districts, the barns and houses of the common people, the temples, pagodas and shrines were destroyed in numbers, which surpass all estimates. In consequence, many of the people and domestic animals were killed or injured. The hot springs of Iyo were dried up at this time and ceased to flow. In the province of Tosa [today the Kōchi Prefecture on Shikoku] more than 500,000 shiro of cultivated land were swallowed up and became sea. Old men said that never before had there been such an earthquake. On this night a rumbling noise like that of drums was heard in the East. Some said that the island of Idzu had increased of itself on two sides, the north and west, to the extent of more than 300 rods, and that a new island had been formed. The noise like that of drums was thought to be the construction of island.] Then on the 3<sup>rd</sup> day of the 11<sup>th</sup> month, the Governor of the province of Tosa reported that owing to a great tide, which rose high, and an overflowing rush of sea-water, many of the ships used for conveying tribute had been sunk and lost [a tsunami event].<sup>149</sup>

In 684 A.D., floods struck several regions of *China*:<sup>153</sup>

— Floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui where 100 persons drowned.

— During the period between 20 April and 19 May, floods struck along the Lo River in central *China* where 400 families were flooded. This occurred in Shensi (now Shaanxi province) and in Honan (now Henan province).

— During the period between 16 August and 14 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou flooding 1,000 families. Flooding also struck along the Lo River in central *China* where 5,000 families were flooded. This occurred in Shensi (now Shaanxi province) and in Honan (now Henan province).

— During the period between 15 September and 13 October, floods struck Honan (now Henan province) in central *China* at Mêng.

**685 A.D.** In *Ireland*, there was a great inundation of the sea.<sup>47, 92</sup>

In 685 A.D. in the 3<sup>rd</sup> month, there was a rain of ashes in the province of Shinano, *Japan*. The herbs and trees all withered up. [Most likely a fall of volcanic ash.]<sup>149</sup>

In 685 A.D. during the period between 8 June and 6 July, a drought struck *China*.<sup>153</sup>

In 685 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

**Winter of 685 / 686 A.D.** In 686 A.D. in the 10<sup>th</sup> day of the 3<sup>rd</sup> month, there was [a late season] snow in *Japan*.<sup>149</sup>

**686 A.D.** In 686 A.D. during autumn in the 7<sup>th</sup> month there was a drought in *Japan* that ended when plentiful rain fell throughout the Empire on the 20<sup>th</sup> of the month.<sup>149</sup>

During the period between 8 November 686 and 5 February 687, a drought struck *China*. There was no snowfall.<sup>153</sup>

In 686 A.D. during the winter, there was a drought in *China*. No snowfall.<sup>165</sup>

**687 A.D.** In 687 A.D. during the period between 19 March and 15 June, a drought struck *China*.<sup>153</sup>

In 687 A.D. during the spring and summer, there was a drought in *China*.<sup>165</sup>

**689 A.D.** In 689 A.D., drought struck *China*.<sup>153, 165</sup>

In 689, there was a great famine in *Syria*.<sup>72</sup>

**690 A.D.** At Venice and Liguria *Italy*, there were great floods from violent rainstorms.<sup>47, 92</sup>

In 690, Venice, *Italy* and other regions had often rains, thunder, lightning and great floods.<sup>72</sup>

In Venice and Liguria, *Italy*, happened the greatest tempest of rain, thunder, lightning and inundation, felt or seen since Noah's Flood, with the greatest damage.<sup>72</sup>

In 690 A.D. during the period between 15 April and 13 May, a drought struck *China*.<sup>153</sup>



In 690 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**691 A.D.** In 691 A.D. during the summer from the 4<sup>th</sup> month to the 6<sup>th</sup> month, profuse rain fell in *Japan* beyond measure and it was feared that the grain crops would certainly be destroyed. During the 6<sup>th</sup> month, sleet fell in forty places in the capital and provinces.<sup>149</sup>

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**692 A.D.** In 692 A.D. on the 3<sup>rd</sup> day (intercalary – leap day) of the 5<sup>th</sup> month, there were great floods in *Japan*. Commissioners were sent to visit the districts and provinces, one after another, making loans to those who, having met with disaster, were unable to support themselves, and allowing them to fish and cut wood in the hills and forests, the ponds and marshes.<sup>149</sup>

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**693 A.D.** In eastern *Ireland*, there were floods caused by rainstorms in Leinster.<sup>47, 92</sup>

In 693 A.D., floods struck Honan (now Henan province) in central *China* at Mêng. Then during the period between 9 June and 8 July, floods struck Shantung (now Shandong province) on the east coast of *China* at Hui-min where 2,000 families were flooded.<sup>153</sup>

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**694 A.D.** In 694 A.D. during the period 2-30 March, a drought struck *China*.<sup>153</sup>

In 694 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**695 A.D.** The River Thames in *England* was frozen so hard that many booths were built thereon.<sup>1</sup>

The River Thames in *England* was frozen for six weeks, when booths were built on it.<sup>2, 40, 41, 42, 43</sup>

The Thames in *England* was frozen for six weeks, when booths were built, and a market held upon the ice.<sup>29</sup>

In *England*, the River Thames was frozen over for six weeks.<sup>72</sup> Trade were carried on in booths.<sup>47, 93</sup>

A severe winter struck *England*. The River Thames was frozen for 6 weeks and it was cold in *Europe*.<sup>28</sup>

In 695 A.D., there was a great frost in *England*. The River Thames was frozen over for 6 weeks.<sup>212</sup>

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**696 A.D.** In 696 A.D. during the period between 2 June and 1 October, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow. Crops were damaged.<sup>153</sup>

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**697 A.D.** In 697 A.D., a drought struck *China*.<sup>153, 165</sup>

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**698 A.D.** In 698 A.D., floods struck Honan (now Henan province) in central *China* at Loyang. Then during the period between 28 March and 25 April, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui where 700 families were damaged.<sup>153</sup>

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**699 A.D.** In 699 A.D., floods struck several regions of *China*:<sup>153</sup>

— During the period between 8 August and 8 November, floods struck Honan (now Henan province) in central *China* at Ch'in-yang where 1,000 families were flooded.

— During the period 1-29 August, floods struck along the Lo River in central *China*. This occurred in Shensi (now Shaanxi province) and in Honan (now Henan province).

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**700 A.D.** In *England* and *Ireland*, there was a famine and pestilence during three years, “so that men ate each other”.<sup>57, 91</sup>

In 700, our Saxon ancestors being yet heathens were plagued with such severe famine for three years together, that many died of hunger. And in Sussex, *England* many were so tormented with it, that sometimes groups of 40 people would get up on the rocks by the seaside and throw themselves down headlong into the sea and were drowned.<sup>72</sup>

In 700, a great drought prevailed in the Auvergne, *France*.<sup>79</sup>

The summer of 700 A.D. was unusually hot [in *France*].<sup>171</sup>

In 700 A.D. during the period between 6 May and 8 August, a drought struck in Shansi (now Shanxi province) in northern *China* at Yung-chi and in Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 700 A.D. during the summer, there was a drought in Shantung and Shensi provinces in *China*.<sup>165</sup>

In 700 A.D., floods also struck several regions of *China*:<sup>153</sup>

— During the period between 13 April and 12 May, floods struck Szechwan (now Sichuan province) in southwest *China* at Hung-chou [some doubt on location]. One thousand families were flooded and 400 persons drowned.

— During the period between 5 November and 3 December, floods struck Honan (now Henan province) in central *China* at Loyang.

**701 A.D.** In Lincoln, *England*, a storm (hurricane) threw down above 100 houses.<sup>40, 41, 43, 56, 72</sup>

**702 A.D.** In 702 A.D. during the period between 5 February and 28 July, a drought struck *China*.<sup>153</sup>

In 702 A.D. during the spring and summer, there was a drought in *China*.<sup>165</sup>

**703 A.D.** In *Italy*, there were three years of famine.<sup>57, 72, 91</sup>

In 703 A.D., there was no snowfall in *China* during the winter. During the period between 20 May and 18 June, there was a drought in *China*. Then during the period between 16 July and 16 August, floods struck Kansu (now Gansu province) in northwest *China* at Ning. Two thousand families were flooded and 1,000 persons drowned.<sup>153</sup>

In 703 A.D. during the summer, there was a drought in *China*. No snowfall during the winter.<sup>165</sup>

**704 A.D.** In 704 A.D. during the period between 4 September and 3 October, floods struck Hopei (now Hebei province) in northern *China* at Ho-chien. Several thousand families were flooded.<sup>153</sup>

**705 A.D.** In 705 A.D., floods struck several regions of *China* including:<sup>153</sup>

— During the period between 28 April and 26 May, Shensi (now Shaanxi province) in central *China* at T'ung-kuan experienced floods. Five hundred families flooded.

— During the period between 26 June and 24 July, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming.

— During the period between 25 July and 23 August, floods struck central *China* along the Lo River in Shensi (now Shaanxi province) and in Honan (now Henan province). Two thousand families flooded.

**706 A.D.** In 706 A.D. during the period between 17 May and 14 June, floods struck central *China* along the Lo River in Shensi (now Shaanxi province) and in Honan (now Henan province). Several hundred

persons drowned. Then during the period between 15 June and 14 July, drought struck in Shensi, in Shantung (now Shandong province) on the east coast of *China*; in Hopei (now Hebei province) in northern *China* at Ta-ming; and in Honan at Loyang. Then during the period between 12 September and 11 October, floods struck Hopei at Ta-ming.<sup>153</sup>

In 706 A.D. during the summer and winter, there was a severe drought in Chihli, Honan, Shantung and Shensi provinces in *China*. Also during this year, there were floods in Chihli province.<sup>165</sup>

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**707 A.D.** In *Asia*, there was a terrible frost.<sup>47, 72, 93</sup>

There was a most severe winter, so that in *Asia*, the earth was covered with snow for 30 days and most animals died.<sup>72</sup>

In 707 A.D. during the period between 7 February and 3 July, a drought struck *China*.<sup>153</sup>

In 707 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**709 A.D.** In 709 A.D. during the period between 12 July and 10 August, a drought struck *China*. There was excessive heat. Then during the period between 10 August and 8 September, floods struck central *China* along the Li River in Honan (now Henan province). Crops were damaged. Then during the period between 8 October and 5 November, floods struck Shantung (now Shandong province) on the east coast of *China* at Chu-ch'êng. Thousands of families were flooded.<sup>153</sup>

In 709 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**710 A.D.** In 710 A.D. during the period between 4 May and 1 June, floods struck Shensi (now Shaanxi province) in central *China* at Sian. Wells overflowed.<sup>153</sup>

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**712 A.D.** A famine struck *Wales*.<sup>57, 72, 91</sup>

There was extensive flooding in 712 in the north of *Western Europe*.<sup>79</sup>

In 712 A.D. during the period between 7 August and 5 September, a drought struck *China*.<sup>153</sup>

In 712 A.D. during the autumn in *China*, there was excessive heat.<sup>165</sup>

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**713 A.D.** In 713 A.D. during the period between 30 March and 29 April, a drought struck *China*.<sup>153</sup>

In 713 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**714 A.D.** In 714 A.D. during the period between 19 February and 20 March, a severe drought struck Shensi (now Shaanxi province) in central *China* at Sian. This led to a famine.<sup>153</sup>

In 714 A.D. during the spring, there was a great drought in Shensi province in *China*.<sup>165</sup>

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**715 A.D.** In 715 A.D., floods struck in Honan (now Henan province) in central *China* at Loyang and in Hopei (now Hebei province) in northern *China* at Ta-ming.<sup>153</sup>

In 715 A.D. during the period between 6 June and 5 July, a drought struck *China*.<sup>153</sup>

In 715 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**716 A.D.** In 716 A.D. during the period between 24 July and 21 August, floods struck central *China* along the Lo River in Shensi (now Shaanxi province) and in Honan (now Henan province).<sup>153</sup>

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**717 A.D.** In Rome *Italy*, the Tiber River greatly overflowed from rain.<sup>47, 72, 92</sup>

The Tiber River in *Italy* overflowed its banks in Rome and in low lying places, the river flowed over the city walls, overturning houses, laying waste to the land and destroying corn [grains].<sup>72</sup>

The Calvisio says in 717 in the region of *Tracia* and on the side of Constantinople [now Istanbul, *Turkey*], the winter was so violent that the horses and camels of the Saracen army perished in great numbers.<sup>58, 80</sup> [Tracia is Italian for Thrace. Thrace designates a region bounded by the Balkan Mountains on the north, Rhodope Mountains and the Aegean Sea on the south, and by the Black Sea and the Sea of Marmara on the east.]

In Constantinople [now Istanbul, *Turkey*], the winter was so severe that the horses and camels of the Saracen army that was besieging the city perished in large numbers.<sup>62</sup>

In 717 A.D., floods struck Honan (now Henan province) in central *China* at Kung where several hundred families were flooded. Floods struck Honan at Loyang where crops were damaged. During the period between 18 March and 15 April, floods struck along the Ch'an River in Honan where 1,000 persons drowned.<sup>153</sup>

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**718 A.D.** A famine struck *Syria*.<sup>57, 72, 91</sup>

In 718 A.D. during the period 3-31 July, floods struck along the Ch'an River in Honan (now Henan province) in central *China*. Then during the period between 1 August and 28 September, a severe drought struck *China*.<sup>153</sup>

In 718 A.D. during the autumn, there was a very severe drought in *China*.<sup>165</sup>

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**719 A.D.** In *Ireland*, there was a rainy summer and a great inundation of the sea.<sup>47, 92</sup>

In 719 A.D. during the period between 20 August and 17 September, a drought struck *China*.<sup>153</sup>

In 719 A.D. during the autumn, there was a drought in *China*.<sup>165</sup>

In 719, there was firey hail, that burnt ships and the sea boiled up.<sup>72</sup>

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**720 A.D.** In 720 A.D., there was a flood in Honan (now Henan province) in central *China* at Mien-ch'ih during the period 6 May - 8 August. This flood resulted in the drowning of 10,000 persons. Then during the period 10 July - 8 August, Shensi (now Shaanxi province) in central *China* was flooded at Sian. This flood caused damaged houses, damaged 500 families and drowned 1,000 people.<sup>153</sup>

In 720 A.D., floods struck Hupeh (now Hubei province) in central *China* at Hsiang-yang. Several hundred families were flooded.<sup>153</sup>

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**Winter of 721 / 722 A.D.** During the period between 8 November 721 and 5 February 722, a drought struck *China*. There was no snowfall during the winter.<sup>153</sup>

In 721 A.D. during the winter, there was a drought in *China*. No snowfall.<sup>165</sup>

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**722 A.D.** In 722 A.D., floods struck Honan (now Henan province) in central *China* at Hsü-ch'ang, Yeh, Ju-nan, Huai-yang, Lin-ju, Pi-yang, and Têng. Crops and houses were damaged and many people drowned. During the period between 20 May and 18 June, flood struck Honan at Loyang. During the period between 18 July and 16 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng and Hui-ming.<sup>153</sup>

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**724 A.D.** In 724 A.D. during the period between 25 June and 24 July, floods struck Honan (now Henan province) in central *China* at Ju-nan. Then during the period between 24 August and 21 September, floods struck Shantung (now Shandong province) on the east coast of *China* at Tzū-yang.<sup>153</sup>

In 724 A.D. during the period between 25 July and 23 August, a drought struck in Shansi (now Shanxi province) in northern *China* at Yung-chi and in Hopei (now Hebei province) in northern *China* at Ta-ming. Then during the period between 15 October and 13 November, a drought struck in Shansi at Yung-chi and in Shensi (now Shaanxi province) in central *China* at Ta-li.<sup>153</sup>

In 724 A.D. during the autumn, there was a drought in Chihli, Shansi and Shantung provinces in *China*.<sup>165</sup>

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**726 A.D.** In 726 A.D., floods struck several regions of *China* including:<sup>153</sup>  
 — Honan (now Henan province) in central *China* at Loyang, Ch'in-yang, Chi, Chêng, Hua and Kaifeng; Hopei (now Hebei province) in northern *China* at Ta-ming; and Shantung (now Shandong province) on the east coast of *China* at P'u. Thousands drowned.  
 — During the period 2-31 August, floods struck along the Ch'an River in Honan.  
 — During the period 1-29 September, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming.

In 726 A.D. during the period between 4 July and 1 August, a drought of long duration struck in Hopei (now Hebei province) in northern *China* at Ta-ming and in Shansi (now Shanxi province) in northern *China* at Taiyuan, Yang-ch'êng and Ch'ang-chih.<sup>153</sup>

In 726 A.D. during the summer and autumn, there was a drought of long duration in Chihli and Shansi provinces in *China*.<sup>165</sup>

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**727 A.D.** In 727 A.D., floods struck several regions of *China* including:  
 — Floods struck Hopei (now Hebei province) in northern *China* at Ta-ming.  
 — During the period between 26 May and 23 June, floods struck Shansi (now Shanxi province) in northern *China* at Lin-fên.  
 — During the period between 23 July and 21 August, floods struck in Honan (now Henan province) in central *China* at Têng where thousands drowned and in Shensi (now Shaanxi province) in central *China* at Lo-ch'uan and Ta-li where many people drowned and 2,000 families were flooded.  
 — During the period between 22 August and 19 September, floods struck in Honan at Mien-ch'ih. And during the same year a drought struck 17 cities in *China*.<sup>153</sup>

In 727 A.D., there was a drought in *China*.<sup>165</sup>

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**728 A.D.** In 728 A.D., a drought struck in Honan (now Henan province) in central *China* at Loyang and Shang-ch'iu and in Anhwei (now Anhui province) in eastern *China* at Po.<sup>153</sup>

In 728 A.D., there was a drought in Honan province in *China*.<sup>165</sup>

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**729 A.D.** In 729 A.D. during the period between 8 January and 5 February, a drought struck *China*. There had been no snowfall during the winter. Then during the period between 29 August and 26 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing.<sup>153</sup>

In 729 A.D. during the winter, there was a drought in *China*. No snowfall.<sup>165</sup>

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**730 A.D.** In Edinburgh, *Scotland*, there was great damage by rain or inundation.<sup>40, 41, 43, 47, 92</sup>

Many families in Edinburgh, *Scotland* drowned by a flood.<sup>72</sup>

In 730 in *England, Wales* and *Scotland*, there was a great famine.<sup>57, 91</sup>

[Another account places this event in the year 739.] In 739. there was a famine in *England, Wales*, and *Scotland*.<sup>90</sup>

In 730 A.D. during the period between 20 June and 19 July, floods struck in Honan (now Henan province) in central *China* at Loyang. At the same time, the Lo River was flooded in Shensi and Honan causing 1,000 families to be flooded.<sup>153</sup>

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**731 A.D.** In 731 A.D. during the period between 9 June and 5 September, a drought of long duration struck Shensi (now Shaanxi province) in central *China* at Sian. Then during the period between 8 August and 8 November, floods struck in Honan (now Henan province) in central *China* at Loyang. Crops were damaged.<sup>153</sup>

In 731 A.D. during the summer, there was a drought of long duration in Shensi province in *China*.<sup>165</sup>

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**732 A.D.** In 732 A.D. during the period between 24 September and 23 October, floods struck in Honan (now Henan province) in central *China* at Shang-ch'iu and Hua and in Shantung (now Shandong province) on the east coast of *China* at Tzū-yang and Tung-p'ing. As a consequence, the land tax was remitted.<sup>153</sup>

In October 732 A.D., there were torrential rains in *France*. The Loire River flooded. Entire villages were swept away.<sup>171</sup>

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**733 A.D.** In 733 A.D. during the period between 18 May and 16 June, a drought of long duration struck *China*.<sup>153</sup>

In 733 A.D. during the summer, there was a drought of long duration in *China*.<sup>165</sup>

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**734 A.D.** In 734 A.D. during the period between 8 August and 8 November, floods struck in central *China* in Honan (now Henan province) at Loyang and in Shensi (now Shaanxi province). Crops were damaged.<sup>153</sup>

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**736 A.D.** In 736 A.D. during the period between 6 May and 8 August, a drought struck *China*.<sup>153</sup>

In 736 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**737 A.D.** In *Britain*, there was a great drought that produced scarcity.<sup>47, 72</sup>

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**738 A.D.** In Glasgow *Scotland*, there were great floods; more than 400 families drowned.<sup>40, 41, 43, 47, 72, 92</sup>  
[Some authorities give the date 758 A.D.]

In 738 A.D., there was an inundation in Glasgow, *Scotland*. More than 400 families were drowned.<sup>212</sup>

In 738 A.D., floods struck in Honan (now Henan province) in central *China* at Li and in Kiangsi (now Jiangxi province) in southern *China* at I-ch'un and Kiukiang.<sup>153</sup>

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**739 A.D.** In 739 A.D., there was a famine in *England, Wales, and Scotland*.<sup>212</sup>

In 739 A.D. during the period between 6 November and 4 December, floods struck in Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

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**741 A.D.** In *Britain*, there was a great drought that produced scarcity.<sup>47, 72</sup>

In 741 A.D. during the period between 8 August and 8 November, floods struck in Honan (now Henan province) in central *China* at Loyang and in Hopei (now Hebei province) in northern *China* at Ta-ming. Crops were damaged. During the period between 16 August and 14 September, floods struck the I River and the Lo River in Honan causing crop damage and the drowning of 1,000 persons.<sup>153</sup>

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**743 A.D.** In *Britain*, there was a great drought with an earthquake.<sup>47, 72</sup>

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**Winter of 743 / 744 A.D.** During the period between 8 November 743 and 5 February 744, a drought struck *China*. There had been no snowfall during the winter.<sup>153</sup>

In 743 A.D. during the winter, there was a drought in *China*. No snowfall.<sup>165</sup>

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**745 A.D.** In 745 A.D. during the period between 30 September and 29 October, floods struck in Honan (now Henan province) in central *China* at Loyang, Huai-yang, and Shang-ch'iu and in Anhwei (now Anhui province) in eastern *China* at Po.<sup>153</sup>

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**746 A.D.** In *Wales*, there was a dearth [famine].<sup>57, 72, 91</sup>

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**747 A.D.** In 747 A.D. during the period between 11 August and 8 September, there was a drought in *China*.<sup>153</sup>

In 747 A.D. during the autumn, there was a drought in *China*.<sup>165</sup>

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**748 A.D.** In *Scotland*, there was a famine.<sup>57, 72, 91</sup>

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**750 A.D.** In 750 A.D. during the period between 11 April and 10 May, a drought struck Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 750 A.D. during the spring, there was a drought in Shensi province in *China*.<sup>165</sup>

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**751 A.D.** In 751 A.D., there was a flood in Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow during the period 26 August - 23 September. As a result several thousand ships were damaged.<sup>153</sup>

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**753 A.D.** In 753, at the time of the taking of Clermont in the region of Auvergne, *France* by Pepin the Short [king of the Franks], there was over all of *France* a horrible storm. This thunderstorm lasted 22 hours. It spoiled wine cellars. Three thousand people and more than twenty-four thousand animals died



of fright during this storm. [I suggest these deaths were more likely attributed to lightning strikes. Clermont today is called Clermont-Ferrand and is located in the south of France]<sup>79</sup>

**754 A.D.** In 754 A.D. during the period between 21 September and 20 October, floods struck in Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

**755 A.D.** In 755 A.D. during the period between 16 April and 15 May, a drought struck Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 755 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

**757 A.D.** A great famine followed the continuous rains in the year 757 in the north of *Western Europe*.<sup>79</sup>

**758 A.D.** In 758, there was an inundation at Glasgow in the west-central lowlands of *Scotland*, which drowned more than 400 families.<sup>90</sup>

In 758 A.D. during the period between 11 June and 9 July, a severe drought struck *China*.<sup>153</sup>

In 758 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

**759 A.D.** In *Ireland*, there was a great famine throughout the kingdom, which lasted for several years.<sup>57, 91</sup>

In 759 A.D. during the period between 2 April and 1 May, a drought of long duration struck *China*.<sup>153</sup>

In 759 A.D. during the spring, there was a drought of long duration in *China*.<sup>165</sup>

**Winter of 759 / 760 A.D.** The frost in *Britain* continued from 1 October 759 to 26 February 760.<sup>40, 41, 42, 43, 47, 93, 212</sup>

**Winter of 760 / 761 A.D.** In the year 761 according to the Helgoländer Chronik (of Helgoland and Norddeutschland in northern *Germany*), the winter was very severe. It began in October when the open sea and large lakes were clogged with ice for many miles. More than 20 Ellen [46 feet, 14 meters] of snow fell. In the following February, the ice broke with the most unheard of incredible bang, that could be conceived on heaven or earth. Some of the ice was like high trees or mountains. The ice was 31 Ellen [71 feet, 22 meters] thick. [The source places this event in the year 761. The passage starts off with “The chronicle available to me reaches back to the year 761. The things presupposed, however, only reach back to the year 800 or so. So in the year 761:”]<sup>172</sup>

**762 A.D.** In *Britain*, there was a long and terrible drought, with heat.<sup>47, 72</sup>

**763 A.D.** In 763 A.D., there was a drought [in *England*]. The summer was so hot that the springs dried up.<sup>212</sup>

In 763 A.D. during the period between 16 June and 15 July, floods struck in Honan (now Henan province) in central *China* at Loyang. During the period between 12 October and 9 November, floods struck Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 763 A.D. during the spring and summer, there was a drought in *China*.<sup>165</sup>

**Winter of 763 / 764 A.D.** In the same year (763 A.D.), it was bitterly cold after the beginning of October, not only in our land, but even more so to the east, west, and north. Because of the cold, the north shore of the *Black Sea* froze to a depth of 30 cubits (~ 45 feet) a hundred miles out. This was so from Ninkhia to the Danube River, including the Kouphis, Dniester, and Dnieper Rivers, the Nekrophela, and the remaining promontories all the way to Mesembria and Medeia. Since the ice and snow kept on falling, its depth increased another twenty cubits (~ 30 feet), so that the sea became dry land. It was traveled by wild men and tame beasts from Khazaria, and the lands of other adjacent people. By divine command, during February of the same (winter in 764 A.D.) second indication the ice divided into a great number of mountainous chunks. The force of the wind brought them down to Daphnusia and Hieron, so that they came through the *Bosporos* to the city (Constantinople or Istanbul) and all the way to Propontis, Abydos, and the islands, filling every shore. We ourselves were an eyewitness and, with thirty companions, went out onto one of them and played on it. The icebergs had many dead animals, both wild and domestic, on them. Anyone who wanted to could travel unhindered on dry land from Sophianai to the city and from Chrysopolis to St. Mamas or Galata. One of these icebergs was dashed against the harbor of the acropolis, and shattered it. Another mammoth one smashed against the wall and badly shook it, so that the houses inside trembled along with it. It broke into three pieces, which girdled the city from Magnaura to the Bosporos, and was taller than the walls. All the city's men, women, and children could not stop staring at the icebergs, then went back home lamenting and in tears, at a loss as to what to say about this phenomenon. (Theophanes the Confessor).<sup>3</sup> [The Danube Delta on the Black Sea is located in eastern Romania and southwestern Ukraine. Dniester and Dnieper are located in the Ukraine. Mesembria is an ancient name for Nesebŭr, Bulgaria. Medeia is a city on the eastern Black Sea coast of present day Turkey. Propontis is an ancient name for the Sea of Marmara, between the Bosphorus Strait and the Dardanelles Strait in Turkey. Abydos is the name of an ancient city located in the south of Nara Point (Nara Burnu ) in the Dardanelle Strait of Turkey. From the 6th century, the port of Çengelköy in Turkey was called Sophianai because of the palace Justin II built nearby for his consort Sophia. Chrysopolis or Üsküdar is a municipality of Istanbul, Turkey. St. Mamas or Galata is a district of Istanbul, Turkey. The Magnaura was a large building in Constantinople [now Istanbul, Turkey] It was located east of the Augustaion, close to the Hagia Sophia and next to the Chalke gate of the Great Palace.]

Around Constantinople (now Istanbul, *Turkey*), the two seas frozen.<sup>47, 93</sup>

In the winter of 762 A.D., the *Dardanelles* and *Black Sea* were frozen over, and snow drifted to an astonishing depth of 50 feet (15 meters).<sup>1</sup> [misprint for 763 A.D.]

In the year 763, the *Black Sea* and the Straits of the *Dardanelles* were frozen.<sup>60, 62</sup> [The Dardanelles is a narrow strait in northwestern Turkey connecting the Aegean Sea to the Sea of Marmara.]

In another account the Byzantine historian Nicephorus described the winter in Constantinople (now Istanbul, *Turkey*): In the beginning of autumn, winter has come with abnormal colds; also saline waters are frozen which affected inhabitants of the city severely. One hundred mile (161 kilometer) stretch of the sea is covered by ice like in the regions north of *Black Sea*. Ice invaded most of the rivers; the coasts of Mesembria and Medeia were a solid mass of ice was 30 coudée thick (13-14 meters). Also snowfall was so heavy that his ice is enclosed by 20 coudée of snow and all morphological differences between sea and coast disappeared. Now a white cover unified sea and land. All parts of the North Sea facing north were solidified. Especially the areas of Hazars and round the Scythian's Lands were inaccessible and unsuitable for human and animal life. After a while this significant crystal crust broke into several pieces and these were uplifted in the middle of the sea like Pyramids. Most of them, dragged by winds, were smashed and sunk in the opening of the *Bosporos* to the *Black Sea* near Daphnusia, which was a powerful castle. Most of them entered into the *Bosporos*. They filled up all the curls of the water way and connected *Asia* and *Europe*. They formed a land bridge between two continents and it was easier to pass the strait by walking instead of using boats. Accumulated ice masses in the Bosporos without any

delay were dragged into Propontis (*Marmara Sea*) and even reached Abydos. There they accumulated again in a perfect way to form a structure like a monolith and Propontis lost its sea characteristics. One of these huge icebergs was grounded in the bottom of Constantinople Fortress, and shook the city walls so that inhabitants were excited. Icebergs accumulated in front of the Fortress, then invaded all waterways. They accumulated to the same height as the city walls. As a result, inhabitants of the city were able to go out of the city from the harbor by crossing these icebergs and they can walk to the Galata Castle on the other side from Constantinople Fortress.<sup>4</sup> [*Mesembria* is an ancient name for Nesebŭr, Bulgaria. *Medeia* is a city on the eastern Black Sea coast of present day Turkey. *Hazars and around the Scythian's Lands* today possibly refers to northwestern Turkey, Georgia and Abkhazia. *Bosphorus* is the strait between the Black Sea and the Sea of Marmara, Turkey.]

A severe winter struck *Europe* beginning in 14 December 763. *Black Sea* was frozen with snow 30 feet (9 meters) deep. Lasted to 16 March 764.<sup>28</sup>

In 764, the *Black Sea* was frozen to a distance of fifty miles from shore. The Hellespont and Dardanelles were frozen and the Sea of Marmara was passable for cavalry.<sup>63</sup> [The Hellespont is where the Dardanelle Strait narrows between Abydos on the Asian side to a point near Sestos on the European side, a distance of about 1.5 kilometers.]

From October 763 to February 764, a frost at Constantinople, when the two seas there were frozen a hundred miles from the shore.<sup>90</sup>

During the winter of 763-764, very severe cold reigned in Gaul [*Western Europe*] and in Illyria (*western part of today's Balkan Peninsula*) to the shores of the *Black Sea*. According to the Frankish chronicles, this cold was exceptional severity and could not be compared with any previous cold winter. The Bosphorus and the *Black Sea* froze. In many areas the snow was 30 feet high. In Gaul [*Western Europe*] from 1 October 763 to February 764 there was a very severe frost. The olive and fig trees were damaged because the soil froze to their roots. As a result over vast regions of the earth a terrible famine broke out in the following years, which killed many people.<sup>62</sup>

During the winter of 763-764 in *Western Europe*, the cold started October 1<sup>st</sup> and ran until February 764.<sup>79</sup>

The winter of 764 A.D. was exceptionally cold [in *France*]; first in October, then from 1 January to late February. There were up to 10 meters [33 feet] of snow in places. The olive trees in the south froze. There were frozen seas. The rivers were frozen "to the bottom". Then there was a famine.<sup>171</sup>

On October the 1<sup>st</sup>, came a most rigorous bitter frost, which lasted until February. It affected not only *Europe* but also all over *the North* and *the East*. The main sea was frozen near the pole and snow laid 20 feet deep upon the ice. It killed most vegetables and many sea animals. The snow destroyed many forests. During the severe frost, the *Sea of Bosphorus* brought great sheets of ice into Propontis [*Sea of Marmara*] that above 30 men might stand on each sheet of ice and be carried safely into the sea. These sheets of ice did great damage to the walls of Constantinople [*Istanbul, Turkey*]. March was followed by an excessive drought.<sup>72</sup>

In 763 in *England*, there was a violent frost, which continues about 150 days.<sup>128</sup>

In the year 764 in *England*, there was the severest frost.<sup>72</sup>

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**764 A.D.** In *Britain*, there was a drought after a long and severe frost.<sup>47, 72</sup>

In 764 A.D. during the spring and summer in Shensi province in *China*, there was a great drought.<sup>165</sup>

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**765 A.D.** In 765 A.D. during the period between 5 February and 8 August, a drought of long duration struck *China*.<sup>153</sup>

During the period of 26 March to 24 April in 765 A.D., there was a famine in *China*.<sup>210</sup>

In 765 A.D. during the summer in *China*, there was a great drought.<sup>165</sup>

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**766 A.D.** In 766 A.D., floods struck central *China* along the Lo River in Shensi (now Shaanxi province) and in Honan (now Henan province).<sup>153</sup>

In 766 A.D. during the period between 14 April and 9 August, a severe drought struck Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

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**Winter of 766 / 767 A.D.** During the period between 8 November 766 and 5 February 767, a drought struck *China*. There had been no snowfall during the winter.<sup>153</sup>

In 766 A.D. during the winter, there was a drought in *China*. No snowfall.<sup>165</sup>

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**767 A.D.** In *Asia*, there was a great drought.<sup>47, 72</sup>

So great a drought in Thracia [*Southeast Europe*] without either rain or dew, that all springs, fountains and rivers at Constantinople were dried up.<sup>72</sup>

In 767 A.D. during the period 1-29 July, a severe drought struck *China*. [This was originally recorded as the third year of the Yung-t'ai period, but since the Yung-t'ai had only two years and ended in the year 766, there apparently was a mistake. Here, it was recorded as if Yung-t'ai did last until 767.]<sup>153</sup>

In 767 A.D. during the period between 8 August and 8 November, floods struck several regions of *China* including:<sup>153</sup>

- Hunan province in south-central *China*.
  - Shansi (now Shanxi province) in northern *China* at Yung-chi.
  - Honan (now Henan province) in central *China* at Kaifeng.
  - Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow, Soochow, Sung-chiang and T'ai-ts'ang.
  - Chekiang (now Zhejiang province) on the east coast of *China* at Ning-po, Shao-hsing, Taichow, Ch'ü, Chin-hua, Chien-tê, Wên-chou, Hangchow, Chia-hsing, and Hu-chou.
  - Fukien (now Fujian province) on the southeast coast of *China*.
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**Winter of 767 / 768 A.D.** The winter of 768 A.D. was cold [in *France*].<sup>171</sup>

On 20 December 767, there was an ice storm in *China*.<sup>210</sup>

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**768 A.D.** In *Ireland*, there was famine and an earthquake.<sup>57, 91</sup>

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**769 A.D.** During the dog days of summer of 769 A.D. [28 July – 5 August] in *China*, the weather was cold.<sup>210</sup>

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**771 A.D.** In 771 A.D. during the period between 5 February and 12 October, a drought struck *China*.<sup>153</sup>

In 771 A.D. during the spring, summer and autumn, there was a drought in *China*.<sup>165</sup>

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**772 A.D.** In *Ireland*, there was a great drought.<sup>47</sup>

In *Ireland*, there was a famine from a drought.<sup>57, 91</sup>

A storm struck Wells, *England*.<sup>40, 41</sup>

In *Wales*, a thunder and lightning storm killed people.<sup>72</sup>

In 772 there was an epidemic at Chichester in Sussex, *England*, where 34,000 people were killed.<sup>212</sup>

In 772 A.D. during the period between 9 March and 7 April, floods struck Kiangsi (now Jiangxi province) in southern *China* at Kiukiang. Then during the period between 6 June and 4 July, a drought struck *China*.<sup>153</sup>

In 772 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**773 A.D.** In 773 A.D., a severe drought struck Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 773 A.D., there was a great drought in Shensi province in *China*.<sup>165</sup>

In 773 A.D., there was a drought in *China*.<sup>210</sup>

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**774 A.D.** In *Scotland*, there was a severe famine with a plague.<sup>57, 72, 91</sup>

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**Winter of 774 / 775 A.D.** In the year 675, there was the greatest frost in *England*.<sup>72</sup> [This entry was out of chronological order and I believe Short was referencing the year 775 A.D.]

On 10 December 774 A.D., there was a great snow in *China*.<sup>210</sup>

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**775 A.D.** In *England*, there was a drought with excessive heat, after a great frost.<sup>47, 72</sup>

The winter was so hard that the Euxine Sea (*Black Sea*) was quite frozen over. The ice was 30 foot or cubits thick. People could walk 50 or 100 leagues (150 to 300 miles, 240 to 480 kilometers) on the ice from the Danube River to the Euphrates River. On the ice fell 30 cubits deep of snow. When the ice broke, it appeared like great mountains on the sea, which demolished and carried down whole villages standing on the shore. This winter was succeeded by so excessive heat during the summer that all springs dried up.<sup>72</sup> [The Danube River probably refers to the Danube Delta in Europe, eastern Romania and south western Ukraine. The Euphrates River rises in Turkey, passes through Syria, and joins with the Tigris River in southeastern Iraq to form the Shatt al Arab, which empties into the Persian Gulf.]

In the year 775, “Snow fell, and lay 30 Cubits on a Level.”<sup>72</sup>

[In *Byzantium*], the summer was hot and all the wells dried up.<sup>62</sup> [Byzantium at this time included Turkey, and the western part of the Balkan peninsula.]

In 775 A.D. during the period 1-30 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow.<sup>153</sup>

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**776 A.D.** In *Ireland*, there were great fall of rain, and consequent flood.<sup>47, 92</sup>

Because of the famine [in *Northern Italy*] in 776, the supply of Lombard slaves sold by the Greeks to the Arabs increased. Some free men boarded the slave ships voluntarily becoming slaves in order to survive the severe effects of starvation.<sup>86</sup>

In 776 A.D. during the period between 20 July and 18 August, floods struck Shensi (now Shaanxi province) in central *China* at Sian. One thousand families were flooded.<sup>153</sup>

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**777 A.D.** During the period of 13 February to 13 March in 777 A.D., there was a drought in *China*.<sup>210</sup>

In 777 A.D. during the period between 10 July and 7 August, a drought struck *China*. There had been no snowfall during the winter. Then during the period between 8 August and 8 November, floods struck several regions of *China* causing crop damage. The floods occurred in:<sup>153</sup>

— Shensi (now Shaanxi province) in central *China* at Sian.

— Honan (now Henan province) in central *China* at Shang-ch'iu, Hua, and Kaifeng.

— Anhwei (now Anhui province) in eastern *China* at Po.

In 777 A.D. during the summer, there was a drought in *China*. No snowfall during winter.<sup>165</sup>

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**779 A.D.** A famine and plague grievously afflicted *France*.<sup>72</sup>

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**780 A.D.** In 780 A.D., the Loire River at Roanne, *France* flooded.<sup>171</sup>

**Winter of 780 / 781 A.D.** During the period between 8 November 780 and 5 February 781, floods struck several regions of *China* causing crop damage. The floods occurred in:

— Hopei (now Hebei province) in northern *China* at Ta-ming, and Chêng-ting.

— Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng.

During the same period of time, a drought struck other regions of *China*. There had been no snowfall during the winter.<sup>153</sup>

In 780 A.D. during the winter, there was a drought in *China*. No snowfall.<sup>165</sup>

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**781 A.D.** A storm (hurricane) struck Coventry, *England*.<sup>40, 41, 72</sup> [Coventry is located in Warwickshire in the West Midlands.]

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**782 A.D.** In 782 A.D. during the period between 16 June and 11 September, a drought struck *China*.<sup>153</sup>

In 782 A.D. during the summer and autumn, there was a drought in *China*.<sup>165</sup>

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**783 A.D.** [In *Germany*], the summer was so burning that many people perished from the heat.<sup>62</sup>

In 783 A.D. [in *France*] the summer was unusually hot.<sup>171</sup>

The heat during the summer of 783 in southern *France* was so extreme that many people died from it.<sup>79</sup>

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**Winter of 784 / 785 A.D.** During the period between 8 November 784 and 5 February 785, a severe drought struck *China*.<sup>153</sup>

In 784 A.D. during the winter, there was a great drought in *China*.<sup>165</sup>

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**785 A.D.** On 15 February 785 A.D., there was a great wind with snow and cold weather in *China*.<sup>210</sup>



In southwest *Ireland*, there was a flood in Darinis [now Molana Island in the County of Cork].<sup>47, 92</sup>

In 785 A.D. during the period between 5 February and 7 October, a very severe drought struck *China*. Crops were damaged. Wells and rivers dried up.<sup>153</sup>

During the period between 15 March and 13 April in 785 A.D., there was a famine in Henan, *China*.<sup>210</sup>

In 785 A.D. during the spring, summer and autumn, there was a very severe drought in *China*. Wells and rivers dried up.<sup>165</sup>

**786 A.D.** During the period between 5 January and 3 February in 786 A.D., there was an ice storm in *China*.<sup>210</sup>

In 786 A.D., floods struck several regions of *China* including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Loyang and Kaifeng.

— Hupeh (now Hubei province) in central *China* at Chiang-ling.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.

— During the period between 30 June and 29 July, floods struck Shensi (now Shaanxi province) in central *China* at Sian.

**787 A.D.** In 787 A.D., during the period between 24 March and 22 April, floods struck several regions of *China* including:

— Honan (now Henan province) in central *China* at Loyang and Kaifeng.

— Hupeh (now Hubei province) in central *China* at Chiang-ling.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.

Then during the period between 22 May and 19 June, floods struck Kiangsu at Yangchow.<sup>153</sup>

**788 A.D.** In *Italy*, the Tiber River much flooded by rain.<sup>47, 92</sup> . . . causing a Great Flood.<sup>72</sup>

In *England* there was a famine. In *Italy* the Tiber River also overflowed and did inestimable damage.<sup>72</sup>

In 788 A.D., floods struck along the Pa River at Kiangsi (now Jiangxi province) in southern *China*.<sup>153</sup>

**790 A.D.** In 790 A.D., a drought struck several regions of *China* including:<sup>153</sup>

— During the period between 5 February and 5 May, a severe drought struck Shensi (now Shaanxi province) in central *China*. Crops were damaged and the summer [land] tax in Sian was remitted.

— During the period between 6 May and 8 August, a severe drought struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Hu-chou, and Chia-hsing. Wells and rivers were dried up and typhus fever raged.

— During the period between 6 May and 8 August, a severe drought struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, T'ai-ts'ang, and Yangchow. Wells and rivers were dried up and typhus fever raged.

— During the period between 6 May and 8 August, a severe drought struck Fukien (now Fujian province) on the southeast coast of *China*. Wells and rivers were dried up and typhus fever raged.

In 790 A.D. during the spring and summer, there was a drought in Chêhkiang, Fuhkien, Honan, Kiangsu, and Shensi provinces in *China*. In Shensi, this was a great drought. Wells and rivers dried up. Typhus fever raged.<sup>165</sup>



**Winter of 790 / 791 A.D.** This winter the vines in Provence in southeastern *France* suffered very much and the flocks came into the stables.<sup>62</sup>

The winter of 791 A.D. was very cold. The grapes in Provence, *France* froze. The livestock was decimated. There was an abundance of snow and ice. Wild animals could be taken up by hand.<sup>171</sup>

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**791 A.D.** In *Wales*, there was a grievous famine.<sup>57, 72, 91</sup>

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**Winter of 791 / 792 A.D.** During the period between 8 November 791 and 5 February 792, a drought struck several regions of *China*. There had been no snowfall during the winter. The regions affected included:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an and Yangchow.
- Anhwei (now Anhui province) in eastern *China* at Ch'u and Shou.
- Hunan province in south-central *China* at Li.

In 791 A.D. during the winter, there was a drought in Anhwei, Kiangsu and Hupeh provinces in *China*. No snowfall.<sup>165</sup>

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**792 A.D.** In *Scotland*, there was a dearth [famine].<sup>57, 72, 91</sup>

In 792 A.D., floods struck in many areas of *China* causing crop damage, loss of houses and the drowning of over 20,000 people. Honan (now Henan province) in central *China* was flooded. Shantung (now Shandong province) on the east coast of *China* was flooded. Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow, Soochow, Sung-chiang and T'ai-ts'ang was flooded. Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hu-chou was flooded. During the period between 24 June and 23 July, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Su-ch'ien. During the period of 8 August - 8 November floods struck in the following locations: Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow was flooded. Anhwei (now Anhui province) in eastern *China* was flooded. Hupeh (now Hubei province) in central *China* at Chiang-ling and Hsiang-yang was flooded. Honan (now Henan province) in central *China* at Huai-yang, Shang-ch'iu and Chêng was flooded. Kansu (now Gansu province) in northwest *China* at Lin-hsia was flooded. Shansi (now Shanxi province) in northern *China* at Shuo was flooded. Hopei (now Hebei province) in northern *China* at Ta-ming, Cho, Chi, Mi-yün, and Lu-lung was flooded. [Chi is located at 117.24 E. longitude, 40.03 N latitude.]<sup>153</sup>

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**Winter of 792 / 793 A.D.** On 7 November, there was an inundation of the West Sea in *Friesland*. Countless people and cattle were devoured. Around this time, the island of Helgeland was more than 2 miles long and one mile wide. [The source places this event in the winter of 892-893, which represents an unresolved conflict.]<sup>172</sup>

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**793 A.D.** Frightful thunder and lightning storms, especially at Northumberland in *England* soon after followed by a severe famine.<sup>72</sup>

In *England*, there was a great thunderstorm.<sup>72</sup>

In *England*, there was a famine "after many meteors;" and this famine was spread through other parts of the world.<sup>91</sup>

In 793 A.D., there was a famine [in *England*]. The famine was so great that people made bread from acorns.<sup>212</sup>

In *England* in the year 793 after many meteors, there was a famine under the Pontificate of Sabinianus; a famine and plague under Boniface the 4<sup>th</sup>; and a famine and plague under Phocas the Emperor.<sup>72</sup>

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**794 A.D.** In 794 A.D. during the period between 5 February and 31 July, a drought struck *China*.<sup>153</sup>

In 794 A.D. during the spring and summer, there was a drought in *China*.<sup>165</sup>

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**795 A.D.** In 795 A.D. during the period between 23 March and 21 June, a drought struck *China*. Then during the period between 16 November and 15 December, floods struck in Hunan province in south-central *China* at Ch'ang-tê and in Szechwan (now Sichuan province) in southwest *China* at Ch'ung-ch'ing.<sup>153</sup>

In 795 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

In 795 A.D., a terrible famine struck *Europe*.<sup>155</sup>

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**796 A.D.** In 796 A.D., floods struck in Fukien (now Fujian province) on the southeast coast of *China* and in Shansi (now Shanxi province) in northern *China* at Lan.<sup>153</sup>

In 796 A.D. during the period between 12 May and 9 June, a drought of long duration struck *China*.<sup>153</sup>

In 796 A.D. during the summer, there was a drought of long duration in *China*.<sup>165</sup>

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**797 A.D.** In 797 A.D. during the period between 5 February and 31 May, a drought struck Shensi (now Shaanxi province) in central *China* at Sian. Then during the period between 28 July and 26 August, floods struck in Anhwei (now Anhui province) in eastern *China* at Po.<sup>153</sup>

In 797 A.D. during the spring and summer, there was a drought in *China*.<sup>165</sup>

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**Winter of 798 / 799 A.D.** During the period between 8 November 798 and 5 February 799, a drought struck *China*. There had been no snowfall during the winter.<sup>153</sup>

In 798 A.D. during the winter, there was a drought in *China*. No snowfall.<sup>165</sup>

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**799 A.D.** In 799 A.D. during the period between 10 April and 7 June, a drought of long duration struck *China*.<sup>153</sup>

In 799 A.D. during the spring and summer, there was a drought in *China*.<sup>165</sup>

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**Winter of 799 / 800 A.D.** During the winter of 799-800 A.D., a huge storm surge damaged Helgoland [now Heligoland - a small *German* archipelago] in the North Sea, which then consisted of two mesas, which were of almost identical size.<sup>172</sup>

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**800 A.D.** [In *England*] on the 9<sup>th</sup> of January came a most prodigious hurricane from Africa, with irresistible force. It cast down to the ground and destroyed infinite towns, houses, villages and trees. The same year happened a very great inundation of the sea, which carried away much cattle.<sup>72</sup>

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**Winter of 800 / 801 A.D.** The winter of 801 A.D. [in *France*] was very cold. A plague ensued.<sup>171</sup>

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**Winter of 801 / 802 A.D.** The Pontus Euxine [*Black Sea*] was totally blocked by the ice.<sup>62</sup>

In the year 801, the winter was very severe on the coast of the *Black Sea*.<sup>62</sup>

The winter of 802 A.D. [in *France*] was very cold from 11 November to 12 March.<sup>171</sup>

**802 A.D.** In 802 A.D. during the period between 5 February and 6 May, floods struck Honan (now Henan province) in central *China* at Huang-ch'uan, Ju-nan, and Hsin-yang.<sup>153</sup>

In 802 A.D., a drought also struck Honan (now Henan province) in central *China* at Huang-ch'uan, Ju-nan, and Hsin-yang.<sup>153</sup>

In 802 A.D., there was a drought in Honan province in *China*.<sup>165</sup>

**803 A.D.** In *Scotland* there was a terrible famine.<sup>57, 72, 91</sup>

In 803 A.D. during the period between 27 January and 20 August, a severe drought struck Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 803 A.D. during the spring, summer and autumn, there was a great drought in *China*.<sup>165</sup>

**804 A.D.** In 804 A.D., a drought struck Shensi (now Shaanxi province) in central *China* causing a famine.<sup>153</sup>

In 804 A.D., there was a drought in Honan and Shensi provinces in *China*.<sup>165</sup>

**805 A.D.** In the South of *Wales*, hail; each stone like hen's egg.<sup>57, 72, 93</sup>

In 805 A.D., floods struck several regions of *China* including:<sup>153</sup>

— Shensi (now Shaanxi province) in central *China* at Sian. Crops were damaged.

— During the period between 6 May and 8 August, floods struck Hunan province in south-central *China* at Ch'ang-tê.

— During the period between 8 August and 8 November, floods struck in Hupeh (now Hubei province) in central *China* at Chu-ch'i and in Hunan province in south-central *China* at Ch'ang-tê. Ten thousand families were flooded.

In 805 A.D. during the period between 8 August and 8 November, a drought struck several regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China*.

— Kiangsu (now Jiangsu province) on the east coast of *China*.

— Hupeh (now Hubei province) in central *China* at Wuchang.

— Hunan province in south-central *China* at Yüeh-yang.

— Honan (now Henan province) in central *China* at Huai-yang and Hsü-ch'ang.

In 805 A.D. during the autumn, there was a drought in Chêhkiang, Honan, Hunan, Hupeh and Kiangsu provinces in *China*.<sup>165</sup>

**806 A.D.** The Rhône River [in *France*] was frozen over.<sup>38</sup>

In 806 A.D., the winter [in *England*] was intensely cold.<sup>212</sup>

In 806 A.D. during the period between 6 May and 8 August, floods struck several regions of *China* including:<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Chiang-ling.
- Anhwei (now Anhui province) in eastern *China* at Shou.
- Hopei (now Hebei province) in northern *China* at Ta-hsing.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow.

**807 A.D.** In 807 A.D. during the period between 9 July and 6 August, floods struck Honan (now Henan province) in central *China* at Ju-nan.<sup>153</sup>

**Winter of 807 / 808 A.D.** The winter of 808 A.D. [in *France*] produced soft unwholesomeness. There were terrible floods. [The winter was mild in temperature but as a result there were destructive floods.]<sup>171</sup>

[In *Europe*], during the winter of 808, the weather was warm but also very destructive because of the terrible floods.<sup>62</sup>

**808 A.D.** In 808 A.D., a drought struck several regions of *China* including:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and Soochow.
- Kiangsi (now Jiangxi province) in southern *China*.
- Hunan province in south-central *China*.
- Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea.
- Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam*.
- *Indochina*.
- Shantung (now Shandong province) on the east coast of *China*.

In 808 A.D., there was a drought in Anhwei, Hunan, Kiangsu, Kiangsi, Kwangtung, Shantung and Shansi provinces in *China*.<sup>165</sup>

**809 A.D.** The flood of 809 surpassed all known floods in *Western Europe*. The floods took [drowned] the harvest fields residents and forced the inhabitants of riverbanks to seek refuge on higher ground. The floods were caused by an abundance of rainfall. The floods reached its climax on December 28.<sup>79</sup>

In 809 A.D., flood records were broken on the Loire River at Burgundy, *France*. Residents were forced to take refuge in the hills. The floods peaked on 28 December.<sup>171</sup>

In 809 A.D. during the period between 20 January and 8 August, a severe drought struck several regions of *China*. As a result the land tax was remitted. The regions affected included:

- Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Hu-chou, and Chia-hsing.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Sung-chiang, T'ai-ts'ang, Nanking, Yangchow and Soochow.
- Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng, and Kuang-tê.
- Kiangsi (now Jiangxi province) in southern *China*.

Then during the period between 11 November and 10 December, floods struck Shensi (now Shaanxi province) in central *China* at Wei-nan. Two hundred families were flooded.<sup>153</sup>

In 809 A.D. during the spring, summer and autumn, there was a great drought in Chêhkiang, Hunan, Hupeh, Kiangsi and Kiangsu provinces in *China*. As a result the land tax was remitted.<sup>165</sup>

**Winter of 810 / 811 A.D.** The winter of 811 was rough and lasted until the end of March.<sup>62</sup>

The winter of 811 seemed very harsh in *Western Europe* in the north. It lasted until the end of March.<sup>79</sup>

The winter of 811 A.D. [in *France*] was very cold through March.<sup>171</sup>

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**811 A.D.** In 811 A.D. during the period between 21 October and 19 November, floods struck in Shensi (now Shaanxi province) in central *China* at Fu and Chung-pu and in Szechwan (now Sichuan province) in southwest *China* at P'êng-shui.<sup>153</sup>

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**Winter of 811 / 812 A.D.** During the period between 20 December 811 A.D. and 17 January 812 A.D. there was a great cold in *China*.<sup>210</sup>

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**812 A.D.** In 812 A.D., floods struck several regions of *China* including:<sup>153</sup>

— During the period between 17 February and 16 March, floods struck Suiyuan province (now part of *Inner Mongolia*) at Horinkar.

— During the period between 13 June and 11 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at P'o-yang, Lin-ch'uan, I-ch'un, and Chi-an.

— Also, during the period between 13 June and 11 July, floods struck Szechwan (now Sichuan province) in southwest *China* at Fêng-chieh.

In 812 A.D., droughts struck several regions of *China* including:<sup>153</sup>

— During the period between 15 April and 13 May, a drought struck Shensi (now Shaanxi province) in central *China* at Sian.

— During the period between 6 May and 8 August, a drought struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and Chinkiang.

In 812 A.D. during the summer, there was a drought in Kiangsu province in *China*.<sup>165</sup>

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**813 A.D.** In *England*, there was a great overflow of the River Severn in the night; 2,000 people and 7,000 cattle drowned.<sup>47, 72, 92</sup>

In 813 A.D., floods struck several regions of *China* including:<sup>153</sup>

— During the period between 2 June and 1 July, floods struck Honan (now Henan province) in central *China* at Huai-yang and Hsü-ch'ang. One thousand persons drowned.

— During the period 2-30 July, floods struck in Shensi (now Shaanxi province) in central *China* at Sian and in Hopei (now Hebei province) in northern *China* at Ts'ang and Yen-shan.

In 813 A.D. during the period between 6 May and 8 August, a drought struck Shensi (now Shaanxi province) in central *China* at Ta-li and Hua.<sup>153</sup>

In 813 A.D. during the summer, there was a drought in Shensi province in *China*.<sup>165</sup>

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**814 A.D.** In 814 A.D. during the period between 8 August and 8 November, floods struck several regions of *China* causing crop damage. Regions that were affected included:<sup>153</sup>

— Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.

— Hunan province in south-central *China* at Yüeh-yang.

— Hupeh (now Hubei province) in central *China* at An-lu.

— Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng.

— Kiangsi (now Jiangxi province) in southern *China* at Kiukiang, Lin-ch'uan, and I-ch'un.

In 814 A.D. during the period between 23 May and 20 June, a drought struck the central part of Shensi (now Shaanxi province) in central *China*. As a result the summer [land] tax was remitted. Then during the period between 8 November 814 and 13 April 815, a drought struck *China*.<sup>153</sup>

In 814 A.D. during the summer, there was a drought in Honan and Shensi provinces in *China*. The land tax was remitted.<sup>165</sup>

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**815 A.D.** In 815 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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In 815 A.D., the Rhine River flooded.<sup>171</sup>

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**816 A.D.** In 816 A.D., floods struck several regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ü. Crops were damaged and 100 persons drowned.

— Kiangsi (now Jiangxi province) in southern *China* at P'o-yang, Fu-liang, and Yüeh-p'ing. Four thousand families were flooded.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang and Wu-chin. Crops were damaged.

— Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ao-an. Crops were damaged.

— Honan (now Henan province) in central *China* at Huai-yang and Hsü-ch'ang. Crops were damaged.

— Shensi (now Shaanxi province) in central *China* at Sian. Crops were damaged.

— During the period between 31 May and 28 June, floods struck Shensi (now Shaanxi province) in central *China* at Sian.

— During the period between 29 June and 28 July, floods struck Shantung (now Shandong province) on the east coast of *China* at Chu-ch'êng.

— During the period between 27 August and 24 September, floods struck along the Wei River in Kansu (now Gansu province) in northwest *China* and in Shensi (now Shaanxi province) in central *China*.

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**817 A.D.** In 817 A.D., floods struck several regions of *China* including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Loyang.

— Hopei (now Hebei province) in northern *China* at Ta-ming, Yung-nien and Hsing-t'ai.

— Shansi (now Shanxi province) in northern *China* at Yung-chi, Chin-ch'êng, Ch'ang-chih, Lin-fên, and Hsi. Crops were damaged.

— Hupeh (now Hubei province) in central *China* at Chiang-ling. Crops were damaged.

— Hopei (now Hebei province) in northern *China* at Ta-hsing. Crops were damaged.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow. Crops were damaged.

— Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing and Taichow. Crops were damaged.

— During the period between 18 July and 15 August, floods struck Shensi (now Shaanxi province) in central *China* at Sian. Two thousand families were flooded.

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In 817 A.D., the Seine River in *France* flooded.<sup>171</sup>

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**818 A.D.** In 818 A.D. during the period between 7 July and 5 August, floods struck along the Huai River in several provinces including Honan (now Henan province) in central *China*, Kiangsu (now Jiangsu province) on the east coast of *China*, and Anhwei (now Anhui province) in eastern *China*.<sup>153</sup>

In 818 [in *England*], there was a plague on man and beast from 3 rainy years and moisture. The grain and grapes were all rotten.<sup>72</sup>

In 818 or 820 in *France*, there was great rains and floods; many and great floods under Boniface the 4<sup>th</sup> from rain.<sup>72</sup>

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**820 A.D.** In *France*, there were great rains and floods.<sup>47, 92</sup>



The year 820 A.D. was a rotten year in *France*. The Seine River flooded and spoiled the fruit crop. This was followed by famines and plagues.<sup>171</sup>

In 820 excessive rainfall caused rivers to overflow their banks in *Western Europe*. The rainfall prevented the autumn sowing. The rain and humidity corrupted the grains and vegetables. The lack of warm temperatures, combined with the excessive rains and the humidity, impoverished and deteriorated crop of wine. There were even countries where the farmers could not sow their seeds during the spring.<sup>79</sup>

In 818 or 820, from long continued rains in *France*, and moisture in the air for two or three years, came a terrible plague on man and cattle, far and near. All corn and other grains were rotten. Wine was useless. There were great floods and stagnant air. No hard corn was sown in *England* before the next spring.<sup>72</sup>

[In *Western Europe*], the summer of 820 was strangely cold. There were abundant and persistent rains, which caused inundation of the fields because many rivers overflowed their banks. This was especially true for the Gironde River near Bordeaux, *France*. The grains and vegetables were spoiled by the wetness and could not be stored without rotting. The grape harvest was very mediocre, because of the lack of heat. The wine produced was quite tasteless. Because of a roughness of the weather, an infectious disease raged among people and the cattle. No part of Gaul [*Western Europe*] was spared from this scourge, and to make this misfortune worse, the flooding also prevented the autumn sowing.<sup>62</sup>

In 820, it rained a lot [in *Germany*] and spoiled the grain in the field. This was followed by a great plague, in which people as well as cattle frequently died.<sup>172</sup>

In 820 A.D. during the period between 8 August and 8 November, floods struck several regions of *China* including:<sup>153</sup>

- Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang and Chi-an.
- Szechwan (now Sichuan province) in southwest *China* at Fêng-chieh.
- Hopei (now Hebei province) in northern *China* at Ts'ang.

In 820 A.D., a drought struck *China*.<sup>153, 165</sup>

**Winter of 820 / 821 A.D.** The winter of 821 A.D. was very cold and grim [in *Germany*].<sup>172</sup>

**821 A.D.** The abundant rainfall of 821 in the north of *Western Europe* prevented the sowing of autumn [fall crops].<sup>79</sup>

During the summer and autumn of 821 A.D., there were torrential rains [in *France*], which spoiled the crops.<sup>171</sup>

**Winter of 821 A.D / 822 A.D.** The great rivers in *France* and *Germany* were frozen for 30 days. Snow was on the ground in Vienna, *Austria* from 22 September 821 until 12 April 822.<sup>28</sup>

In 822, the Rhône River in *France* froze.<sup>58, 80</sup>

The winter of 822 A.D. was very long and very cold. All the rivers in *Europe* were frozen for more than a month. Rivers could be crossed on the ice as if on dry land. There were disasters on the Rhine, the Seine and Yonne rivers.<sup>171</sup>

In 822, the Po River in *Italy* froze.<sup>58, 80</sup>



In *England*, the frost was great following two or three weeks of rain.<sup>47,93</sup>

In the year 821, there was the greatest frost in *England* following 2 or 3 years of rains.<sup>72</sup>

In the year 822 in *Europe*, heavily loaded carts crossed the ice on the frozen Danube, the Rhine, the Elbe and the Seine rivers, for more than a month. The Rhône, the Po, the *Adriatic* and several *Mediterranean* ports were frozen.<sup>60,61,62</sup> [The Danube River is located in Central and Eastern Europe. The Rhine River runs through Switzerland, Germany and the Netherlands. The Elbe River is located in Central Europe. The Seine River is located in northern France. The Rhône River runs through Switzerland and France. The Po River is located in northern Italy. The Adriatic is the Adriatic Sea.]

During the winter of 821-822 in *Western Europe*, the [frozen] rivers bore the weight of carriages for more than thirty days.<sup>79</sup>

In the year 822, very heavy rains in *France* spoiled all the fruits of the earth (crops destroyed), which could not be planted until the next spring. The rivers came out of their beds and the water flowed far into the country. "These evils followed a long and very severe winter, so that not only the streams and small rivers, but also the great rivers, the Rhine, Danube, Elbe and Seine were frozen, and wagons drove on the ice." The ice caused great devastation along the banks of the Rhine River to the banks of Meierhöfen, *Austria*.<sup>62</sup> [Maierhofen is located in southern Bavaria near Bregenz, Austria, on the banks of Lake Constance.]

In the year 821, the winter was so long and frosty that not only small brooks, but streams and rivers including the Rhine, Danube, Albis [Elbe], and Seine, and generally all great rivers both in *France* and *Germany* were so hard frozen, that for 30 days loaded carriages went over the rivers as if the ice were bridges.<sup>72</sup>

In the year 822 or 824, there was a great frost in *England*.<sup>72</sup>

### **822 A.D. – 823 A.D. England, Wales and Scotland. Famine**

In 822-823 in *England* and *Scotland*, thousands starved.<sup>57,91</sup>

In 823, there was a famine in *England*, *Wales*, and *Scotland*. Thousands starved.<sup>90,212</sup>

In 823, there was a famine in *Scotland*; many thousands starved.<sup>72</sup>

**822 A.D.** In the year 822 in *Western Europe*, there were severe frosts on 2 July and 22 July.<sup>79</sup>

In 822 A.D., floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. The city walls and the mulberry trees were damaged. Then during the period between 22 July and 20 August, floods struck Honan (now Henan province) in central *China* at Huai-yang, Hsü-yang and Ju-nan. Three hundred families were flooded. Then during the period between 8 November 822 and 14 February 823, a drought struck *China*.<sup>153</sup>

In 822 A.D. during the winter, there was a drought in *China*.<sup>165</sup>

*Also refer to the section 822 A.D. – 823 A.D. for information on the famine in England, Wales and Scotland during that timeframe.*

**Winter of 822 / 823 A.D.** The winter of 823 A.D. was unusually severe. Winter's cold began on 22 September. Frost and snow continued until 12 April. For a month, all the rivers of *Europe* bore the load

of the heaviest wagons almost without interruption.<sup>172</sup>

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**823 A.D.** In 823 thunder and lightning this summer did great damage by killing people and cattle. Hail destroyed the corn.<sup>72</sup>

[In *England*], there were tempests of hail, thunder, lightning that was fatal to grain, grass, people and cattle which lasted all summer.<sup>72</sup>

In the year 823 or 824, lightning set fire to a multitude of buildings and killed many people and huge hail ravaged the countryside in *France*. In addition, all historians assure, that we dare not believe without the unanimity of their testimony, that by the summer solstice [around 20 or 21 June] in Autun in the region of Burgundy, *France*, was seen falling from the sky, following a sudden storm and amidst a terrible hailstorm, real ice blocks (we are sure of these measures) of 4.6 meters (15 feet) long by 1.8 meters (6 feet) wide and 0.6 meters (2 feet) thick. (These facts were confirmed in the Annals of Einhard, the chronicle of Adhemar, the short Chronicle of Reims, the Annals of Fulda, the Chronicle of Hermann, all contemporary sources. Paradin, in *Annales de Bourgogne*, bk. 1, p. 149, also speaks of a miraculous ice stone that fell in the year 956 in *Germany*, and another one that fell in April 1562 in the Beaujolais region of central *France*.)<sup>79</sup>

Another source places this event in the year 824. In 824, a hailstone fifteen feet (4.6 meters) in length fell upon the city of Autun [Autun is a commune in the Saône-et-Loire department in Burgundy in eastern *France*].<sup>190</sup>

Another source places this event in the year 825. “In 825 there was a fall of huge hail [in *France*]. A piece of ice fell that was 15 feet long by 6 feet wide.”<sup>171</sup>

In 823 A.D. during the period between 15 April and 13 May, a drought struck several regions of *China* including:<sup>153</sup>

- Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo, Shao-hsing, Taichow, Ching-hua, Ch’ü, Chien-tê, Wên-chou, Li-shui, Hangchow, Chia-hsing, and Hu-chou.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, T’ai-ts’ang, and Yangchow.
- Anhwei (now Anhui province) in eastern *China* at Hsüan-ch’êng and Hsi.
- Kiangsi (now Jiangxi province) in southern *China*.

In 823 A.D. during the spring, there was a drought in Chêhkiang, Kiangsu and Kiangsi provinces in *China*.<sup>165</sup>

*Also refer to the section 822 A.D. – 823 A.D. for information on the famine in England, Wales and Scotland during that timeframe.*

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**Winter of 823 A.D / 824 A.D.** The winter in Gaul [*Western Europe*] was severe and lasted longer than usual. Many beast and even humans were subjected to extreme cold. A disease followed and snatched away many people of both sexes and ages.<sup>62</sup>

The winter of 824 in *Western Europe* in the north was as long as it was rigorous.<sup>79</sup>

In 823, a bitter sharp and long winter ensued. A load of snow fell, which laid 29 weeks, even to Easter. This also was fatal to many people and cattle in *England*.<sup>72</sup>

In the year 822 or 824, there was a great snow that killed many people and cattle [in *England*].<sup>72</sup>

The winter of 824 A.D. was very long and very cold [in *France*]. This was followed by epidemics that affected all age groups.<sup>171</sup>

**824 A.D.** In 824-825, *Ireland* was afflicted with a great dearth [famine].<sup>57, 91</sup>

In *France* in 824 after a rainy year, then a severe frost and drought and plague.<sup>72</sup>

In 824 A.D. during the period between 6 May and 8 August, floods struck several regions of *China* causing damage to houses and crops. These regions included:

- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow.
  - Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Chien-tê.
  - Anhwei (now Anhui province) in eastern *China* at Shou.
  - Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing, Ts'ao, and P'u.
  - Hupeh (now Hubei province) in central *China* at Hsiang-yang, Chün, Mien-yang, and Chung-hsiang.
- Then during the period between 8 August and 8 November, floods struck Honan (now Henan province) in central *China* at Loyang, Huai-yang, and Hsü-ch'ang. Crops were damaged.<sup>153</sup>

**825 A.D.** In *France* great hail killed several people and much cattle.<sup>72</sup>

In 824-825, *Ireland* was afflicted with a great dearth [famine].<sup>57, 91</sup>

In 825 A.D., floods struck several regions of *China* causing damage to crops. These regions included:<sup>153</sup>

- Shantung (now Shandong province) on the east coast of *China* at Tzū-yang.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Tung-hai.
- Shensi (now Shaanxi province) in central *China* at Hua, Sian, and Ch'ien.

Then during the period between 8 August and 8 November, floods struck Shensi province at Fu and Chung-pu.

In 825 A.D., the Great Taihu Lake in *China* overflowed.<sup>166</sup>

In 825 A.D. during the period between 8 August and 8 November, a drought struck several regions of *China* including:<sup>153</sup>

- Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing, and Hu-chou.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, T'ai-ts'ang, and Yangchow.
- Kiangsi (now Jiangxi province) in southern *China*.
- Hunan province in south-central *China*.
- Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng.
- Hupeh (now Hubei province) in central *China* at Hsiang-yang, Chiang-ling, and Wuchang.

In 825 A.D. during the autumn, there was a drought in Chêhkiang, Hunan, Hupeh, Kiangsu and Kiangsi provinces in *China*.<sup>165</sup>

**826 A.D.** In 826 A.D. during the period between 9 July and 6 August, a drought struck Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 826 A.D. during the summer, there was a drought in Shensi province in *China*.<sup>165</sup>

**827 A.D.** In *England*, the River Thames was frozen for 9 weeks.<sup>28, 29, 47, 72, 93</sup>

The frost in *England* lasted nine weeks.<sup>40, 41, 42, 43, 212</sup>

In 827 A.D. during the period between 28 June and 27 July, a drought struck in Shensi (now Shaanxi province) in central *China* at Sian and Ta-li and in Shansi (now Shanxi province) in northern *China* at Yung-chi.<sup>153</sup>

In 827 A.D. during the summer, there was a drought in Shensi and Shansi provinces in *China*.<sup>165</sup>

**828 A.D.** "In *Italy*, raised scorching winds, accompanied by fiery meteors. But this year was very fruitful." <sup>62</sup>

In 828 A.D., floods struck several regions of *China* including: <sup>153</sup>

— Honan (now Henan province) in central *China* at Mêng and Loyang.

— Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing, Ts'ao, P'u, I-tu, Ling, Tzū-ch'uan, Tsinan, Tzū-yang, and Tung-hai.

— During the period between 6 May and 8 August, floods struck in Shensi (now Shaanxi province) in central *China* at Sian and in Honan at Huai-yang and Hua. Crops were damaged.

— During the period between 16 July and 14 August, floods struck on the east coast of *China* in Shantung (now Shandong province) at Hui-min and in Chekiang (now Zhejiang province) at Shao-hsing.

**829 A.D.** The year 829 in *Western Europe* produced famines, plagues, and all kinds of evils.<sup>79</sup>

[In *England*], there was a tempest of wind.<sup>72</sup>

[In *England*], there was a great hurricane with twinkling fires like stars running to and fro.<sup>72</sup>

In 829 A.D., floods struck several regions of *China* including: <sup>153</sup>

— Honan (now Henan province) in central *China* at Shang-ch'iu. Crops were damaged.

— Anhwei (now Anhui province) in eastern *China* at Po. Crops were damaged.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow. Crops were damaged.

— During the period between 7 May and 4 June, floods struck in Shensi (now Shaanxi province) in central *China* at T'ung-kuan. Two hundred families were flooded.

In 829 A.D. during the period between 2 September and 1 October, a drought struck the central part of Shensi (now Shaanxi province) in central *China*. As a result, the land tax of 9 districts was remitted.<sup>153</sup>

In 829 A.D. during the autumn, there was a drought in Shensi province in *China*. The land tax of nine districts was remitted.<sup>165</sup>

**Winter of 829 / 830 A.D.** *Europe* experienced a very severe winter in 829. Ice was present on the Nile River in *Egypt*.<sup>28</sup>

In the year 829, the Patriarch of Antioch, Dionysius of Telmahre, went with the Caliph Al-Ma'mun to *Egypt*; they found the Nile River frozen.<sup>60, 62</sup>

In the year 829, the winter in *Egypt* was very severe.<sup>62</sup>

The year 830 produced a very harsh winter in *Western Europe* in the north.<sup>79</sup>

The winter of 830 A.D. [in *France*] was very harsh in the north.<sup>171</sup>

**830 A.D.** In 830 A.D., floods struck several regions of *China* including:<sup>153</sup>

- Shensi (now Shaanxi province) in central *China* at Fu and Chung-pu. Over 300 families were flooded.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, T'ai-ts'ang, and Yangchow. Crops were damaged.
- Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing, Hu-chou, Ningpo, Shao-hsing, Taichow, Chin-hua, Ch'ü, Chien-tê, Wên-chou, and Li-shui. Crops were damaged.
- Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng and Hsi. Crops were damaged.
- Kiangsi (now Jiangxi province) in southern *China*. Crops were damaged.
- Shensi at Fu, Chung-pu, and Sian. Crops were damaged.
- Hupeh (now Hubei province) in central *China* at Hsiang-yang, Chiang-ling, and Wuchang. Crops were damaged.
- Honan (now Henan province) in central *China* at Loyang. Crops were damaged.
- Hunan province in south-central *China* at Yüeh-yang. Crops were damaged.
- During the period between 24 June and 23 July, floods struck in Anhwei province at Ch'ien-shan, T'ai-hu, Su-sung, and Wang-chiang.

In the year 830, there was a terrible thunderstorm in *Wales*.<sup>72</sup>

**831 A.D.** In 831 A.D. during the period between 13 July and 11 August, floods struck several regions of *China* damaging crops. These regions included:<sup>153</sup>

- Szechwan (now Sichuan province) in southwest *China* at San-t'ai and Sui-ning.
- Kiangsi (now Jiangxi province) in southern *China* at Lo-ch'êng.
- Honan (now Henan province) in central *China* at Ju-nan [location in dispute under Huai-hsi].
- Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo, Shao-hsing, Taichow, Ch'ü, Chin-hua, Chien-tê, Wên-chou, Li-shui, Hangchow, Chia-hsing, and Hu-chou.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, and T'ai-ts'ang.
- Hupeh (now Hubei province) in central *China* at Chiang-ling, Hsiang-yang, and Wuchang.
- Hunan province in south-central *China* at Yüeh-yang.

In 831 A.D., the Seine River in *France* flooded. [Tree rings in giant oaks showed this year was a very wet year.]<sup>171</sup>

**832 A.D.** In 832 A.D. during the period between 5 March and 4 April, floods struck in Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and in Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou. Then during the period 2-30 July, floods struck Kiangsu at Soochow causing 900 families to be flooded. Then during the period between 31 July and 29 August, a drought struck in Shensi (now Shaanxi province) in central *China*; in Shansi (now Shanxi province) in northern *China* at Yung-chi; and in Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

In 832 A.D. during the autumn, there was a drought in Honan, Shantung and Shensi provinces in *China*.<sup>165</sup>

**833 A.D.** In 833 A.D. during the period between 8 August and 8 November, floods struck several regions of *China* causing crop damage. This occurred at:

- Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing, and Hu-chou.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, T'ai-ts'ang, Yangchow, and Huai-an.
- Anhwei (now Anhui province) in eastern *China* at Ch'ien-shan, Shou, Ch'u, Ho, Hsüan-ch'êng and Ho-fei.

During the period between 19 August and 16 September, in other regions of *China* a severe drought prevailed.<sup>153</sup>

In 833 A.D. during the autumn, there was a great drought in *China*.<sup>165</sup>

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**834 A.D.** In 834 A.D., Anhwei (now Anhui province) in eastern *China* at Ch'u sustained flooding. Over 10,000 families were flooded. Hupeh (now Hubei province) in central *China* at Ch'i-ch'un also experienced flooding.<sup>153</sup>

In 834 A.D. during the period between 10 July and 8 August, a drought struck in Kiangsu (now Jiangsu province) on the east coast of *China*; in Anhwei (now Anhui province) in eastern *China*; in Honan (now Henan province) in central *China* at Shan; and in Shensi (now Shaanxi province) in central *China* at Hua. Then during the period between 8 August and 8 November, floods struck in Kiangsi (now Jiangxi province) in southern *China* and in Hupeh (now Hubei province) in central *China* at Hsiang-yang. Crops were damaged.<sup>153</sup>

In 834 A.D. during the summer, there was a drought in Kiangsu and Shensi provinces in *China*.<sup>165</sup>

In 834 A.D., the Seine River in *France* flooded.<sup>171</sup>

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**835 A.D.** In 835 A.D. during the period between 29 July and 27 August, a drought struck several regions of *China* including:<sup>153</sup>

- Shensi (now Shaanxi province) in central *China* at Sian, Hua, and Ta-li.
- Shansi (now Shanxi province) in northern *China* at Yung-chi.
- Honan (now Henan province) in central *China* at Loyang and Shan.

In 835 A.D. during the autumn, there was a drought in Honan, Shansi and Shensi provinces in *China*.<sup>165</sup>

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**836 A.D.** In *Wales*, due to a famine, “the ground covered with dead bodies of men and beast.”<sup>57, 72, 91</sup>

In 836, the River Tweed in *Great Britain* overflowed its banks, and laid waste the country for 30 miles round.<sup>90</sup>

In 836 A.D., there was an inundation of the River Tweed in *England*. The country for 30 miles [48 kilometers] round was laid to waste.<sup>212</sup>

In 836, there was an inundation of the Tweed, which did immense damage.<sup>43</sup>

[Another source places this flood in the year 834.] In 834 in Northumberland, *England*, the River Tweed overflowed and extended 30 miles round. Loss of life and cattle.<sup>47, 92</sup> In 834, Tweed drowned many people and far more cattle.<sup>72</sup>

In 836 A.D. during the period between 25 February and 20 March, a drought struck *China*. Then floods struck Hopei (now Hebei province) in northern *China* at Chêng-ting damaging crops. Then during the period between 6 May and 8 August, floods struck Shensi (now Shaanxi province) in central *China* at Fêng-hsiang and Lin-yu. Several hundred families were damaged and over 100 persons drowned.<sup>153</sup>

In 836 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**837 A.D.** In 837 A.D. during the period between 5 February and 4 September, a severe drought struck *China*.<sup>153</sup>

In 837 A.D. during the spring and summer, there was a great drought in *China*.<sup>165</sup>



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**Winter of 837 / 838 A.D.** The winter [in *Europe*] was completely taken up by rain and wind. Thunder was heard from January to mid-February, just as in March, and the extraordinary heat of the sun dried up the earth.<sup>62</sup>

The winter of 838 A.D. was rainy and windy [in *France*]. There were winter storms and then extreme sun.<sup>171</sup>

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**838 A.D.** The year 838 produced diluvial rains [heavy rainfalls that produced floods] in *Western Europe*.<sup>79</sup>

There were massive rainfalls in 838 in the north of *Western Europe*, which ruined the entire crops.<sup>79</sup>

[In *Germany*] this year was marked by unusual atmospheric changes. A terrible burning sun scorched the earth.<sup>62</sup>

On 26 December 838 A.D., there was a severe storm surge which reached the height of the dune ridges overran the coast. This was probably the first emergence of Leybucht [second largest bay in East Frisia in northwest *Germany* after the Dollart]. Many of the survivors between the Ems and Weser Ostfriesen emigrated to North Friesland.<sup>172</sup>

In 838 A.D. during the period between 30 January and 27 February, a drought struck *China*. As a result, the summer [land] tax was remitted.<sup>153</sup>

In 838 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

In 838 A.D., floods struck several regions of *China* including:<sup>153</sup>

— Floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow.

— Floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Li-shui.

— Floods struck Hupeh (now Hubei province) in central *China* at Chün, Chiang-ling and Hsiang-yang. Houses were damaged.

— During the period between 6 May and 8 August, floods struck Honan (now Henan province) in central *China* at Chêng, Hua, Huai-yang and Hsü-ch'ang. Houses were damaged.

— During the period between 6 May and 8 August, floods struck Shensi (now Shaanxi province) in central *China* at Fu and Chung-pu. Houses were damaged.

— During the period between 6 May and 8 August, floods struck Hupeh at Wuchang and Hsiang-yang. Houses were damaged.

— During the period between 6 May and 8 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Ts'ao, P'u, and Liao-ch'êng. Houses were damaged.

— During the period between 6 May and 8 August, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming. Houses were damaged.

— During the period between 8 August and 8 November, floods struck Szechwan (now Sichuan province) in southwest *China* at Chengtu causing flood damage to houses and crops.

— During the period between 8 August and 8 November, floods struck Hopei province at Ts'ang and Ching causing flood damage to houses and crops.

— During the period between 8 August and 8 November, floods struck Shantung province at Tzū-yang, Tê and I-tu causing flood damage to houses and crops.

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**839 A.D.** In 839 A.D. during the period between 15 July and 13 August, a severe drought of long duration struck Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo, Shao-hsing, Taichow, Chin-hua, Ch'ü, Chien-tê, Wên-chou, and Li-shui.<sup>153</sup>



In 839 A.D. during the summer, there was a very severe drought in Chêhkiang province in *China*.<sup>165</sup>

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**840 A.D.** In *Germany*, the Rhine River flooded from rains.<sup>47, 72, 92</sup>

From excessive rains, the Rhine River overflowed.<sup>72</sup>

In 840 A.D. during the period between 3 July and 2 August, a drought struck *China*. Then during the period 2-30 August, floods struck in Hopei (now Hebei province) in northern *China* at Chêng-ting and in Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow.<sup>153</sup>

In 840 A.D. during the summer, there was a drought in Chêhkiang, Chihli, Fuhkien, Honan, and Kiangsu provinces in *China*. The land tax was remitted. The drought was accompanied by a plague of locusts. Typhus fever raged.<sup>165</sup>

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**Winter of 840 / 841 A.D.** In the winter of 841 A.D., the Seine and Yonne rivers in *France* flooded.<sup>171</sup>

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**841 A.D.** In Herbipolis [now Würzburgnorth, Bavaria in southern *Germany*], people cattle and the lands were greatly harassed by hail, whirlwinds and unusual temperatures.<sup>72</sup>

In 841, there was a terrible storm accompanied by lightning, thunder and heavy rains on the territory of Glandfeuil [Le Thoureil, Maine-et-Loire in western *France*].<sup>79</sup>

In 841 A.D. during the period between 22 July and 19 August, floods struck in Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and in Hupeh (now Hubei province) in central *China* at Hsiang-yang and Chün where houses were damaged.<sup>153</sup>

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**Winter of 841 / 842 A.D.** The cold during the winter of 842 in *Western Europe* in the north was neither less intense nor less permanent. A lot of snow fell on the night of April 14.<sup>79</sup>

In the winter of 842 A.D. was intense and lasting. The Seine and Yonne rivers in *France* flooded.<sup>171</sup>

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**Winter of 842 / 843 A.D.** The winter of this year was very long and very cold, producing many diseases and in agriculture, the weather injured cattle and bees.<sup>62</sup>

The winter of 843 A.D. was very long and cold [in *France*]. The cold weather decimated the livestock and the bees. Then a disease struck.<sup>171</sup>

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**Winter of 843 / 844 A.D.** The winter was exceptionally mild [in *Europe*] and rainy up to early February, with some intervals of bright sky.<sup>62</sup>

The winter of 844 A.D. [in *France*] was mild and rainy until February.<sup>171</sup>

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**Winter of 844 / 845 A.D.** The winter was very severe in Normandy in northern *France*.<sup>62</sup>

The winter of 845 A.D. [in *France*] was very cold in the north.<sup>171</sup>

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**845 A.D.** In *Bulgaria*, there was a great famine.<sup>57, 72, 91</sup>

In 845 A.D. during the period between 11 April and 9 May, a drought struck *China*.<sup>153</sup>

In 845 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**Winter of 845 / 846 A.D.** The winter of 846 A.D. [in *France*] saw a persisting north wind until May. This was very harmful to the crops. The city of Troyes in north-central *France* was flooded.<sup>171</sup>

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**846 A.D.** In May 846, Auxerre in the Burgundy region of northern *France* experienced such a flood. The Yonne River in northern *France* swelled prodigiously, entered houses and dragged the casks of wine from the cellars. The violent waters removed whole vines, and carried them to the opposite shore.<sup>79</sup>

In 846 A.D. during the period 1-31 March, a drought struck *China*. As a result, the summer tax was remitted. Then during the period between 8 November 846 and 20 March 847, another drought struck *China*.<sup>153</sup>

In 846 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**847 A.D.** In the year 847, there was a frost in Britain.<sup>72</sup>

In 847 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**Winter in 848 / 849 A.D.** The Seine River in *France* was frozen; so people used the river as a bridge.<sup>62</sup>

The winter of 849 A.D. was very cold in *France*. The Seine River was passable on the ice as if it was dry land.<sup>171</sup>

We crossed the Seine River in *France* on the ice in 6 January 849.<sup>79</sup>

In the year 849, the winter in Gaul [*Western Europe*] was very harsh.<sup>62</sup>

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**849 A.D.** The fall of 849 produced excessive rainfall in the north of *Western Europe*.<sup>79</sup>

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**850 A.D.** In 850 A.D., a severe drought struck *China*.<sup>153</sup>

In 850 A.D., there was a great drought in *China*.<sup>165</sup>

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**850 A.D. - 855 A.D. France, Italy and Germany. Famine**

During the years 850-851 in *Italy* and *Germany* there was a drought with famine.<sup>47, 72</sup>

In 850, a famine prevailed in Paris, *France*.<sup>57, 91</sup>

In 851 there was a famine in *Italy* and *Germany*.<sup>57, 91</sup>

In 850 A.D., a terrible famine struck *Europe*.<sup>155</sup>

In the year 851 and 852, the sun was glowing extremely hot in *Gaul* [*Western Europe*] *Germany* and *Italy*. The drought was so great that food shortage for the cattle occurred. It became clear that a terrible famine was beginning, which continued to the year 855. "You could see parents eating their own children."<sup>62</sup>

In 851 and 855, there was so great a drought over all of *Italy* and *Germany* as caused such a famine that parents eat their own children and children their parents.<sup>72</sup>

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**Winter of 853 / 854 A.D.** From 11 to 28 November 853 A.D., there were a series of frost [in *France*].<sup>171</sup>

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**854 A.D.** In 854 A.D. during the period 1-30 April, a drought struck *China*.<sup>153</sup>

In 854 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

*Also refer to the section 850 A.D. – 855 A.D. for information on the drought and famine in France, Italy and Germany during that timeframe.*

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**855 A.D.** In 855 A.D. during the period between 17 August and 14 September, a drought struck several regions of *China* including:<sup>153</sup>

- Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing, and Hu-chou.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, T'ai-ts'ang, and Yangchow.
- Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng and Hsi.

In 855 A.D. during the autumn, there was a drought in Anhwei, Chêhkiang and Kiangsu provinces in *China*.<sup>165</sup>

[In *England*], there was a tempest of hail, whirlwind and thunder.<sup>72</sup>

*Also refer to the section 850 A.D. – 855 A.D. for information on the drought and famine in France, Italy and Germany during that timeframe.*

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**Winter of 855 / 856 A.D.** On 6 January, there was a shocking inundation of the Tiber River in *Italy*. This was followed by a plague, wherein the throat being obstructed by great defluxions [inflammations], the sick died suddenly.<sup>72</sup>

In *Poland*, there was a great frost.<sup>47, 72, 93</sup>

The winter in 856 was very harsh and very dry, a violent epidemic pulled out many people.<sup>62</sup>

The winter of 856 A.D. was very rigorous and dry [in *France*]. It was followed by epidemics.<sup>171</sup>

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**856 A.D.** In *England*, there were great rains and floods, followed by an epidemic of quinsy.<sup>47, 72, 92</sup>

In the year 856 in *Scotland*, a four year famine began.<sup>57, 72, 91</sup>

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**858 A.D.** In 858 A.D., floods struck several regions of *China* including:<sup>153</sup>

- Floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Su-ch'ien. Thousands of houses were flooded.
- During the period between 11 September and 10 October, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming and Chêng-ting. Crops were damaged.
- During the period between 11 September and 10 October, floods struck Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng, Tzû-yang, and Tung-p'ing. Crops were damaged.
- During the period between 11 September and 10 October, floods struck Honan (now Henan province) in central *China* at Hua, Kaifeng, and Shang-ch'iu. Crops were damaged.
- During the period between 11 September and 10 October, floods struck Anhwei (now Anhui province) in eastern *China* at Ch'ien-shan, Shou, and Ho. Crops were damaged.
- During the period between 11 September and 10 October, floods struck Kiangsu province at Chinkiang. Crops were damaged.

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**Winter of 858 / 859 A.D.** During the period between 10 November 858 and 25 March 859, a drought struck *China*.<sup>153</sup>

In 858 A.D. during the winter, there was a drought in *China*.<sup>165</sup>

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**859 A.D.** In 859 A.D., floods struck *China* during the period between 6 May and 8 August.<sup>153</sup>

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**Winter of 859 / 860 A.D.** During the winter most of the rivers in *Europe* were frozen for two months.<sup>1</sup>

In the year 860, the Rhône River in *France* froze.<sup>58, 80</sup>

The winter of 860 A.D. was very long and very cold [in *France*]. It lasted from November to April. There was an overabundance of snow. The winter destroyed the [grape] vines. The Rhône River was frozen over its entire length. Wild animals could be taken up by hand. This was followed by a famine.<sup>171</sup>

In the year 860, the *Adriatic Sea* and the Rhône River froze.<sup>60</sup>

In the year 859, the ice was so great that carriages were used on the *Adriatic Sea*. The *Mediterranean Sea* was frozen over, and passable by carts in 860 A.D.<sup>2, 39, 40, 41, 42, 43, 47, 93</sup>

In 860, frosts and snows were continuously beginning in November until April. The Ionian Sea froze. People went to Venice, *Italy* on horseback [over the frozen water].<sup>79</sup>

The winter was very severe over nearly all of *Europe*. The *Ionian and Adriatic Seas* were frozen during 860 A.D.<sup>28</sup> [The Ionian Sea is an arm of the Mediterranean Sea, south of the Adriatic Sea, bounded by southern Italy including Calabria, Sicily and the Salento peninsula to the west, southern Albania to the north, and a large number of Greek islands. The Adriatic Sea separates the Italian Peninsula from the Balkan peninsula.]

So severe a winter that the *Adriatic Sea* was frozen over and people walked on foot to Venice, *Italy* [on the ice].<sup>72</sup>

In the year 860, the *Adriatic Sea* was so frozen that one could travel on foot from the continent and walk to Venice, *Italy*. The Rhône River in *France* also shivered.<sup>62</sup>

In 860 in *Italy*, the Port of Venice was frozen.<sup>58, 80</sup>

In the year 859, there was a very severe and long frost [in *Britain*].<sup>72</sup>

In the winter of 859-860 in Gaul [*Western Europe*] and *Germany*, the winter was very harsh and long. The winter in *France* lasted from November to April with snow and solid ice. In *Italy*, the frost was violent and persistent, and the earth was covered with immense snow. The seeds in the ground and the vines froze and died. The wine froze in the cask, where it has been preserved. The mortality rate among people and animals was large, and then a famine broke out, which was terrible in the next year.<sup>62</sup>

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**860 A.D.** In 860 A.D., floods struck Anhwei (now Anhui province) in eastern *China* at Fou-yang.<sup>153</sup>

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**861 A.D.** In Kent, *England*, there were floods in the River Medway.<sup>40, 41, 43</sup> Great loss of cattle.<sup>47, 72, 92</sup>

During the period between 8 August 861 and 30 July 862, a drought struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

In 861 A.D. during the autumn, there was a drought in Honan and Kiangsu provinces in *China*.<sup>165</sup>

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**862 A.D.** At the headquarters of Haslou on the Meuse River in *the Netherlands* in July 862, as a result of excessive heat, the sky became so dark a little after noon. One could not see much more than if it was dark. Incessant lightning pierced the darkness and set the whole sky on fire. Soon there were burst of appalling thunder amid torrents of terrible hail. Some of the hailstones were 1.5 inches (38 millimeters) in circumference. Furious eddies intensified the uproar of the storm.<sup>79</sup> [Haslou or Elsloo is a town in the Netherlands. The Meuse River runs through France, Belgium and the Netherlands.]

During the period between 8 August 861 and 30 July 862, a drought struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

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**863 A.D.** In *Scotland*, there was a famine with a plague.<sup>57, 72, 91</sup>

In 863 A.D., floods struck several regions of *China* including:<sup>153</sup>

— During the period between 27 June and 17 August, floods struck Honan (now Henan province) in central *China* at Loyang. Many people drowned.

— During the period between 18 August and 16 September, floods struck Honan province at Hsü-ch'ang and Lin-ju causing crop damage.

— During the period between 18 August and 16 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow and Su-ch'ien causing crop damage.

— During the period between 16 October and 14 November, floods struck Shansi (now Shanxi province) in northern *China* at Hsiao-i.

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**Winter of 863 / 864 A.D.** The winter of 864 A.D. was very cold in *France*. The Rhône River was covered with ice.<sup>171</sup>

In 864 in *England*, there was a sharp and long frosty winter.<sup>72</sup>

In the year 864, there was a frost in *England*.<sup>72</sup> There was a deep snowfall.<sup>72</sup>

In the year 864 in *Italy* and *Germany*, the winter was long and harsh. The *Adriatic Sea* was frozen around Venice and on its lagoon; riders and wagons laden with goods traveled across the ice.<sup>62</sup>

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**864 A.D.** In *England*, the River Humber greatly flooded.<sup>40, 41, 43, 47, 92</sup> much loss of cattle.<sup>72</sup>

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**865 A.D.** In 865 there was a great flood of water [in *Germany*] and the next year 866 produced a cruel famine.<sup>172</sup>

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**866 A.D.** In 866 A.D. during the period between 6 May and 8 August, floods struck in Kiangsu (now Jiangsu province) on the east coast of *China* and in Anhwei (now Anhui province) in eastern *China*. Then during the period between 8 August and 8 November, floods struck Honan (now Henan province) in central *China* at Loyang causing crop damage.<sup>153</sup>

On 6 February 866 A.D., the Seine River in *France* flooded.<sup>171</sup>

In March 866 A.D., the Seine River in *France* flooded (twice).<sup>171</sup>

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**867 A.D.** Excessive rains fell in 867 in the north of *Western Europe*.<sup>79</sup>

There was a tempest of wind, that was fatal in many places.<sup>72</sup>

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**868 A.D.** Paris, *France* suffered again from famine.<sup>57, 91</sup>

A great famine afflicted not only *Germany*, but also all other countries of *Europe*.<sup>72</sup>

In 868 A.D., a terrible famine struck *Europe*.<sup>155</sup>

The heavy rainfalls in 868 caused floods fatal to the grains in *Western Europe*.<sup>79</sup>

In 868 A.D., there was a flood of many rivers [in *France*].<sup>171</sup>

In 868 A.D., a drought struck Kiangsu (now Jiangsu province) on the east coast of *China* and Anhwei (now Anhui province) in eastern *China*.<sup>153</sup>

In 868 A.D., there was a drought in Kiangsu province in *China*.<sup>165</sup>

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**Winter of 868 / 869 A.D.** The winter of 869 A.D. was cold and produced a famine. As a result, in the province of Quercy in southwestern *France*, one-third of the population died.<sup>171</sup>

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**869 A.D.** During the summer a terrible famine arose in many provinces of *France* and *Burgundy*. A frightening amount of people died. So great was the hunger that people resorted to eating human flesh.<sup>62</sup> [Burgundy during this period of time was part of the Frankish Kingdom.]

In 869 A.D. during the period between 13 July and 11 August, a drought struck *China* followed by a plague of locust.<sup>153</sup>

In 869 A.D. during the summer, there was a drought in *China*. The drought was accompanied by a plague of locusts.<sup>165</sup>

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**870 A.D.** In the region around Worms in southeastern *Germany*, there was such violent heat that the reapers in the field fell down dead [from heatstroke]. And several people died of suffocation while traveling on the Rhine.<sup>62</sup>

[In *England*], there was a tempest of hail and lightning, which was fatal to corn (grain), people and cattle.<sup>72</sup>

In 870 A.D. during the period between 6 May and 8 August, a drought struck *China*.<sup>153</sup>

In 870 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**872 A.D.** In *Germany* and in Gaul [*Western Europe*] the summer was characterized by a suffocating heat and almost constant storm. Saint Peter's Church in Worms, *Germany* was destroyed by lightning. Many people were killed, and the harvests were poor. *England* was hit by an all-consuming drought and heat.<sup>62</sup>

In *England*, there was a famine “from ugly locusts.”<sup>72, 91</sup>

Worms, *Germany* was burnt to the ground by lightning.<sup>72</sup> [The source list this event in the year 873]

There was a great drought and unusual scorching heat.<sup>72</sup>

The summer of 872 [in *Germany*] was unusually warm. Because of the heat, the corn [grain] harvest turned out badly. Then grains became expensive.<sup>172</sup>

Due to the extreme dryness during the summer of 872 in the north of *Western Europe*, almost all the fruit was destroyed.<sup>79</sup>

The extreme heat and drought of the summer of 872 destroyed almost all fruit in the north of *Western Europe*. Lightning consumed many houses with their inhabitants.<sup>79</sup>

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**873 A.D.** In Paris, *France*, there was much suffering from a famine.<sup>91</sup>

In 873 A.D., a terrible famine struck *Europe*.<sup>155</sup>

The summer of 873 A.D. was very hot [in western *Europe*]. There was a plague of locusts in *Germany* and *Spain*.<sup>171</sup>

In the year 873, the city of Worms, *Germany* was burnt down from thunder.<sup>72</sup>

In 873 A.D. during the period between 27 August and 25 September, floods struck in Honan (now Henan province) in central *China* at Loyang and other areas in Honan, and in Shantung (now Shandong province) on the east coast of *China*. Then during the period between 24 December 873 and 21 January 874, a drought struck *China*. As a result, the land tax was remitted.<sup>153</sup>

In 873 A.D. during the autumn, there was a drought in *China*.<sup>165</sup>

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**Winter of 873 / 874 A.D.** In the north of *Western Europe* the winter of 873-874 was harsh and prolonged, characterized in particular by the prodigious mass of snowfall.<sup>79</sup>

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#### **Within 874 A.D. – 889 A.D. China. Famine**

During the reign of Emperor Hi-Tsong [874-889 A.D.] in *China*, there was a grievous famine, which was caused by the overflowing of the rivers and by vast swarms of locusts, which destroyed most of the corn [grain].<sup>186</sup>

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**874 A.D.** [In *France*] the heat of summer and long duration caused the pastures to dry up and this resulted in a shortage of grains. As a result of the famine and plague in *France*, one third of the population was swept away.<sup>62</sup>

In 874, a plague of ugly deformed locusts ate up the fields in *France*. They had six feet and two teeth harder than stone. So numerous were they, that they darkened the sun. In one day and night they eat up all greens and trees. But strong winds drove them into the sea where they drowned. The waves cast their bodies ashore where the putrefaction proved fatal to many. So that by famine and plague, a third part of the people died.<sup>72</sup>

The long summer of 874 in *Western Europe* produced a long drought that was so great that it destroyed the hay and grains.<sup>79</sup>



The summer of 874 in the north of *Western Europe* was long and dry. This cruel drought consumed the hay and corn [grains].<sup>79</sup>

Paris, *France* suffered again from famine.<sup>57</sup> [Another source list this event in the year 873]

In 874 A.D., a terrible famine struck *Europe*.<sup>155</sup>

In 874 A.D. during the period between 20 May and 17 June, a drought struck *China*.<sup>153</sup>

In 874 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**Winter of 874 / 875 A.D.** Cold weather brought great frost to *Scotland* from November to April. The winter thaw produced floods.<sup>28</sup>

In the year 875, there was a frost in *England*.<sup>72</sup>

In 874 A.D., there was a very severe frost [in *England*]. The winter was long. There was snow from November to the end of March. Because of the deep snow, the forest was inaccessible for the supply of fuel [firewood].<sup>212</sup>

In the year 874, the Rhine and the Meuse rivers remained frozen for a long time and were accessible to pedestrians.<sup>62</sup>

In the year 874, the winter in Gaul [*Western Europe*], was so long and so strong in frost and snow, that, as the chronicles of St. Denys records, "No man who lived at that time had seen such a severe winter." The winter lasted from September to March. The snow fell in such a large quantity that the forests had become inaccessible and as a result people could procure no wood. The earth was covered with snow for five months, and the effects of this winter were very disastrous. The domestic animals, especially the horses died in great numbers, as did many people from the cold. The famine and the diseases that followed this winter snatched up, according to the chronicles of Fulda, a third of the population there [*Bavaria*]. *Italy* felt similar effects of the snow and the cold.<sup>62</sup>

The winter of 875 was very long and very cold in *France*. It lasted from early September to the end of March. There was so much snow that many forests were inaccessible. There was up to 15 feet of snow in the mountains of Burgundy. There were 5 months of heavy snow. The Rhine and Meuse rivers were frozen and could be crossed as if on dry land. There was a catastrophic thaw, which caused flooded. Horses were decimated. There were epidemics. One-third of the population of *France* died from this winter.<sup>171</sup>

The winter of 875 was sharper and longer than ordinary. The Earth was covered with snow and ice from November to the vernal equinox [around March 20/21].<sup>72</sup>

[Another account places this winter in 873.] In 873 in *Western Europe*, frost and snow continued without interruption from November 1<sup>st</sup> until the spring equinox.<sup>79</sup>

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**876 A.D.** In Saxony [now part of northwest *Germany*], there were great rains in June that produced extensive flood damage.<sup>47, 72, 92</sup>

A sudden tempest and inundation of rain in *Saxony*, to the ruin of many men, beast, buildings and trees.<sup>72</sup>

In 876 A.D., no snow fell during the winter. During the period between 4 March and 24 June a drought struck several regions on the east coast of *China*. As a result, one year's land tax was remitted. The regions affected included: <sup>153</sup>

— Chekiang (now Zhejiang province) at Ningpo, Shao-hsing, Taichow, Chin-hua, Chien-tê, Wên-chou, Ch'ü, Li-shui, Hangchow, Chia-hsing and Hu-chou.

— Kiangsu (now Jiangsu province) at Soochow, Sung-chiang, and T'ai-ts'ang

In 876 A.D. during the spring and summer, there was a drought in Chêhkiang and Kiangsi provinces in *China*. The land tax was remitted. No snowfall during the winter. <sup>165</sup>

In 876 A.D., floods struck in Honan (now Henan province) in central *China* and in Shantung (now Shandong province) on the east coast of *China*. <sup>153</sup>

**878 A.D.** In *England*, there was a famine “from ugly locusts.” <sup>72</sup>

**879 A.D.** In 879, a universal famine prevailed. <sup>57, 72, 91</sup>

**880 A.D.** In 880 A.D. during the period between 13 April and 12 May, a severe drought struck *China*. <sup>153</sup>

In 880 A.D. during the spring, there was a great drought in *China*. <sup>165</sup>

In 880 A.D., a terrible famine struck *Europe*. <sup>155</sup>

**Winter of 880 / 881 A.D.** In the year 880 in *Germany*, the winter was severe and of extraordinary length. The Rhine and the Main rivers froze for a long time and individuals could travel across these rivers on the dry ice. <sup>61</sup>

The winter of 880-881 was very long and very cold in *Western Europe* in the north. The Rhine River and the Main River froze for a long time. We crossed the firm ice on foot. The frosts persevered until the spring. <sup>79</sup> [The Main River is located in southwest Germany.]

The winter of 881 A.D. was very long and very cold. The Rhine and Meuse rivers were frozen for a long time. There were frosts in the spring. As a result, the pastures did not grow. There were famines. <sup>171</sup>

In the year 880, the Rhine and the Meuse rivers froze for a long time. <sup>62</sup>

The winter of 880-881 was very cold and persistent in *France*, Flanders [now *Belgium*] and *Germany*. The winter showed itself to be very dangerous for several species of domestic animals because “in the spring, the very severe frost compressed the earth” and yielded no green feed. The cold and famine by the very barrenness of the previous year brought suffering to the utmost. <sup>62</sup> [When Flandria appeared in the 8<sup>th</sup> century, it was a Frankish fief centered in Bruges in northwestern Belgium].

**882 A.D.** In 882 A.D., there were destructive hailstorms [in *France*]. <sup>171</sup>

**883 A.D.** There was a terrible famine in *Italy*. <sup>57, 72, 91</sup>

There was a terrible thunder and lightning storm [in *England*]. <sup>72</sup>

**884 A.D.** In 884 A.D., there was a severe drought in Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow. The resulting famine was so severe that cannibalism was practiced. <sup>153</sup>

In 884 A.D., there was a great drought in Anhwei, Kiangsi and Kiangsu provinces in *China*. The resulting famine was so severe that it led to cannibalism.<sup>165</sup>

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**885 A.D.** In Cheshire, *England*, the River Dee greatly overflowed; many villages injured.<sup>40, 41, 47, 92</sup>

Dee demolished many villages, people and cattle.<sup>72</sup>

In 885, there was an inundation of the River Dee.<sup>43</sup>

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**886 A.D.** On 6 February 886, the Loire River in *France* flooded.<sup>171</sup>

In March 886, the flooding of the Seine River in *France* help the Parisians that were besieged by the Normans.<sup>171</sup>

In 886, it rained day and night almost without interruption during the months of March, June and July in the vicinity of Mainz in west-central *Germany*, which led to flooding of a frightening part of the Rhine River and other rivers.<sup>79</sup>

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**Winter of 886 / 887 A.D.** The winter was very severe and of unusually long duration. It was accompanied by such a severe disease among the oxen and sheep, that in *France* few animals of this kind remained.<sup>62</sup>

The winter of 887 [in *France*] was very long or maybe the term “unusually” long would be appropriate. It caused the near extinction of oxen and sheep.<sup>171</sup>

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**887 A.D.** In 887 in *England*, there was a grievous famine that lasted 2 years.<sup>57, 72, 91</sup>

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**889 A.D.** In 889, the extraordinary floods desolated northern *Italy*. The mass of rains in Thuringia in central *Germany* destroyed in a short time three villages, and three hundred people drowned there.<sup>79</sup>

In 889 A.D., the Seine River in *France* flooded.<sup>171</sup>

In 889 A.D., a terrible famine struck *Europe*.<sup>155</sup>

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**890 A.D.** In *Scotland*, there was a great dearth [famine].<sup>57, 72, 91</sup>

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**Winter of 890 / 891 A.D.** In *Western Europe*, the Meuse River was frozen.<sup>62</sup>

The winter of 891 A.D. was very cold in *France*. The vineyards and herds were decimated. The Meuse River froze.<sup>171</sup>

In the year 891 in Flanders [now *Belgium*] and Holland [now *the Netherlands*], the winter was severe.<sup>62</sup>

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**892 A.D.** The months of April and May 892 in *Western Europe* produced an extreme drought.<sup>79</sup>

In April and May 892 A.D., it was extremely dry [in *France*].<sup>171</sup>

In 892 in *Western Europe*, excessive drought struck beginning in the first of April and continuing through May. Then disastrous frosts struck on May 18 and July 17. These late frosts destroyed the [grape] vines and wheat.<sup>79</sup>

In 892 A.D. during the period between 8 August and 8 November, a severe drought struck *China*.<sup>153</sup>

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**Winter of 892 / 893 A.D.** In the year 893, the vine and fruit trees in *France* were killed [by the extreme cold].<sup>58, 80</sup>

The winter of 893 A.D. was very cold in *France*. The Rhône River was frozen. Livestock was decimated. There was 5 days of very heavy snowfall in March.<sup>171</sup>

The Rhône River in *France* froze.<sup>62</sup>

The winter of 893 was at once so hard and so long, we could see in some places a foot of snow for five days in March. This cold led to a great scarcity of wine in the territory of Bayeux in northwestern *France*.<sup>79</sup>

The winter of 893 was severe and of a longer duration than usual. In March, a foot of snow fell in 5 days. As a result of this severe winter in *Bavaria*, there was almost a total lack of wine and many sheep and bees were killed.<sup>62</sup>

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**893 A. D.** In 893, there was a great flood in *China*. The Yellow River cut a new course to the sea.<sup>142</sup>

In 893 A.D. during the autumn, there was a great drought in *China*.<sup>165</sup>

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#### **895 A.D. - 897 A.D. Ireland. Famine**

In *Ireland*, there was a famine from an invasion of locusts.<sup>91</sup>

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**895 A.D.** In York, *England*, hail; stones like ducks' eggs.<sup>57, 93</sup> [Another source places this event in the year 896.<sup>72</sup>]

In the year 895, part of the town of Shaftesbury, Dorset, *England* was burnt by lightning.<sup>72</sup>

In 895 in the north of *Western Europe*, the trees bloom a second time in December.<sup>79</sup>

*Also refer to the section 895 A.D. – 897 A.D. for information on the famine in Ireland during that timeframe.*

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#### **896 A.D. - 899 A.D. France. Famine**

In 896-899, Paris, *France* suffered from a famine.<sup>91</sup>

In 898, the famine was so great in *France* that people out of necessity ate one another.<sup>72</sup>

From 896 to 899, Paris, *France*, once again suffered from a famine.<sup>57</sup>

In 898 in *France* a sore famine.<sup>57, 72, 91</sup>

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**896 A.D.** Due to the extreme cold and hard frost, the Lagoons in Venice, *Italy* in 1709 froze to a depth of several inches in thickness. The same phenomenon had occurred in 896 according to the annals of Fulda.<sup>81</sup>

In 896 A.D. the Rhine River flooded.<sup>171</sup>

In 896 A.D., Honan (now Henan province) in central *China* at Hua during the period 17 May - 14 June experienced flooding. Over 1,000 li [333 miles] flooded.<sup>153</sup>

Also refer to the section **895 A.D. – 897 A.D.** for information on the famine in Ireland during that timeframe.  
Also refer to the section **896 A.D. – 899 A.D.** for information on the famine in France during that timeframe.

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**897 A.D.** In 897, there was a great famine in *Germany*.<sup>128</sup>

Also refer to the section **895 A.D. – 897 A.D.** for information on the famine in Ireland during that timeframe.  
Also refer to the section **896 A.D. – 899 A.D.** for information on the famine in France during that timeframe.

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**900 A.D.** *England* was visited by a sore famine.<sup>57, 72, 91</sup>

In 900 A.D. during the period between 29 July and 27 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China*. Then during the period between 8 November 900 and 6 May 901, a drought struck Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 900 A.D. during the winter, there was a drought in Shensi province in *China*.<sup>165</sup>

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**901 A.D.** In 901 A.D. during the period between 22 February and 22 March, a drought struck *China*.<sup>153</sup>

In 901 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**Winter of 901 / 902 A.D.** In 901 in *England*, there was a frost of 120 days that began at the end of the year.<sup>128</sup>

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**902 A.D.** In 902 the Nile River in *Egypt* only rose to thirteen cubits during the peak of the annual inundation. [Generally this means that *Egypt* experience a strong famine during the harvest in the following year.]<sup>83</sup>

In 902 A.D., a flood struck Szechwan (now Sichuan province) in southwest *China* at Yüeh-shan.<sup>153</sup>

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**905 A.D.** In 905 A.D. during the period between 18 May and 16 June, a drought struck *China*.<sup>153</sup>

In 905 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**908 A.D.** Most of the rivers in *England* were frozen for two months.<sup>2, 28, 40, 41, 42, 43, 47, 93</sup>

The frost in *England* was severe for 2 months.<sup>72</sup>

The River Thames in *England* was frozen for two months.<sup>29</sup>

During the winter of 908 A.D., there was a severe frost. Most of the rivers in *England* were frozen for 2 months.<sup>212</sup>

In 908 A.D. during the period between 5 March and 3 April, a drought struck *China*.<sup>153</sup>

In 908 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**911 A.D.** In 911 A.D. during the period between 2 April and 1 May, a drought of long duration struck *China*.<sup>153</sup>

In 911 A.D. during the spring, there was a drought of long duration in *China*.<sup>165</sup>

In the year 911, there was a great snowfall in *Scotland*. Snow “lay deep in Scotland, the Death of much Cattle.”<sup>72</sup>

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**912 A.D.** *Saxony* was flooded by rain.<sup>47, 92</sup>

There was a great inundation in *Saxony*.<sup>72</sup>

In 912 there was a scarcity [famine] in *Egypt*.<sup>83</sup>

In 912 A.D. during the period between 22 March and 17 June, a drought struck *China*.<sup>153</sup>

In 912 A.D. during the spring and summer, there was a drought in *China*.<sup>165</sup>

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**Winter of 912 / 913 A.D.** In *Germany* and *Northern Europe*, the winter was very severe.<sup>62</sup>

In the year 913, there was a frost in *England*. A most severe winter.<sup>72</sup>

The winter of 913 A.D. was cold [in *France*].<sup>171</sup>

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**914 A.D.** A great famine in *Germany*.<sup>72</sup>

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**916 A.D.** There was a terrible thunder and lightning storm in *Scotland*.<sup>72</sup>

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**918 A.D.** It rained most of the year in *Scotland*.<sup>1</sup>

A continual rain in *Scotland* for five months.<sup>2, 40, 41, 56</sup>

There was 5 or 6 months of continual rain in *Scotland*.<sup>72</sup>

In *Scotland*, rains extended over five months producing floods. In *Ireland*, a great flood occurred.<sup>47, 92</sup>

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**919 A.D.** In Cambridge in southeastern *England*, a storm destroyed more than 40 houses.<sup>41, 56, 72</sup>

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**921 A.D.** A storm (great hurricane) struck Manchester, Lancashire in northwestern *England*.<sup>40, 41, 72</sup>

[In *England/Normandy*] the heat of the summer was very great; this year produced an abundance of wine. The drought was almost constantly during the months of July, August and September.<sup>62</sup>

Intense heat and extreme drought ruled almost without interruption during the months of July, August, and September of 921 in *Western Europe*. As the year came to an end, there were many storms.<sup>79</sup>

In 921 A.D. from July to September, there were heat, drought and thunderstorms [in *France*].<sup>171</sup>

In *Western Europe*, terrible storms filled the summer of 921.<sup>79</sup>

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**Winter of 922 / 923 A.D.** In the winter of the year 923, the River Thames in *England* was frozen for nine weeks.<sup>1</sup>

In 923 A.D., the River Thames at London, *England*, was frozen for 13 weeks.<sup>212</sup>

In the year 923, there was a frost in *England*.<sup>72</sup>

The winter of 923 A.D. [in *France*] was cold.<sup>171</sup>

The winter of the year 922 [in *Western Europe*] is recorded as very severe.<sup>62</sup>

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**923 A.D.** In 923 A.D. during the period between 20 January and 18 May, a drought struck *China*. There was no snowfall during the winter.<sup>153</sup>

In 923 A.D. during the spring and summer, there was a drought in *China*. No snowfall during the winter.<sup>165</sup>

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**924 A.D.** In 924 A.D. during the period between 8 March and 6 April, a drought struck *China*.<sup>153</sup>

In 924 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**925 A.D.** In 925 A.D. during the period between 27 January and 23 June, a drought struck *China*.<sup>153</sup>

In 925 A.D. during the spring and summer, there was a drought in *China*.<sup>165</sup>

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**926 A.D.** In 926 A.D. during the period between 13 June and 12 July, a drought struck *China*.<sup>153</sup>

In 926 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**927 A.D.** Cold weather struck *Byzantium*. The frost lasted 120 days.<sup>28</sup> [Byzantium at this time included Turkey, Bulgaria, Macedonia, Albania, Greece and the southern and eastern Italian peninsula.]

In 927 A.D. during the period 2-31 July, a drought struck *China*.<sup>153</sup>

In 927 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**Winter of 927 / 928 A.D.** The winter was very severe in northern *France* and Flanders [now *Belgium*].<sup>62, 79</sup>

The winter of 928 A.D. [in *France*] was very cold in the north. Ten thousand people died.<sup>171</sup>

The winter of 928 A.D. was an extremely severe winter. The whole River Thames in *England* was frozen for 3 months. The army of the first emperor at the siege of Brandenburg, *Germany* set up camp on the frozen Havel River. [Frozen solid enough to bear the weight of his army].<sup>172</sup>

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**928 A.D.** In Reims in northeastern *France*, the harvest was almost finished before August.<sup>62</sup>

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**Winter of 928 / 929 A.D.** During the period between 15 November 928 and 12 February 929, a drought struck *China*. There was no snowfall during the winter. The drought continued during the period between 14 March and 12 April.<sup>153</sup>

In 928 A.D. during the winter, there was a drought in *China*. No snowfall.<sup>165</sup>

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**929 A.D.** In the year 929, the River Thames in England was frozen for 13 weeks.<sup>72</sup> [Other accounts place this year in 923. In the year 923, the River Thames in London, *England* was frozen for 13 weeks.<sup>2, 28, 40, 41, 42, 43, 47, 93</sup>]



In 929 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

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**930 A.D.** In 930 A.D. during the period 6-30 May, a drought struck *China*.<sup>153</sup>

In 930 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**931 A.D.** A famine in *Wales*.<sup>57, 72, 91</sup>

In 931 A.D. during the period between 21 April and 19 May, a drought struck *China*.<sup>153</sup>

In 931 A.D. during the summer, there was a drought in *China*.<sup>165</sup>

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**932 A.D.** A great famine in *France*.<sup>57, 72, 91</sup>

In 932 A.D. during the period between 5 August and 2 September, a severe drought struck *China*.<sup>153</sup>

In 932 A.D. during the autumn, there was a great drought in Hunan province in *China*.<sup>165</sup>

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**933 A.D.** In 933 A.D. during the period between 25 July and 23 August, a drought struck *China*.<sup>153</sup>

In 933 A.D. during the autumn, there was a drought in *China*.<sup>165</sup>

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**Winter of 933 / 934 A.D.** In 933 in *England*, there was a frost of 120 days that began at the end of the year.<sup>128</sup>

The winter of 934 A.D. in *France* was very cold from 30 November to March. The frozen Meuse River was passable as if on dry land.<sup>171</sup>

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**934 A.D.** A terrible whirlwind [tornado] blew down Saint Maximinus's Church at Treves [now Trier] in southwestern *Germany*.<sup>72</sup>

In 934 A.D., there was a drought in Honan (now Henan province) in central *China* at Loyang during the period of 15 July - 12 August. Many people died from excessive heat.<sup>153</sup>

In 934 A.D. during the summer, there was a drought of long duration in Honan province in *China*. Many people died from sunstroke.<sup>165</sup>

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**935 A.D.** In Southampton in Hampshire in southeastern *England*, there were great floods; many people drowned.<sup>40, 41, 43, 47, 72, 92</sup>

In 935 A.D. during the period between 6 April and 5 May, a drought struck Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

In 935 A.D. during the spring and summer, there was a drought in Honan province in *China*.<sup>165</sup>

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**Winter of 935 / 936 A.D.** There had been no snowfall during the winter in *China*.<sup>153</sup>

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**936 A.D.** In *Scotland*, after the appearance of a comet, there were four years of continuous famine "till people began to devour one another."<sup>57, 72, 91</sup>

In 936 A.D. during the period between 24 May and 21 June, a drought struck Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

In 936 A.D. during the spring, summer and autumn, there was a drought Honan province in *China*. No snowfall [during the winter].<sup>165</sup>

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**Winter of 936 / 937 A.D.** During the period between 8 August 936 and 5 February 937, a drought struck *China*. There had been no snowfall during the winter.<sup>153</sup>

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**Winter of 937 / 938 A.D.** In 938 A.D. during the period between 4 January and 1 February, a drought struck *China*. There had been no snowfall during the winter.<sup>153</sup>

In 937 A.D. during the winter, there was a drought in *China*. No snowfall.<sup>165</sup>

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**938 A.D.** In 938 A.D., during the period between 28 August and 26 September, a drought struck *China*. As a result the land tax was remitted. Also during the same year, a flood struck *China* and damaged the imperial ancestral temple.<sup>153</sup>

In 938 A.D. during the autumn, there was a drought in *China*. In some areas there were floods.<sup>165</sup>

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**939 A.D.** In 939 A.D. during the period between 22 May and 15 September, a drought struck *China*.<sup>153</sup>

In 939 A.D. during the summer and autumn, there was a drought in *China*.<sup>165</sup>

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**Winter of 939 / 940 A.D.** The winter was extremely severe in *Germany* and *France*. The harvest was destroyed by the bad weather. There was famine and disease, and the mortality among cattle was particularly large.<sup>62</sup>

The winter of 940 A.D. [in *France*] was very cold. The cold decimated the herd of cattle. This was followed by epidemics and famines.<sup>171</sup>

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**940 A.D.** In 940 A.D., floods struck in Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and in Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow.<sup>153</sup>

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**941 A.D.** In 941 A.D. during the period between 25 August and 23 September, a drought struck Hupeh (now Hubei province) in central *China* at Huang-kang. Some people died [of famine].<sup>153</sup>

In 941 A.D. during the autumn in Hupeh province in *China*, there was a drought that cause a great mortality.<sup>165</sup>

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**942 A.D.** In *England* in December, there were great rains and floods.<sup>47, 72, 92</sup>

In *Ireland*, there was a great flood of the River Shannon.<sup>47, 92</sup> [The River Shannon travels through northern, central and southwestern Ireland.]

In 942 A.D. during the period between 20 March and 17 April, a drought struck *China*. During the period between 18 April and 17 May, a flood struck Honan (now Henan province) in central *China* at Kaifeng. During the period between 16 July and 14 August, a flood struck Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin. During the period between 16 July and 14 August, a flood struck Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng and Hsi.<sup>153</sup>

In 942 A.D. during the spring, there was a drought in *China*.<sup>165</sup>

In 942 A.D., a famine struck *Upper India*.<sup>156</sup>

— “In 330 A.H. (941-942 A.D.), a comet made its appearance, the tail of which reached from the eastern to the western horizon. It remained in the heavens eighteen days, and its blighting influence caused so severe a famine that wheat, the produce of one jarib [a measuring chain] of land was sold for 320 miskāls of gold. [A miskāl is a unit of weight equivalent to approximately 4.25 grams.] When the value of a spike of corn was esteemed as high as the Pleiades [star cluster], conceive what must have been the value of wheat!”

— “The famine in the land was so severe that man was driven to feed on his own species [cannibalism], and a pestilence prevailed with such virulence that it was impossible to bury the dead who fell victims to it.”

**943 A.D.** In 943 A.D. during the period between 6 June and 4 July, a drought of long duration struck Honan (now Henan province) in central *China* at Kaifeng and An-yang. The drought was accompanied by [a plague of] locusts.<sup>153</sup>

In 943 A.D. during the summer, there was a drought of long duration in *China*. The drought was accompanied with a plague of locusts.<sup>165</sup>

**944 A.D.** In *England*, a great storm raged in and near London, which destroyed 1,500 houses.<sup>40, 41, 43, 56, 57, 72</sup>

In 944 A.D., there was a severe gale throughout the whole of *England*. In London alone, over 1,500 houses were unroofed and destroyed.<sup>212</sup>

In 944 A.D., a great hurricane struck London, *England* destroying 1,500 houses. Different accounts from early chroniclers report that between 1,000 and 6,000 people were killed.<sup>197</sup>

[In *Western Europe*] in the year 944, the frost froze the grapevines in the beginning of May. It rained constantly during the whole summer.<sup>62</sup>

In the north of *Western Europe*, the frost burnt the vines around May 1, 944. Then the weather turned rainy which lasted all summer.<sup>79</sup>

The entire summer of 944 was rainy in the north of *Western Europe*.<sup>79</sup>

In 944 A.D. during the period between 23 June and 22 July, a flood struck Honan (now Henan province) in central *China* at Hua.<sup>153</sup>

#### **945 A.D. – 946 A.D. France and Italy. Famine**

In 945-946, a famine struck *France*.<sup>57, 72, 91</sup>

In 945, a famine over all *Italy*, which with war reached *France* in 946.<sup>72</sup>

In 946, a shocking famine in *Italy*.<sup>57, 72, 91</sup>

**946 A.D.** In 946 A.D. during the period between 6 March and 1 June, a drought of long duration struck *China*. This was followed by floods that struck several regions of *China* including:<sup>153</sup>

— During the period between 31 July and 29 August, floods struck in Shantung (now Shandong province) on the east coast of *China* at Tung-a and Chao-ch'êng and in Honan (now Henan province) in central *China* at Ch'in-yang.

— During the period between 30 August and 27 September, floods struck Shantung province at Ên.

— During the period between 28 September and 27 October, floods struck in Hopei (now Hebei province) in northern *China* at P'u-yang; in Honan province at Hua and Ch'in-yang; and in Shantung province at Kuan-ch'êng.

— During the period between 28 October and 26 November, floods struck Honan province at Chi and Yüan-wu.

In 946 A.D. during the spring and summer, there was a drought of long duration in *China*.<sup>165</sup>

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**947 A.D.** A cold frosty snowy winter in *Poland* from 1 November to the middle of March.<sup>72</sup>

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**948 A.D.** In 948 A.D. during the period between 5 February and 5 September, a drought of long duration struck *China*.<sup>153</sup>

In 948 A.D. during the spring and summer, there was a drought of long duration in *China*.<sup>165</sup>

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**951 A.D.** Southampton, *England*, was nearly destroyed in a storm by lightning.<sup>40, 41, 43, 56.</sup>

There was a terrible lightning storm at Southampton, *England* that lasted 4 days.<sup>72</sup>

In 951 [in *England*], there were great thunders.<sup>72</sup>

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**Winter of 951 / 952 A.D.** The winter of 952 A.D. [in *France*] was cold from November to February.<sup>171</sup>

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**952 A.D.** In Bagdad, *Iraq*, half of the city was inundated from a great overflow of the Euphrates River.<sup>47, 92</sup>

In 952 A.D. during the period between 27 April and 26 May, a severe drought struck *China*. Then during the period between 25 June and 24 July, floods struck Szechwan (now Sichuan province) in southwest *China* at Chengtu and Hua-yang. Over 1,000 families were flooded and 5,000 persons drowned.<sup>153</sup>

In 952 A.D. during the summer, there was a great drought in *China*. No snowfall during the winter.<sup>165</sup>

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**Winter of 952 / 953 A.D.** There had been no snowfall during the winter in [*China*].<sup>153</sup>

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**953 A.D.** In 953 A.D. during the period between 14 July and 11 August, a drought struck Honan (now Henan province) in central *China* at Kaifeng. There had been no snowfall during the winter. Wells and rivers dried up. There was [a plague of] locust. There was a famine.<sup>153</sup>

During the period between 14 July 953 and 4 May 954, there was a drought in *China* which produced a great famine and a plague.<sup>153</sup>

In 953 A.D. during the period between 20 October and 18 November, a severe drought struck the east coast of *China* in Kiangsu (now Jiangsu province) at Suchow and in Chekiang (now Zhejiang province) at Hangchow.<sup>153</sup>

In 953 A.D., a flood struck Hopei (now Hebei province) in northern *China* at Peiping. As a result, the land tax was remitted.<sup>153</sup>

In 953 A.D. during the spring and summer, there was a great drought in *China*. Wells and rivers dried up. The Hwang Ho River was fordable on foot. The drought was accompanied by a plague of locusts.<sup>165</sup>

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**954 A.D.** In *England, Wales* and *Scotland*, a great famine which lasted four years.<sup>57, 90, 91, 212</sup>

In 954 A.D., there was pestilence in *Scotland* in which 40,000 people perished.<sup>212</sup>

In 954 A.D. during the spring and summer, there was a drought in *China*. Typhus fever raged. Due to the hardship, soup kitchens were opened.<sup>165</sup>

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**956 A.D.** A very severe winter followed by a grievous famine, especially in *France* and *Burgundy*.<sup>72</sup>

Paradin, in *Annales de Bourgogne*, bk. 1, p. 149, speaks of a miraculous ice stone that fell in the year 956 in *Germany*.<sup>79</sup>

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**959 A.D.** In *Baghdad, Iraq*, nearly three-fourths of the city was inundated from a great overflow of the *Euphrates River*.<sup>47, 92</sup>

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**960 A.D.** In 960 A.D. during the period between 28 August and 23 September, a drought struck *China*. Then during the period between 23 October and 21 November, floods struck Shantung (now Shandong province) on the east coast of *China* at Hui-min and Shang-ho. Houses and fields were damaged by the floodwaters.<sup>153</sup>

In 960 A.D. during the autumn, there was a drought in *China*.<sup>165</sup>

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**961 A.D.** In 961 A.D., floods struck in central *China* in Honan (now Henan province) at Shang-ch'iu and Mêng and in Hupeh (now Hubei province) at Hsiang-yang. During the same year between 16 July and 13 August, a drought struck Honan province at Kaifeng.<sup>153</sup>

In 961 A.D. during the summer and winter, there was a drought in Honan province in *China*.<sup>165</sup>

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**Winter of 961 / 962 A.D.** During the period between 8 November 961 and 5 February 962, a drought struck *China* in Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

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**962 A.D.** In *England*, the frost was so great as to cause a famine.<sup>47, 57, 72, 91, 93</sup>

A most severe winter, a great famine and horrible fire.<sup>72</sup>

In 962 A.D. during the period between 5 February and 8 August, a severe drought struck many regions of *China*. The areas affected included: <sup>153</sup>

- Honan (now Henan province) in central *China* at Loyang, Kaifeng, Mêng-ching, and Hua.
- Hopei (now Hebei province) in northern *China* at Ta-ming.
- Shansi (now Shanxi province) in northern *China* at Yung-chi and Hsi.
- Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing, Tsinan, Chü-yeh and P'u.
- Anhwei (now Anhui province) in eastern *China* at Su.
- Shensi (now Shaanxi province) in central *China* at Fu-shih.

Generally during the period between 2 June and 4 July, the drought affected many regions of *China*.

In 962 A.D. during the spring and summer, there was a drought in Chihli and Honan provinces in *China*.

In Chihli, this was a great drought.<sup>165</sup>

In 962 A.D. during the 7<sup>th</sup> moon, there were violent winds, which tore up trees in the vicinity of Shanghai, *China*.<sup>166</sup>

**963 A.D.** In 963 A.D. during the period between 22 August and 20 September, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan. Then during the period between 21 September and 19 October, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow causing fields to be damaged.<sup>153</sup>

During the period between 26 April 963 and 5 February 964, a drought struck Honan (now Henan province) in central *China* at Kaifeng. In 963 A.D. during the period 6 May and 8 November, the drought also struck in Honan province at Ch'in-yang.<sup>153</sup>

In 963 A.D. during the summer, autumn and winter, there was a drought in Honan province in *China*.<sup>165</sup>

### **963 A.D. – 964 A.D. Ireland. Famine**

In 963-964, an intolerable famine visited *Ireland*, and parents are said to have sold their children in order to get money with which to buy food.<sup>84</sup>

In *Ireland* in 963-964, an intolerable famine, “so that parents sold their children for food.”<sup>57, 91</sup>

**Winter of 963 / 964 A.D.** Up to the beginning of February, the winter [in *Western Europe*] was very hard and rough.<sup>62</sup>

The winter of 964 A.D. [in *France*] was cold until February.<sup>171</sup>

The excessive harshness of the cold in 964 in *Western Europe* in the north persisted until 1 February.<sup>79</sup>

**964 A.D.** In 964 A.D. during the period between 16 February and 8 August, a very severe drought struck several regions of *China* including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Loyang, Shan and Ling-pao.
- Shensi (now Shaanxi province) in central *China* at Shen-mu.
- Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng.
- Ningsia (now Ningxia province) in northwest *China* on the Loess Plateau at Ling-wu.
- Shansi (now Shanxi province) in northern *China* at Yung-chi.

In 964 A.D. during the spring and summer, there was a very severe drought in Honan and Shensi provinces in *China*.<sup>165</sup>

In 964 A.D., floods struck several regions of *China* including:<sup>153</sup>

- During the period between 15 May and 12 June, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and I-chêng. Fields were damaged.
- During the period between 10 August and 8 September, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Yang-ch'un.
- During the period between 10 August and 8 September, floods struck Kiangsu province at T'ai. Houses were damaged and cattle drowned.

*Also refer to the section 963 A.D. – 964 A.D. for information on the famine in Ireland during that timeframe.*

**965 A.D.** In 965 A.D., floods struck many regions of *China* including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Mêng. Houses were damaged by the floodwaters.
- Kiangsu (now Jiangsu province) on the east coast of *China* at T'ai. Fields were damaged.
- Shantung (now Shandong province) on the east coast of *China* at Chi-yang and Kao-wan. Fields were damaged.
- During the period between 6 March and 4 April, floods struck Kiangsi (now Jiangxi province) in southern *China* at Ch'üan.
- During the period between 31 July and 28 August, floods struck Hupeh (now Hubei province) in central *China* at Ch'i-ch'un. Houses were damaged by the floodwaters.
- During the period between 29 August and 27 September, floods struck Honan province at Yang-wu and Mêng. Houses were damaged by the floodwaters.
- During the period between 29 August and 27 September, floods struck Shantung province at Tung-p'ing. Fields were damaged.
- During the period between 28 September and 26 October, floods struck Hopei (now Hebei province) in northern *China* at P'u-yang.
- During the period between 27 October and 25 November, floods struck Shantung province at Chi-yang.

In 965 [in *Germany*], there was a large persistent summer drought.<sup>172</sup>

**966 A.D.** In 966 A.D. during the period between 5 February and 8 August, a drought struck central *China* in Honan (now Henan province) at Kaifeng and in Shensi (now Shaanxi province) at Hua. The land tax was remitted at Hua. During the period between 26 May and 23 July, a drought struck several regions of *China*.<sup>153</sup>

In 966 A.D. during the spring, summer and autumn, there was a drought in Shensi province in *China*. The land tax was remitted.<sup>165</sup>

In 966 A.D., floods struck many regions of *China* including:<sup>153</sup>

- Floods struck Shantung (now Shandong province) on the east coast of *China* at Kuan-ch'êng where houses were damaged and at Chi-yang where houses and fields were damaged.
- Anhwei (now Anhui province) in eastern *China* at Hsü-i.
- Hunan province in south-central *China* at Hêng-yang. The floods were caused by heavy protracted rains.
- During the period between 21 June and 20 July, floods struck Shantung province at Tung-a. Fields were damaged.
- During the period between 21 July and 18 August, floods struck Honan (now Henan province) in central *China* at Jung-tsê. The dikes were damaged.
- During the period between 19 August and 16 September, floods struck Honan province at Hua and Anhwei at Su. The dikes were damaged.
- During the period between 19 August and 16 September, floods struck Shantung province at Tzū-ch'uan and Kao-wan. Several hundred families were flooded.
- During the period between 17 September and 16 October, floods struck in Honan province at Hua and in Hopei (now Hebei province) in northern *China* at Tung-ming.

### **966 A.D. – 967 A.D. Egypt. Famine**

The lowest Nile flood peak ever known seems to have been that of A. D. 966, when the waters rose only to twelve cubits, seventeen digits.<sup>83</sup> [The famine the following year swept away 600,000 people in the vicinity of the city of Al-Fustat, *Egypt*.<sup>84</sup> Al-Fustat was the first capital of *Egypt* under Arab rule. Today Al-Fustat is contained in the older part of Cairo.]

The death toll could have even been greater except for the actions of G'awhar, a lieutenant of the Caliph



Mo'izz. G'awhar organized relief measures. The Caliph lent him every assistance by sending many ships laden with grain. But the price of bread still remained high. G'awhar, being a food controller who had no patience with persuasive methods, ordered his soldiers to seize all the millers and grain dealers and flog them in the public market place. The administrator then established central grain depots and grain was sold throughout the two years of the famine under the eyes of a government inspector.<sup>84</sup>

During the famine, G'awhar allowed the natives to cast their hundreds of unburied dead into the Nile River, thereby contaminating the waters all the way to the sea and ushering in plagues of disease.<sup>84</sup>

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**967 A.D.** In 967 A.D. during the period between 12 February and 8 November, a drought struck Honan (now Henan province) in central *China* at Kaifeng. As a consequence, one year's land tax was remitted. Then during the period between 7 September and 5 October, floods struck Honan province at Chi. Several hundred persons drowned.<sup>153</sup>

In 967 A.D. during the spring and autumn, there was a drought in Honan province in *China*. The land tax was remitted.<sup>165</sup>

In 967, neither the sun nor the moon could be seen in *Scotland* for 6 months. This was followed by a famine.<sup>72</sup>

*Also refer to the section 966 A.D. – 967 A.D. for information on the famine in Egypt during that timeframe.*

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**968 A.D.** A famine in all of *Europe*, but chiefly *Germany* and *Scotland*.<sup>57, 72, 91</sup>

[In *Europe*], there was a tempest of wind and rain, that rotted the corn [grain] and caused a famine.<sup>72</sup>

[In 968 in the *Persian Gulf*, there were severe irruption following an earthquake [tsunami]. Several cities destroyed, and new islands formed.<sup>92</sup>]

In 968 A.D., a drought struck several regions of *China* including Kiangsu (now Jiangsu province) on the east coast of *China*; Anhwei (now Anhui province) in eastern *China*; Fukien (now Fujian province) on the southeast coast of *China*; and Kiangsi (now Jiangxi province) in southern *China*.<sup>153</sup>

In 968 A.D., there was a drought in Honan province in *China*.<sup>165</sup>

In 968 A.D., floods struck several regions of *China* including:<sup>153</sup>

— During the period between 29 June and 27 July, the floods damaged houses and fields.

— During the period between 28 July and 26 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at T'ai. Crops were damaged.

— During the period between 27 August and 24 September, floods struck Szechwan (now Sichuan province) in southwest *China* at Nan-chiang. Houses were damaged by the floodwaters.

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**969 A.D.** In May 969, the corn [grains] burnt by the winds, died; hence a sore famine.<sup>72</sup>

In 969 in *England*, “All grain burnt by the winds.” As a result, there was a famine.<sup>72, 91</sup>

[Another source places this famine in 968.] In May 968, there were very tempestuous and strong winds, which corrupted the corn [grains], vines and fruit trees; hence arose a great famine.<sup>72</sup>

In 969 A.D., floods struck many regions of *China* including:<sup>153</sup>

— Shantung (now Shandong province) on the east coast of *China* at I-tu and Tzū-ch'uan.

- Honan (now Henan province) in central *China* at Ju-nan and Shang-ch'iu.
- Anhwei (now Anhui province) in eastern *China* at Su.
- Hopei (now Hebei province) in northern *China* at Chêng-ting, P'u-yang and Yung-nien. Crops were damaged.
- Honan province at Hua, Ju-nan, Huai-yang and Hsü-ch'ang. Crops were damaged.
- Shantung province at Liao-ch'êng and Tsinan. Crops were damaged.
- Anhwei province at Fou-yang, Po, and Su. Crops were damaged.
- During the period between 16 August and 14 September, floods struck Honan province at Hsia-i.

In 969 A.D. during the period between 6 May and 14 September, a drought struck Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 969 A.D. during the summer and autumn, there was a drought in Honan province in *China*.<sup>165</sup>

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**970 A.D.** In 970 A.D. during the period between 5 February and 8 August, a drought struck in central *China* in Honan (now Henan province) at Kaifeng and in Shensi (now Shaanxi province) at Pin.<sup>153</sup>

In 970 A.D. during the spring and summer, there was a drought in Honan and Shensi provinces in *China*.<sup>165</sup>

In 970 A.D., floods struck many regions of *China* damaging fields including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Chêng, Ling-pao, and Ju-nan.
  - Hopei (now Hebei province) in northern *China* at P'u-yang.
  - Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing, Tzū-ch'uan and Chi-ning.
  - Shansi (now Shanxi province) in northern *China* at Chieh.
  - Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow.
  - Hunan province in south-central *China* at Yüeh-yang
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**971 A.D.** A great famine in *England*.<sup>72</sup>

In 971 A.D., according to legend, it rained for 40 days in *Southern England*. Swithin or Swithun, Bishop of Winchester died on 2 July 862. He desired to be buried in the open churchyard and not in the chancel of the minster, as was usual with other bishops and his request was complied with. But the monks on his being canonized, considering it disgraceful for the saint to lie in a public cemetery, resolved to remove his body into the choir; which had been done with a solemn procession, on the 15<sup>th</sup> of July [971?]. It rained however so violently for forty days together at this season, that the design was abandoned. The Feast Day of St. Swithun is observed on July 15. As a result, a popular superstition, expressed in this rhyme, was attached to Swithun's name.<sup>175</sup>

*St. Swithin's day if thou dost rain  
For forty days it will remain  
St. Swithin's day if thou be fair  
For forty days 'twill rain nae mair.*

In 971 A.D., floods struck many regions of *China* including:<sup>153</sup>

- Shantung (now Shandong province) on the east coast of *China* at Tung-a. Granaries and houses were damaged by the floodwaters.
- Honan (now Henan province) in central *China* at Ju-nan, Yüan-wu, and Shang-ch'iu.
- During the period between 25 July and 23 August, floods struck Honan province at Shang-ch'iu.
- During the period between 25 July and 23 August, floods struck Shantung province at I-tu and Tsinan. Farm fields were damaged.

— During the period between 21 November and 20 December, floods struck Hopei (now Hebei province) in northern *China* at P'u-yang.

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**972 A.D.** In 972 A.D., floods struck many regions of *China* including:<sup>153</sup>

— Hopei (now Hebei province) in northern *China* at P'u-yang.

— Shansi (now Shanxi province) in northern *China* at Hsin-chiang.

— Anhwei (now Anhui province) in eastern *China* at Ho, Ho-fei, and Fêng-t'ai.

— During the period between 14 June and 12 July, floods struck Hopei province at P'u-yang.

— During the period between 13 July and 11 August, floods struck Honan (now Henan province) in central *China* at Yang-wu, Shang-ch'iu, and Chêng.

— During the period between 13 July and 11 August, floods struck Szechwan (now Sichuan province) in southwest *China* at Chung.

In 972 A.D. during the period between 5 February and 6 May, a drought struck Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 972 A.D. during the spring and winter, there was a drought in Honan province in *China*.<sup>165</sup>

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**Winter of 972 / 973 A.D.** During the period between 8 November 972 and 5 February 973, a drought struck Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

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**973 A.D.** In *England*, the River Thames greatly overflowed; many people drowned.<sup>40, 41, 47, 92</sup>

Thames in the night drowned much people and cattle.<sup>72</sup>

In 973, there was an inundation of the Thames.<sup>43</sup>

In 973 A.D., floods struck in Shantung (now Shandong province) on the east coast of *China* at P'u and in Hopei (now Hebei province) in northern *China* at P'u-yang and Ch'ing-fêng.<sup>153</sup>

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**Winter of 973 / 974 A.D.** During the period between 28 December 973 and 25 January 974, a drought struck Honan (now Henan province) in central *China* at Kaifeng. [This drought continued between 5 February 974 and 5 February 975. It reappeared again in 975 during the period between 14 April and 13 May.]<sup>153</sup>

In 973 A.D. during the winter, there was a drought in Honan province in *China*.<sup>165</sup>

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**974 A.D.** In 974 A.D. during the period between 6 May and 8 August, a drought struck Shansi (now Shanxi province) in northern *China* at Lin-fên and Chieh. During the period between 5 February 974 and 5 February 975, a drought struck Honan (now Henan province) in central *China* at Kaifeng. In 974 A.D. during the period between 8 August and 8 November, a drought struck Honan province at Hua.<sup>153</sup>

In 974 A.D. during the spring, summer and autumn, there was a drought in Chihli, Honan and Shansi province in *China*.<sup>165</sup>

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**Winter of 974 / 975 A.D.** *Europe* experienced a cold winter which began on 1 November 974 lasting to 11 March 975.<sup>28</sup>

A most rigorous strong frost took place from 1 November to 11 March. Famine affected those that lived in the mountains.<sup>72</sup>

In the year 975 in Gaul [*Western Europe*], the winter was "long, dry and hard." A heavy frost lasted from early November until 22 March. In mid-May heavy snow fell.<sup>62</sup>

The winter of 975 A.D. was very cold for very long time. It lasted from November to 22 March. As a result, one-third of the population of *France* was decimated by famine and epidemics. It snowed in May.<sup>171</sup>

The winter of 975 in the north of *Western Europe* was dry, despite its great snow.<sup>79</sup>

The winter of 975 in *Western Europe* in the north was tough, long, dry, and accompanied by deep snow.<sup>79</sup>

In *England*, the frost was severe in 975 A.D.<sup>47, 93</sup> The frost was the severest.<sup>72</sup>

**975 A.D.** In Paris, *France*, a great number of inhabitants carried off by famine.<sup>57, 91</sup>

In *England*, famine scoured the hills.<sup>91</sup>

In 975, there was a famine in the mountains of *England*.<sup>72</sup>

In 975 A.D., there was a very terrible famine [in *England*].<sup>212</sup>

After a hard winter, on 14 May 975, there was a very heavy snowfall [in *Germany*].<sup>172</sup>

In 975 A.D. during the period between 14 April and 13 May, a drought struck in central *China* in Honan (now Henan province) at Kaifeng and in Shensi (now Shaanxi province). At Shensi, the drought was severe and brought on a famine.<sup>153</sup>

In 975 A.D. during the spring, there was a very severe drought in Honan and Shensi provinces in *China*.<sup>165</sup>

In 975 A.D., floods struck several regions of *China* including:<sup>153</sup>

— Shantung (now Shandong province) on the east coast of *China* at Lin-i [located at 118.24° East longitude and 35.07° North latitude]. The floods were caused by heavy and protracted rains. The floods caused damage to the fields and crops.

— During the period between 12 June and 11 July, floods struck Honan (now Henan province) in central *China* at Kaifeng. The floods were caused by heavy and protracted rains.

— During the period between 12 July and 9 August, floods struck in Shantung province at P'u and in Hopei (now Hebei province) in northern *China* at P'u-yang and Ch'ing-fêng.

**976 A.D.** A grievous famine over all *England*.<sup>72</sup>

In *England*, this was the *micla hungor* (great famine).<sup>57, 91</sup>

In 976 A.D., floods struck Shantung (now Shandong province) on the east coast of *China* at Tzū-ch'uan. Fields were damaged. Then during the period between 3 April and 1 May, floods struck Honan at Kaifeng. This flood was caused by a heavy and protracted rainfall.<sup>153</sup>

**977 A.D.** In 977 A.D. during the period between 22 January and 20 February, a drought struck Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 977 A.D. during the spring, there was a drought in Honan province in *China*.<sup>165</sup>

In 977 A.D., floods struck many regions of *China* including: <sup>153</sup>

- Shantung (now Shandong province) on the east coast of *China* at P'u. The flood damaged the fields.
- Honan (now Henan province) in central *China* at Chêng.
- Szechwan (now Sichuan province) in southwest *China* at Nan-chiang and Kuang-yüan
- During the period between 20 June and 18 July, floods struck Shantung province at Tzū-ch'uan. Houses were damaged by the floodwaters.
- During the period between 20 June and 18 July, floods struck Hunan province in south-central *China* at Yung-shun. Dikes were damaged.
- During the period between 19 July and 17 August, floods struck Honan province at Jung-tsê.
- During the period between 19 July and 17 August, floods struck Hopei (now Hebei province) in northern *China* at Ch'ing-fêng.
- During the period between 19 July and 17 August, floods struck Hupeh (now Hubei province) in central *China* at Mien-yang. Houses and fields were damaged by the floodwaters.
- During the period between 18 August and 15 September, floods struck Honan province at Kaifeng. Crops were damaged.
- During the period between 16 September and 15 October, floods struck Honan province at Shan; Hopei at P'u-yang; and Hunan at Tao; Szechwan at Chung; and Anhwei (now Anhui province) in eastern *China* at Fêng-t'ai.
- During the period between 16 October and 13 November, floods struck Shensi (now Shaanxi province) in central *China* at Liao-yang.

**978 A.D.** In 978 A.D. during the period between 2 February and 8 August, a drought struck Honan (now Henan province) in central *China* at Kaifeng. <sup>153</sup>

In 978 A.D. during the spring and summer, there was a drought in Honan province in *China*. <sup>165</sup>

In 978 A.D., floods struck several regions of *China* including: <sup>153</sup>

- During the period between 10 May and 8 June, floods struck Honan (now Henan province) in central *China* at Huai-chia.
- During the period between 8 July and 6 September, floods struck Anhwei (now Anhui province) in eastern *China* at Hsü-i.
- During the period between 8 July and 6 September, floods struck Honan province at Ning-ling.
- During the period between 4 November and 2 December, floods struck Honan province at Hua.

**979 A.D.** In 979 A.D., floods struck several regions of *China* including: <sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Mien-yang. Houses and fields were damaged by the floodwaters.
- Chekiang (now Zhejiang province) on the east coast of *China* at Tung-yang. Houses were damaged by the floodwaters.
- During the period between 31 March and 28 April, floods struck Honan (now Henan province) in central *China* at Loyang. Houses were damaged by the floodwaters.
- During the period between 26 August and 23 September, floods struck Honan province at Shang-ch'iu.
- During the period between 26 August and 23 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at T'ai.
- During the period between 24 September and 23 October, floods struck Honan province at Chi.
- During the period between 24 September and 23 October, floods struck Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing.

In 979 A.D. during the summer and winter, there was a drought in Honan province in *China*. <sup>165</sup>

In 979, there was a grievous famine in *England*.<sup>72</sup>

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**Winter of 979 / 980 A.D.** During the period between 8 November 979 and 5 February 980, a drought struck Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

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**980 A.D.** In 980 A.D. during the period between 6 May and 8 November, a drought struck Honan (now Henan province) in central *China* at Kaifeng. During the period between 17 May and 15 June, a drought was prevalent across much of *China*.<sup>153</sup>

In 980 A.D. during the summer and autumn, there was a drought in Honan province in *China*.<sup>165</sup>

In 980 A.D., floods struck several regions of *China* including:<sup>153</sup>

— During the period between 15 July and 13 August, floods struck Anhwei (now Anhui province) in eastern *China* at Fou-yang. Houses were damaged by the floodwaters.

— During the period between 15 July and 13 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow.

— During the period between 14 August and 11 September, floods struck Hupeh (now Hubei province) in central *China* at Mien-yang. Houses and dikes were damaged.

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**981 A.D.** In 981 A.D. during the period between 5 February and 4 June, a drought struck Honan (now Henan province) in central *China* at Kaifeng. Then during the period 3-31 August, floods struck several regions of *China* and the houses were damaged by floodwaters. Areas affected by floods included: Shensi (now Shaanxi province) in central *China* at Fu and Fu-shih; Kansu (now Gansu province) in northwest *China* at Ning; and Shansi (now Shanxi province) in northern *China* at Yung-chi.<sup>153</sup>

In 981 A.D. during the spring and summer, there was a drought in Honan province in *China*.<sup>165</sup>

In 981, there was a famine over all of *England*.<sup>72</sup>

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**982 A.D.** In 982 A.D. during the period between 28 March and 25 April, a drought struck several regions of *China* including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Kaifeng, Mêng, Ling-pao, and Chi.

— Shansi (now Shanxi province) in northern *China* at Hsin-chiang.

— Shantung (now Shandong province) on the east coast of *China* at Chu-ch'êng, Ts'ao, and Tzŭ-ch'uan.

— Hopei (now Hebei province) in northern *China* at Ho-chien.

In 982 A.D., floods struck many regions of *China* including:<sup>153</sup>

— During the period between 28 March and 25 April, floods struck Honan (now Henan province) in central *China* at Kaifeng. Fifty-four persons drowned.

— During the period between 26 April and 25 May, floods struck Shensi (now Shaanxi province) in central *China* at Yao. Crops were damaged.

— During the period between 26 April and 25 May, floods struck Shantung (now Shandong province) on the east coast of *China* at Chu-ch'êng and Liao-ch'êng. Crops were damaged.

— During the period between 26 April and 25 May, floods struck Honan province at Chi. Crops were damaged.

— During the period between 26 April and 25 May, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin and Chinkiang. Crops were damaged.

— During the period between 24 June and 22 July, floods struck Shantung province at Chang-ch'iu.

— During the period between 24 June and 22 July, floods struck Hupeh (now Hubei province) in central *China* at Hanyang and Chün. Houses were damaged by the floodwaters and people and cattle drowned.

— During the period between 23 July and 21 August, floods struck Shensi province.



- During the period between 23 July and 21 August, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Nan-p'ing. Houses were damaged by the floodwaters.
- During the period between 20 September and 19 October, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu. Granaries and houses were damaged by the floodwaters.
- During the period between 20 October and 18 November, floods struck Honan province at Ch'in-yang and Wu-chih. Farm fields were damaged.

**983 A.D.** A grievous famine everywhere.<sup>72</sup>

In 983 A.D., floods struck many regions of *China* including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Mêng-ching. Granaries and houses were damaged by the floodwaters.
- Hopei (now Hebei province) in northern *China* at Hsiung. Houses were damaged by the floodwaters.
- Shensi (now Shaanxi province) in central *China* at Fu.
- Hupeh (now Hubei province) in central *China* at Ching-mên. Houses were damaged by the floodwaters. Over 50 persons drowned.
- During the period between 5 February and 8 November, floods struck Honan province at Kaifeng, Yen-ching, Yang-wu, Fêng-ch'iu, Chung-mou, Yü-shih, Sui, and Ch'i. Farm fields were damaged.
- During the period between 5 February and 8 November, floods struck Hopei province at Ch'ang-yüan. Farm fields were damaged.
- During the period between 14 June and 12 July, floods struck Honan province at Hua. Houses and fields were damaged.
- During the period between 14 June and 12 July, floods struck Hopei province at P'u-yang. Houses and fields were damaged.
- During the period between 14 June and 12 July, floods struck Shantung (now Shandong province) on the east coast of *China* at P'u, Ts'ao, and Chi-ning. Houses and fields were damaged.
- During the period between 13 July and 10 August, floods struck Honan province at Kung and Kaifeng. Houses were damaged and many people drowned.
- During the period between 11 August and 9 September, floods struck *China*.
- During the period between 10 September and 8 October, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow.
- During the period between 9 October and 7 November, floods struck Honan province at Hua.
- During the period between 9 October and 7 November, floods struck Anhwei (now Anhui province) in eastern *China* at Su. Houses were damaged by the floodwaters.

**984 A.D.** In 984 A.D. during the period between 6 May and 8 August, a drought struck Honan (now Henan province) in central *China* at Kaifeng. Then during the period between 8 August and 8 November, a severe drought struck Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

In 984 A.D., floods struck many regions of *China* including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Mêng. Farm fields were damaged by the floodwaters.
- Szechwan (now Sichuan province) in southwest *China* at Ya-an. Houses were damaged by the floodwaters.
- Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsin-hsing. The army camp was damaged by the floodwaters.
- During the period between 4 April and 3 May, floods struck Honan province at Hua.
- During the period between 31 July and 28 August, floods struck Szechwan province at Yüeh-shan. Houses were damaged by the floodwaters and over 1,000 persons drowned.



— During the period between 29 August and 27 September, floods struck Shensi (now Shaanxi province) in central *China* at Fu-shih. Houses were damaged.

— During the period between 29 August and 27 September, floods struck Shantung (now Shandong province) on the east coast of *China* at Tzū-ch'uan. Houses were damaged.

**Winter of 984 / 985 A.D.** The winter of 985 A.D. was a very cold winter [in *Germany*], which lasted from November to May.<sup>172</sup>

**985 A.D.** In 985 A.D. during the period between 19 August and 16 September, floods struck Hopei (now Hebei province) in northern *China* at Ho-chien and Jên-ch'iu. Fields were damaged.<sup>153</sup>

**Winter of 985 / 986 A.D.** During the period between 15 December 985 and 12 January 986, a drought struck Honan (now Henan province) in central *China* at Kaifeng. There had been no snowfall during the winter.<sup>153</sup>

**986 A.D.** In 986 A.D. during the period between 10 July and 8 August, floods struck Anhwei (now Anhui province) in eastern *China* at Fêng-t'ai.<sup>153</sup>

**Winter of 986 / 987 A.D.** During the period between 4 December 986 and 2 January 987, a drought struck Honan (now Henan province) in central *China* at Kaifeng. There had been no snowfall during the winter.<sup>153</sup>

**987 A.D.** [In *England*], the extreme heat of summer killed many people; and they harvested almost nothing in fruits [of the earth].<sup>62</sup>

There was a dearth [famine] in *Albania*.<sup>57, 72, 91</sup>

A great dearth in *Albania*; but the unseasonableness of the weather brought barrenness of lands, and a grievous famine on many countries.<sup>72</sup>

In 987, the sudden thaw of unusually high snow brings powerful floods to the river Weser in *Germany*.<sup>172</sup>

In 987 a strong storm struck *Germany*. The great storm winds and high water occurred almost everywhere causing a lot of damage.<sup>172</sup>

The extreme summer heat of 987 in *Western Europe* caused a great reduction in crop yield.<sup>79</sup>

The summer of 987 A.D. produced extreme heat [in *France*].<sup>171</sup>

The summer of 987 in *Western Europe* produced frightening storms with extraordinary lightning and thunder.<sup>79</sup>

[In *England*], there were tempest all winter.<sup>72</sup>

**Winter of 987 / 988 A.D.** In the winter, the River Thames in *England* was frozen for 120 days.<sup>1</sup>

The River Thames in *England* was frozen for 120 days, which began on 22 December 987.<sup>2</sup>

In 987 A.D., there was a frost in London, *England*. It began on 22 December and lasted for 120 days.<sup>212</sup>

In *England*, the frost began on 22 December 987 which lasted for 120 days.<sup>28, 40, 41, 42, 43, 47, 93</sup>

*Byzantium* experienced a very cold winter.<sup>28</sup>

In the year 988, the winter [in *Western Europe*] was rough. The winter crop was destroyed by the cold. There was a drought in the spring. A great famine ensued.<sup>62</sup>

The winter of 988 A.D. was very severe [in *France*]. There were droughts in the spring. Then came famines.<sup>171</sup>

During the period between 23 December 987 and 21 January 988, a drought struck Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 987 A.D. during the winter, there was a drought in Honan province in *China*.<sup>165</sup>

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**988 A.D.** In *England*, there was a great drought with excessive heat, both years (988-989).<sup>47, 72</sup>

[In *England*] from mid-July to mid-August in the year 988, there was such searing heat that many people were affected. The harvest of the fruits [of the earth] was much lower than usual. The burning sun and the drought consumed all and then there came a famine.<sup>62</sup>

Repeated flooding preceded the great summer of 988 in the north of *Western Europe*.<sup>79</sup>

In 988 A.D., the summer [in *Germany*] was extremely dry. This was soon followed by a famine.<sup>172</sup>

A harsh winter was followed by long copious rains. Then there was sudden heat, sustained and passionate. This characterized the weather in 988 in the north of *Western Europe*.<sup>79</sup>

From 15 July to 13 August 988 in the north of *Western Europe*, a scorching heat burnt the harvest. The heat broke out suddenly after a very cold winter and a great flood.<sup>79</sup>

In 988 in *England*, there was a famine from rains and barren land.<sup>57, 72, 91</sup>

In 988, there was an excessive drought and a most scorching heat.<sup>72</sup>

In 988 A.D., floods struck several regions of *China* including:<sup>153</sup>

— During the period between 20 February and 20 March, floods struck Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng. Fields were damaged.

— During the period between 19 May and 16 June, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ying-tê. Fields and houses were damaged by the floodwaters.

— During the period between 15 August and 13 September, floods struck Hopei (now Hebei province) in northern *China* at Tz'ŭ.

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**989 A.D.** In *England*, there were floods all the winter.<sup>47, 72, 92</sup>

There were great and often inundations in winter and violent winds, which threw down many buildings. In spring there was so great a drought, that it hindered sowing. The heat of the summer was past enduring. Hence came a famine. Then there were unseasonable snows and continual rains at harvest time. This prevented both plowing and sowing. A great famine in *Albania* and *Saxony*.<sup>72</sup>

In 989 in *England*, there was a grievous famine from a rainy winter and bad spring. There was neither plowing nor sowing. There was a snowy harvest.<sup>57, 72, 91</sup>

In 989 [in *England*], there was a snowy rainy harvest and as a result no sowing [during the fall planting] followed by a rainy winter.<sup>72</sup>

In *England*, there was a great drought with heat, both years (988-989).<sup>47</sup>

In 989 A.D. it rained fish in Saxony [now part of *Germany*].<sup>171</sup>

In 989 A.D., there was a large flood in *Friesland*. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

In the year 989 in the north of *Western Europe*, an excessive drought during the spring prevented the first seeds from being planted.<sup>79</sup>

In the north of *Western Europe* in 989, there was a drought during the spring, which did not allow the planting of first seeds. Abundant snows immediately followed this excessive drought. Then heavy rainfalls completely prevented the planting of the seeds in the fall.<sup>79</sup>

The snowfalls and the spring drought of 989 in the north of *Western Europe* were followed by continuous rains that prevented the sowing of autumn [fall crops].<sup>79</sup>

In 989 A.D., a drought struck several regions of *China* including:<sup>153</sup>

— During the period between 6 June and 5 July, a drought struck Honan (now Henan province) in central *China* at Kaifeng.

— During the period between 4 August and 30 December, a drought struck Honan (now Henan province) in central *China* at Loyang. The drought resulted in a famine and as a consequence the granaries were opened.

— During the period between 4 August and 30 December, a drought struck Shantung (now Shandong province) on the east coast of *China* at Yeh and P'êng-lai. The drought resulted in a famine and as a consequence the granaries were opened.

— During the period between 4 August and 30 December, a drought struck Hopei (now Hebei province) in northern *China* at Shen and Chi [located at 115.34° East longitude and 37.34° North latitude]. The drought resulted in a famine and as a consequence the granaries were opened.

In 989 A.D. during the summer, autumn and winter, there was a great drought in Chihli, Honan and Shantung provinces in *China*. The granaries were opened.<sup>165</sup>

**990 A.D.** In 990 A.D., a terrible famine struck *Europe*.<sup>155</sup>

The weather during the summer of 990 A.D. was very favorable [in *France*].<sup>171</sup>

In 990 A.D. during the period between 5 February and 8 November, a severe drought struck several regions of *China* including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Kaifeng, Hsü-ch'ang, Lin-ju, Chêng, and I-yang.

— Hopei (now Hebei province) in northern *China* at Ta-ming and Ts'ang.

— Shantung (now Shandong province) on the east coast of *China* at Shan.

— Shensi (now Shaanxi province) in central *China* at Ch'ien, Sian, and Fêng-hsiang.

In 990 A.D. during the spring, summer and autumn, there was a drought in Chihli, Honan and Shensi

provinces in *China*.<sup>165</sup>

In 990 A.D., floods struck several regions of *China* including:<sup>153</sup>

- Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang. Dikes were damaged and over 2,000 families were flooded.
- Honan (now Henan province) in central *China* at Mêng.
- During the period between 25 June and 24 July, floods struck Hupeh (now Hubei province) in central *China* at Huang-mei. Houses and fields were damaged by the floodwaters.
- During the period between 25 July and 22 August, floods struck Kiangsi province at Nan-ch'ang, Kiukiang, Chi-an, and Ch'i-ch'un.
- During the period between 25 July and 22 August, floods struck Honan province at Mêng.
- During the period between 25 July and 22 August, floods struck Kansu (now Gansu province) in northwest *China* at Ch'in-an.

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**Winter of 990 / 991 A.D.** In 991, the vine and fruit trees in *France* were killed [by the extreme cold].<sup>58, 80</sup>

In the year 991 [in *Western Europe*], the vines were suffering much from the severity of the cold, the animal died from lack of food in the stalls, and there was a famine.<sup>62</sup>

The winter of 991 A.D. [in *France*] was very long and hard. The [grape] vines were decimated. The herds of domestic animals were depleted. Wheat crop was destroyed. Then came famine and pestilence.<sup>171</sup>

In 991 A.D., there was an extremely severe and long lasting frost [in *England*]. Crops failed, and famine and pestilence ended the year.<sup>212</sup>

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**991 A.D.** The weather during the summer of 991 A.D. was very favorable [in *France*].<sup>171</sup>

In 991 A.D., a drought accompanied by a plague of locust struck many regions of *China* including:<sup>153</sup>

- Hopei (now Hebei province) in northern *China* at Ta-ming and Tz'ü, Ch'ing-ho, and Pa.
- Shansi (now Shanxi province) in northern *China* at Yung-chi, Hsin-chiang, Lin-fên, and Fên-shan.
- Shantung (now Shandong province) on the east coast of *China* at Hui-min, Lin-i, I-tu, Ts'ao, Chü-yeh, Shan, Ling, Liao-ch'êng, Tzū-yang, Tsinan, Tzū-ch'uan, and Pin. [Lin-i is located at 118.24° East longitude and 35.07° North latitude.]
- Honan (now Henan province) in central *China* at Shan, Lin-ju, Ling-pao, Chêng, Hsü-ch'ang, and Chi.
- Shensi (now Shaanxi province) in central *China* at Ta-li.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow.
- Anhwei (now Anhui province) in eastern *China* at Po.
- Kansu (now Gansu province) in northwest *China* at Ch'ing-yang.
- During the period between 5 February and 6 May, a severe drought struck Honan province at Kaifeng.

In [991 A.D.], floods struck many regions of *China* including:<sup>153</sup>

- Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng. Houses were damaged.
- Anhwei (now Anhui province) in eastern *China* at Po. Houses and fields were damaged by the floodwaters. Also in Anhwei province, Hsu-i experienced flooding caused by heavy rains. Houses and fields were damaged and 21 persons drowned.
- Hupeh (now Hubei province) in central *China* at Chiang-ling. Fields were damaged.
- During the period between 17 May and 14 June, floods struck Honan (now Henan province) in central *China* at Kaifeng and Shan.
- During the period between 14 July and 12 August, floods struck Honan province at Kaifeng where fields and dikes were damaged and at Shang-ch'iu.

- During the period between 13 August and 10 September, floods struck Honan province at Hsü-ch'ang.
- During the period between 13 August and 10 September, floods struck Szechwan (now Sichuan province) in southwest *China* at Yüeh-shan.
- During the period between 13 August and 10 September, floods struck Hopei (now Hebei province) in northern *China* at Hsiung.
- During the period between 13 August and 10 September, floods struck Shantung province at Tsinan. The city walls were damaged by the floodwaters.
- During the period between 11 September and 10 October, floods struck Kiangsi (now Jiangxi province) in southern *China* at T'êng. Houses and fields were damaged by the floodwaters.
- During the period between 11 October and 8 November, floods struck Szechwan (now Sichuan province) in southwest *China* at Ch'üung-lai and P'u-chiang. Houses were damaged and 79 persons drowned.

In 991 A.D. during the spring, there was a great drought in Chihli, Honan, Shantung, Shansi and Shensi provinces in *China*. The drought was accompanied by a plague of locusts.<sup>165</sup>

**Winter of 991 / 992 A.D.** The winter of 992 A.D. was hard [in *France*].<sup>171</sup>

The year 992 was a troubled year producing many dreadful fire signs in the sky [in *Germany*]. The winter was long and hard, such that it was still frozen very hard shortly before Pentecost [late May]. One observed northern lights at the beginning of the year.<sup>172</sup>

**992 A.D.** In 992 A.D., a drought struck many regions of *China* including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Loyang and Kaifeng.
- Hopei (now Hebei province) in northern *China* at Ta-ming.
- Shansi (now Shanxi province) in northern *China* at Yang-ch'ü.
- Shensi (now Shaanxi province) in central *China* at Sian.
- Anhwei (now Anhui province) in eastern *China* at Po and Shou.
- Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou.
- Kiangsu (now Jiangsu province) on the east coast of *China*.
- During the period between 5 February and 6 May, a severe drought struck Honan province at Kaifeng.

In 992 A.D. during 1-30 August, floods struck Honan (now Henan province) in central *China* at Loyang. Houses were damaged and 240 persons damaged [drowned?].<sup>153</sup>

In 992 A.D. during the spring, summer and winter, there was a drought in Chihli, Honan, Kiangsu and Shensi provinces in *China*. In Honan, this was a great drought.<sup>165</sup>

**Winter of 992 / 993 A.D.** During the period between 8 November 992 and 5 February 993, a severe drought struck Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

**993 A.D.** [In *Germany*] from the Feast of St. John [24 June] to 9 November, throughout the summer and the fall, the drought and the heat were extraordinary. Many of the fruits [of the earth] did not come to maturity and were burned by the sun's heat. This was followed by great disease and mortality among humans and domestic animals.<sup>62</sup>

During the summer of 993 A.D., there was a drought from 24 June to 9 November [in *France*]. Then came epidemics. The crops were burned from the great heat and destroyed.<sup>171</sup>

The summer of 993 A.D. [in *England*] was so hot that the corn [grain] and fruit dried up.<sup>212</sup>

In 993 A.D. during the period between 6 February and 8 August, a drought struck several regions of *China* including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Loyang, Kaifeng, Hsü-ch'ang, Lin-ju and Hua.
- Anhwei (now Anhui province) in eastern *China* at Po.
- Shensi (now Shaanxi province) in central *China* at Shang.

In 993 A.D. during the summer, there was a drought in Honan and Shensi provinces in *China*.<sup>165</sup>

In 993 A.D., floods struck many regions of *China* including:<sup>153</sup>

- During the period between 23 June and 21 July, floods struck Kansu (now Gansu province) in northwest *China* at Ch'in-an. Houses were damaged and people drowned.
- During the period between 22 July and 19 August, floods struck Hopei (now Hebei province) in northern *China* at Ch'ang-p'ing where crops were damaged and at Peiping where houses were damaged.
- During the period between 22 July and 19 August, floods struck Chahar province (now eastern *Inner Mongolia*) at Cho-lu. Houses were damaged by the floodwaters.
- During the period between 19 September and 17 October, floods struck Hopei province at P'u-yang. Houses were damaged and people drowned.
- During the period between 19 September and 17 October, floods struck Szechwan (now Sichuan province) in southwest *China* at Fou-ling. Houses were damaged and people drowned.
- During the period between 18 October and 16 November, floods struck Hopei province at P'u-yang.

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**Winter of 993 / 994 A.D.** [Two great volcanic eruptions occurred in the past 2,000 years. Both were rated with a “7” on the Volcanic Explosivity Index (VEI).<sup>20</sup> One eruption was the Tambora eruption of 19 April 1815 and the other was the Changbaishan eruption around the year 1,000 A.D. The volcanic eruptions of this size are very rare events typically occurring on a millennium scale. Changbaishan is located in the border between *North Korea* and *China*. Corrected radiocarbon dating of the Changbaishan eruption places it at 1,000 A.D. ± 40 years. But there appears to be a wide divergence of opinions about this event's timing. If the Changbaishan eruption occurred in the year 992 or 993, then it would be consistent with another “year without summer” type event.]

In *Germany*, the winter was very harsh and the freeze lasted almost without interruption from 12 November to mid-May. The spring and summer brought the plagues of every kind and a violent epidemic raged among men, and among cattle, sheep and pigs. In *Italy*, the rivers were covered with ice and the plants froze.<sup>62</sup>

The year 994 was a very hard winter [in *Germany*] with heavy frost, from the beginning of the winter months, until May. At the end of the month of July, the water in the lakes froze so hard that fish died. The trees, fruits and grazing livestock were destroyed. Then came famine and plague, which emptied the houses. The winter was full of rough weather, pestilence, storms, severe cold and unusually dryness.<sup>172</sup>

In 994 there was frost from 14 October until the middle of April. In the following summer, dryness made streams dry up [in *Germany*].<sup>172</sup>

During the winter of 994 A.D., there was a very cold winter of unusual length [in *France*]. It lasted from 15 November to 15 May.<sup>171</sup>

During the summer of 994 A.D., there were frosts in July [in *France*]. There were droughts and famines.<sup>171</sup>

The rigor of the winter of 994 in *Western Europe* ran from 15 November to 15 May. Then, there were very dangerous cold winds. And, still later, severe frosts lasted until 12 July.<sup>79</sup>



The summer was very cold throughout *Europe*. Severe frost and ice in July 995 A.D.<sup>28</sup>

[In *England*] in the year 994, the frost was strong and hard.<sup>72</sup>

From November 1<sup>st</sup> to May was a most severe winter. Cold pestiferous winds blew at the same time. About the end of July, from the severity of the frost, ice was frozen so hard on ponds and rivers, that most fish died, and the water was unfit for human use. Trees, corn and pastures were burnt up as though there had been a fire under the earth's surface. Finally famine and dire pestilence made most terrible havoc of man and beast. So great was the deaths that many houses were left desolate without inhabitants.<sup>72</sup>

In 994, there was the severest plague on man and beast from severe frost and famines.<sup>72</sup>

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**994 A.D.** A destructive storm struck London, *England*, blowing down fifteen hundred buildings and killing several hundred persons.<sup>1, 90</sup>

In 994 A.D., Hopei (now Hebei province) in northern *China* at Ta-ming during the period of 13 February - 14 March experienced flooding. Three thousand villages flooded.<sup>153</sup>

In 994 A.D. during the period between 12 July and 9 August, a drought struck Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 994 A.D. during the summer, there was a drought in Honan province in *China*.<sup>165</sup>

The summers in the years 994 and 995 in *Europe* produced very high temperatures and a very persistent heat wave. Historians reported that the drought was so terrible that the fish died in the ponds, the trees caught fire, and the fruit and the flax harvest were destroyed. In 995 the greater part of *Europe's* rivers were so shallow that you could wade through them.<sup>62</sup>

The summer of 994 A.D. [in *England*] was so hot that the corn [grain] and fruit dried up.<sup>212</sup>

In 994 in *Western Europe*, the dearth of rain caused the rivers to dry up. It killed the fish in most lakes. It dried up thousands of trees and burned grassland and crops.<sup>79</sup>

In 994, a summer drought dried up many streams [in *Germany*].<sup>172</sup>

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**995 A.D.** In 995 A.D. during the period between 4 March and 2 April, a drought struck Honan (now Henan province) in central *China* at Kaifeng. There had been no snowfall during the winter.<sup>153</sup>

In 995 A.D. during the spring, there was a drought in Honan province in *China*. No snowfall during the winter.<sup>165</sup>

In 995 A.D. during the period 3-31 May, floods caused by heavy rains struck Honan (now Henan province) in central *China* at Kaifeng. Then during the period 1-30 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Kan where the city walls were damaged.<sup>153</sup>

In 995, a terrible hurricane struck the town of Chichester in West Sussex, *England*.<sup>72</sup>

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**996 A.D.** A storm struck Colchester, *England*.<sup>40, 41</sup>



In 996 A.D. during the period between 5 February and 8 August, a drought struck Honan (now Henan province) in central *China* at Kaifeng. There had been no snowfall during the winter.<sup>153</sup>

In 996 A.D. during the spring and summer, there was a drought in Honan province in *China*.<sup>165</sup>

In 996 A.D., floods struck several regions of *China* including:<sup>153</sup>

— During the period between 19 June and 17 July, floods struck Honan (now Henan province) in central *China* at Kaifeng.

— During the period between 18 July and 16 August, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou. Granaries and houses were damaged by the floodwaters.

— During the period between 18 July and 16 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing. The dikes were damaged.

— During the period between 18 July and 16 August, floods struck Honan province at Shang-ch'iu.

— During the period between 17 August and 15 September, floods struck Honan province at Shan.

— During the period between 17 August and 15 September, heavy and protracted rains caused floods in Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton.

**998 A.D.** The River Thames in *England* was frozen five weeks.<sup>2, 28, 40, 41, 42, 43, 47, 72, 93</sup>

In 998 A.D., the frost in London, *England*, caused the River Thames to be frozen over for 5 weeks.<sup>212</sup>

In 998 A.D. during the period between 5 February and 8 August, a drought struck several regions of *China* including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Kaifeng. The land tax was remitted.

— Chekiang (now Zhejiang province) on the east coast of *China*.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.

— Hupeh (now Hubei province) in central *China* at Chiang-ling.

— Hunan province in south-central *China* at Changsha.

In 998 A.D. during the spring and summer, there was a drought in Chêhkiang, Honan, Hunan, Hupeh, Kiangsu and Kiangsi provinces in *China*.<sup>165</sup>

In 998 A.D. during the period between 6 May and 8 August, floods struck *China*. During the period between 26 July and 24 August, floods struck Shensi (now Shaanxi province) in central *China* at Fêng-hsiang. People drowned. Floods also struck Shantung (now Shandong province) on the east coast of *China* at Tsinan where houses and fields were damaged by the floodwaters.<sup>153</sup>

In 998 A.D. in the vicinity of Shanghai, *China*, a flood caused a scarcity of food.<sup>166</sup>

**999 A.D.** The cold weather in Baghdad, *Iraq* around the year 999 killed palm trees.<sup>28</sup>

In the years 999 and 1000 [in *Germany*], there were two hot and dry summers that caused all the streams and rivers to shrink [dry up].<sup>172</sup>

In 999 A.D. during the period between 19 April and 17 May, a drought struck many regions of *China* including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Kaifeng.

— Hupeh (now Hubei province) in central *China* at Chiang-ling.

— Hunan province in south-central *China* at Changsha.

— Chekiang (now Zhejiang province) on the east coast of *China*.

- Kiangsu (now Jiangsu province) on the east coast of *China* at P'ei [located at 118.03° East longitude and 34.30° North latitude].
- Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Kuei-lin.
- Shantung (now Shandong province) on the east coast of *China* at Ts'ao and Shan.
- Shansi (now Shanxi province) in northern *China* at Lan.

In 999 A.D. during the period between 11 November and 10 December, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Lung-ch'i. Houses were damaged.<sup>153</sup>

In 999 A.D. during the spring, there was a great drought in Chêhkiang, Honan, Hunan, Hupeh, Kiangsi, Kiangsu, Kwangsi, Shansi and Shantung provinces in *China*.<sup>165</sup>

**1000 A.D.** [*France* experienced a famine in the year 1000. The cause was rather unusual. The year 1000 was a time of extraordinary suffering, for the whole country was seized with a panic, fearing that the world would come to an end during this the millennial year. Thousands went on pilgrimages, deserting their homes and their fields and obstructing the whole normal course of their existence.<sup>84</sup> Since the fields were left unplowed and unplanted and since the world did not come to an end, starvation set in.]

In the years 999 and 1000 [in *Germany*], there were two hot and dry summers that caused all the streams and rivers to shrink [dry up].<sup>172</sup>

In 1000, a drought struck several regions of *China* including:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.
- Hupeh (now Hubei province) in central *China* at Chiang-ling.
- Hunan province in south-central *China* at Changsha.
- During the period between 9 March and 6 April, a drought struck Honan (now Henan province) in central *China* at Kaifeng.

In the year 1000 during the spring, there was a drought in Anhwei, Honan, Hunan, Hupeh, Kiangsu and Kiangsi provinces in *China*.<sup>165</sup>

In 1000, floods struck Szechwan (now Sichuan province) in southwest *China* at Lang-chung. During the period between 7 April and 6 May, flood struck Szechwan province at San-t'ai. Fields were flooded. During the period between 5 June and 3 July, floods struck Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing. During the period 3-31 August, floods struck Shensi (now Shaanxi province) in central *China* at Yang where people drowned.<sup>153</sup>

**1001 A.D.** In 1001 during the period between 28 January and 25 May, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 1001 during the spring and summer, there was a drought in Honan province in *China*.<sup>165</sup>

In 1001, floods struck Szechwan (now Sichuan province) in southwest *China* at San-t'ai. During the period between 23 July and 21 August, floods struck Shensi (now Shaanxi province) in central *China* at Ho-yang where people drowned.<sup>153</sup>

**1002 A.D.** In 1002 [in *France*], the summer was unfavorable.<sup>173</sup>

In 1002, several regions of *China* experienced flooding.<sup>153</sup>

- During the period between 17 March and 15 April, floods struck Hopei (now Hebei province) in northern *China* at Hsiung, Pa, Ho-chien, Jên-ch'iu, Shen and Ts'ang. Fields were damaged.

— During the period between 17 March and 15 April, floods struck Shensi (now Shaanxi province) in central *China* at Ch'ien. Fields were damaged.

— During the period between 13 July and 10 August, floods from heavy rains struck Honan (now Henan province) in central *China* at Kaifeng. Houses were damaged.

**1003 A.D.** The year 1003 produced excessive rains and overflowing rivers in several places. The Loire River in *France* rose to a prodigious height, and it ravaged the coast and there was fear of another deluge.<sup>79</sup> [The Loire River is located in south-central and west-central France and drains into the Atlantic Ocean in the Bay of Biscay.]

In 1003 [in *France*], the summer was unfavorable.<sup>173</sup>

The winter in *France* was harder than usual, and disastrous flooding occurred in the aftermath.<sup>62</sup>

In 1003, the winter in southern *France* was longer than usual.<sup>79</sup>

In 1003 during the period between 4 February and 5 March, floods struck in Honan (now Henan province) in central *China* at Kaifeng and Loyang and in Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.<sup>153</sup>

#### **1004 A.D. – 1016 A.D. England. Famine**

In 1004 in *England* “such a famine prevailed as no man could remember.”<sup>57, 91</sup>

A famine struck *England* from 1005 to 1016 during the reign of Aethelred the Unready. “Such a famine prevailed as no man can remember.” Chroniclers say that half the population of the larger island perished, although many of the dead were caused by the wars between Aethelred and Sweyn the Dane, the latter being forced by the famine to retire from England for a time.<sup>84</sup>

In 1005 in *England*, “This year was the great famine in England.” Sweyn the Dane quits in consequence.<sup>91</sup>

In 1006, a great famine in *England* and over all *Europe*, such as the living never saw before. They scarce sufficed to bury the dead.<sup>72</sup>

In 1008, there was a famine attended with a plague in *Wales*.<sup>72</sup>

In 1012, there was a terrible famine.<sup>72</sup>

In 1016, there was a famine from great hailstorms, thunder and lightning.<sup>72</sup>

**1004 A.D.** In 1004, there was a drought in Honan (now Henan province) in central *China* at Kaifeng during the period of 21 June - 19 July. Many people died from sunstroke. In 1004 during the period between 17 September and 16 October, floods struck in Honan (now Henan province) in central *China* at Shang-ch'iu and in Hopei (now Hebei province) in northern *China* at P'u-yang. During the period between 17 October and 14 November, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

In 1004 during the summer, there was a drought in Anhwei, Honan, Kiangsi and Kiangsu provinces in *China*. Many people died from sunstroke in Honan.<sup>165</sup>

Also refer to the section **1004 A.D. – 1016 A.D.** for information on the famine in England during that timeframe.

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**1005 A.D.** In 1005 during the period between 9 July and 7 August, floods struck Kansu (now Gansu province) in northwest *China* at Ning. Houses were damaged by the floodwaters and many people drowned. Then during the period between 11 October and 4 November, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.<sup>153</sup>

In 1005 during the autumn, there was a drought in Kiangsu province in *China*.<sup>165</sup>

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

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**1006 A.D.** In 1006 during the period between 30 May and 27 July, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng. Then during the period between 28 July and 26 August, floods struck Honan province at Shang-ch'iu. During the period between 27 August and 24 September, floods struck Shantung (now Shandong province) on the east coast of *China* at I-tu.<sup>153</sup>

In 1006 during the summer, there was a drought in Honan province in *China*.<sup>165</sup>

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

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**1007 A.D.** In 1007, several regions of *China* experienced flooding.<sup>153</sup>

— During the period between 17 July and 15 August, floods struck Honan (now Henan province) in central *China* at Jung-tsê. Forty-two families were flooded and people drowned.

— During the period between 17 July and 15 August, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Nan-p'ing. People drowned.

— During the period between 16 August and 13 September, floods struck Hopei (now Hebei province) in northern *China* at P'u-yang.

— During the period between 14 September and 13 October, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Hêng. The army camps were damaged by the floodwaters.

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

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**1008 A.D.** In *Wales*, there was a famine followed by a plague.<sup>57, 91</sup>

In 1008 during the period between 10 February and 9 March, a drought engulfed Hopei (now Hebei province) in northern *China* at Ta-hsing. Then during the period between 6 July and 3 August, floods struck Honan (now Henan province) in central *China* at Yü-shih.<sup>153</sup>

In 1008 during the spring, there was a drought in Chihli province in *China*.<sup>165</sup>

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

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**1009 A.D.** In one part of *Italy*, the rivers were frozen.<sup>62</sup>

In the year 1009 in *Italy*, the troops marched over the frozen rivers.<sup>62</sup>

[In *England*], it was very rainy.<sup>72</sup>

In 1009 [in *France*], the weather was unfavorable.<sup>173</sup>

A hurricane in the Irish Sea did incredible damage.<sup>72</sup>

In 1009 during the period between 5 February and 8 August, several regions of *China* experienced droughts including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Kaifeng and Loyang.
- Hunan province in south-central *China* at Changsha.
- Hopei (now Hebei province) in northern *China* at Hsing-t'ai.
- Shensi (now Shaanxi province) in central *China* at Sian.

In 1009 during the spring and summer, there was a drought in Honan and Shensi provinces in *China*.<sup>165</sup>

In 1009, several regions of *China* experienced flooding.<sup>153</sup>

- During the period between 25 July and 22 August, floods damaged houses.
- During the period between 25 July and 22 August, floods struck Honan (now Henan province) in central *China* at Kaifeng. As a result, the land tax was remitted.
- During the period between 25 July and 22 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow. As a result, the land tax was remitted.
- During the period between 25 July and 22 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Chi-ning, I-tu, and Tzū-ch'uan. As a result, the land tax was remitted.
- During the period between 23 August and 20 September, floods struck Honan province at Kaifeng.
- During the period between 21 September and 20 October, floods struck Kansu (now Gansu province) in northwest *China* at T'ien-shui.
- During the period between 21 September and 20 October, floods struck Shensi (now Shaanxi province) in central *China* at Fêng.

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

**1010 A.D.** The year 1010 produced extraordinary rainfall in southern *France*.<sup>79</sup>

The year 1010, northern *France* suffered from alternating periods of droughts and harmful overabundant rains.<sup>79</sup>

In 1010 during the period between 6 May and 8 August, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng. Then during the period between 14 July and 12 August, floods struck Kiangsi (now Jiangxi province) in southern *China* at Chi-an and Ch'ing-chiang. Fields were damaged. Then during the period between 11 September and 9 October, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking and Chinkiang and Anhwei (now Anhui province) in eastern *China* at Su. Then during the period between 10 October and 8 November, floods struck Shansi (now Shanxi province) in northern *China* at Yung-chi.<sup>153</sup>

In 1010 during the summer and autumn, there was a drought in Anhwei, Honan, Kiangsi and Kiangsu provinces in *China*.<sup>165</sup>

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

**1011 A.D.** *Europe* and *Egypt* experienced a cold severe winter. There was ice on the Nile River.<sup>28</sup>

During the winter of 1011, [*France*] experienced a cold winter.<sup>173</sup>

In 1011 during the period between 5 June and 3 July, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 1011 during the summer, there was a drought in Honan province in *China*.<sup>165</sup>

In 1011, several regions of *China* experienced flooding.<sup>153</sup>

— Floods struck Kiangsi (now Jiangxi province) in southern *China* at Chi-an and Ch'ing-chiang. Houses and fields were damaged by the floodwaters.

— During the period between 4 July and 1 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.

— During the period 2-31 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Pin and Hui-min.

— During the period 2-31 August, floods struck Kiangsi province at Kiukiang, Nan-ch'ang, Kao-an and I-ch'un. Fields were damaged.

— During the period 1-29 September, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming. Farm fields were damaged and people drowned.

— During the period between 30 September and 28 October, floods struck Honan (now Henan province) in central *China* at Mêng and Wên. Houses were damaged by the floodwaters.

— During the period between 30 September and 28 October, floods struck Kiangsu province at Soochow.

— During the period between 28 December 1011 and 25 January 1012, floods struck Kiangsu province at Huai-an and T'ai. Crops were damaged.

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

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**1012 A.D.** In *England* and *Germany*, there was a great inundation from the sea.<sup>47, 72, 92</sup>

In *England* and *Germany*, endless multitudes died of famine.<sup>57, 91</sup>

An inundation from the sea overwhelmed many towns in *England*, *Germany*, etc. And much people, endless multitudes, died of famine and plague. There were great rains.<sup>72</sup>

In 1012, a storm surge caused floods. As a result, dikes were built along the river Weser [in northeast *Germany*]. “At that time, the Danube River in Bavaria overflowed its banks, the Rhine and its banks as well. An innumerable amount of people and livestock died and many buildings and forest were destroyed by the forces of the tide.”<sup>172</sup>

In 1012 in the north of *Western Europe*, there were heavy rainfalls that produced floods. The waters of the Danube and Rhine Rivers caused immense damage.<sup>79</sup>

In 1012, several regions of *China* experienced flooding.<sup>153</sup>

— During the period between 26 January and 24 February, floods struck Shantung (now Shandong province) on the east coast of *China* at Hui-min.

— During the period between 25 February and 24 March, floods struck Shantung province in *China* at Pin and Hui-min.

— During the period between 22 June and 21 July, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Shao-wu.

— During the period between 22 July and 19 August, floods struck Kansu (now Gansu province) in northwest *China* at Ch'ing-yang. People drowned.

In 1012 during the period between 24 May and 21 June, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China*; Anhwei (now Anhui province) in eastern *China*; and Chekiang (now Zhejiang province) on the east coast of *China*. Then during the period between 12 August and 18 September, a drought engulfed Kiangsu province at Yangchow.<sup>153</sup>



In 1012 during the summer, there was a drought in Chêhkiang and Kiangsu provinces in *China*.<sup>165</sup>

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

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**1013 A.D.** In *England*, there was an earthquake, rains, floods, thunder, lightning and a hurricane.<sup>47, 72, 92</sup>

[In *England*] in 1013, there was a great earthquake, and whirlwind or hurricane from the west, throwing down houses and tearing up trees by the roots. Thunder and lightning in May.<sup>72</sup>

In 1013 during the period 11 July and 9 August, floods struck Shensi (now Shaanxi province) in central *China* at Pao-an. Houses were damaged by the floodwaters and 650 persons drowned.<sup>153</sup>

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

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**1014 A.D.** Many *English seaports* destroyed by the sea.<sup>46</sup>

In 1014, there were great inundations of the *English coasts* and a number of seaport towns were demolished.<sup>47, 92</sup>

In 1014, there was an inundation on the *English coasts*, which demolished a number of seaport towns.<sup>90</sup>

In 1014, on the 3<sup>rd</sup> of October, the sea overflowed, drowned many villages and an innumerable multitude of people.<sup>72</sup>

In 1014 [in *France*], the winter was mild.<sup>173</sup>

In 1014, several regions of *China* experienced flooding.<sup>153</sup>

— During the period between 30 June and 29 July, floods struck Anhwei (now Anhui province) in eastern *China* at Hsü-i. Fields were damaged.

— During the period between 30 June and 29 July, floods struck Honan (now Henan province) in central *China* at Loyang.

— During the period between 30 June and 29 July, floods struck Kansu (now Gansu province) in northwest *China* at T'ien-shui. People drowned.

— During the period between 28 July and 26 September, floods struck Hopei (now Hebei province) in northern *China* at P'u-yang.

— During the period between 25 November and 24 December, floods struck Hopei province at Pin.

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

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**1015 A.D.** In 1015 during the period between 22 February and 22 March, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng. Then during the period between 17 August and 15 September, a flood struck Shensi (now Shaanxi province) in central *China* at Chung-pu. People drowned.<sup>153</sup>

In 1015 during the spring, there was a drought in Honan province in *China*.<sup>165</sup>

[In *England*], there was a fatal inundation of the Sea.<sup>72</sup>

In 1015, there was a great inundation of the sea along the *English coasts*. A number of seaport towns and their inhabitants were destroyed.<sup>212</sup>



In 1015 [in *France*], the winter was mild.<sup>173</sup>

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

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**1016 A.D.** In 1016 [in *France*], the winter was mild.<sup>173</sup>

In *Ireland*, there were excessive rains and floods – producing cattle mortality.<sup>47, 92</sup>

There was an awful famine throughout *Europe* – “Hail, thunder and lightning.”<sup>57, 91</sup>

There was an awful famine throughout *Europe*.<sup>90, 212</sup>

In July, hail and thunder killed many people. Trees and corn suffered much. A grievous famine followed.<sup>72</sup>

There was a terrible tempest of much hail, rain, thunder and lightning [in *England*], which was fatal to people, corn [grain], cattle and trees.<sup>72</sup>

In 1016, several regions of *China* experienced flooding.<sup>153</sup>

— During the period between 7 July and 5 August, floods struck Kansu (now Gansu province) in northwest *China* at T'ien-shui. Houses were damaged by the floodwaters and 67 persons drowned.

— During the period between 6 August and 3 September, a flood struck Shensi (now Shaanxi province) in central *China* at Fu-shih. Dikes and the city walls were damaged by the floodwaters.

— During the period between 4 October and 2 November, a flood struck Hopei (now Hebei province) in northern *China* at Hsiung and Pa.

— During the period between 4 October and 2 November, a flood struck Szechwan (now Sichuan province) in southwest *China* at Kuang-yüan.

In 1016 during the period between 4 September and 2 November, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng and An-Yang, and Hopei (now Hebei province) in northern *China* at Ta-ming and P'u-yang. The drought was accompanied by a plague of locust.<sup>153</sup>

In 1016 during the autumn, there was a drought in Chihli and Honan provinces in *China*. The drought was accompanied by a plague of locusts.<sup>165</sup>

*Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.*

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**1017 A.D.** In 1017 [in *France*], the winter was mild.<sup>173</sup>

In 1017 during the period between 31 March and 28 April, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng. Then during the period between 6 May and 8 August, a drought struck Shensi (now Shaanxi province) in central *China* at Sian. Then during the period between 8 August and 8 November, a drought again struck Honan province at Kaifeng.<sup>153</sup>

In 1017 during the spring, summer and autumn, there was a drought in Honan and Shensi provinces in *China*. [The source text cited the year 1107 but was out of chronological order and the error was the result of a transposed number.]<sup>165</sup>

On 7 July 1017, there was a severe thunderstorm over Magdeburg, *Germany*.<sup>172</sup>

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**1018 A.D.** The summer of 1018 [in *France*] was hot and dry.<sup>173</sup>

In 1018 a drought engulfed Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 1018, there was a drought in Shensi province in *China*.<sup>165</sup>

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**1019 A.D.** In 1019, several regions of *China* experienced flooding.<sup>153</sup>

— During the period between 5 July and 3 August, floods struck Honan (now Henan province) in central *China* at Hua.

— During the period between 5 July and 3 August, floods struck Hopei (now Hebei province) in northern *China* at P'u-yang.

— During the period between 5 July and 3 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow.

— During the period between 5 July and 3 August, floods struck Shantung (now Shandong province) on the east coast of *China* at P'u, Tung-p'ing, Tsinan, Chi-ning and Shan.

— During the period 2-30 September, floods struck Honan province at Hua, Kaifeng and Loyang.

— During the period 2-30 September, floods struck Hopei province at Ta-ming.

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**Winter of 1019 / 1020 A.D.** Many people succumbed to the very harsh winter of 1019-1020 [in *Germany*]. The year 1020 was remembered as a hard and cold winter with much snow. This year, the Sea poured over North Friesland so much so, that many towns and villages were entirely ruined. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

In the year 1020, the winter was very harsh and persistent. As a result, there was a huge mortality rate spread over the whole continent [of *Europe*].<sup>62</sup>

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**1020 A.D.** In *England*, the frost was very severe.<sup>47, 72, 93</sup>

In *England*, there were great floods followed by plague.<sup>47, 72, 92</sup>

In 1020 many people were killed by the severe cold winter. The Albis (now called Elbe) and Visurgis (now called Weser) Rivers in *Germany* rose high drowning many of their coasters [coastal trading vessels - shallow-hulled ships used for trade between locations on the same island or continent].<sup>72</sup>

In July 1020, there were 3 days of very heavy floods along the Weser and Elbe rivers [in *Germany*]. Also this year, a strong storm surge struck along the North Sea.<sup>172</sup>

In 1020 during the period between 5 February and 6 May, a drought engulfed Shensi (now Shaanxi province) in central *China* at Nan-chêng. Then during the period between 6 May and 8 August, a drought struck Honan (now Henan province) in central *China* at Kaifeng. Then during the period between 24 June and 22 July, a flood struck Honan province at Hua.<sup>153</sup>

In 1020 during the spring and summer, there was a drought in Honan province in *China*.<sup>165</sup>

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**1021 A.D.** In 1021, several regions of *China* experienced flooding.<sup>153</sup>

— During the period between 15 February and 15 March, floods struck Honan (now Henan province) in central *China* at Kaifeng.

— During the period between 15 April and 14 May, floods struck Honan province at Kaifeng and Loyang. Fifty percent of the land tax was remitted.

— During the period between 8 November and 6 December, floods struck in Honan province at Kaifeng and Loyang; in Anhwei (now Anhui province) in eastern *China*; and in Chekiang (now Zhejiang province) on the east coast of *China*. The land tax was remitted.

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**Winter of 1021 / 1022 A.D.** During the period between 8 November 1021 and 5 February 1022, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 1021 during the winter, there was a drought in Honan province in *China*.<sup>165</sup>

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**1022 A.D.** In 1021 or 1022 in *England*, there was excessive heat, “yet marbles sweat profusely.”<sup>47, 72</sup>

In 1022 [in *England*], there was a strong heat wave in the summer. Men and animals died.<sup>212</sup>

In 1021 there was an excessive hot droughty summer in *England*. The *French* and *Germans* place this heat wave in 1022 and say that so great a drought and heat arose that many people and cattle died of it. In this heat, marble pillars sent forth so profuse a sweat.<sup>72</sup>

The summer of 1022 [in *France*] was superb.<sup>173</sup>

In 1022 in *Ireland*, there was a great shower of hail, the hailstones as big as crab apples. There was also great thunder and lightning which killed an infinite number of cattle.<sup>93</sup>

In the year 1022, during the synod and royal assembly at Aachen in west-central *Germany*, such a strong heat occurred that many people suffocated and died a sudden death. Many animals also died. The plaster and the marble columns of the temple were sweating as if there was considerable moisture. In *England*, this summer was extremely hot and dry. In a great part of *Germany* heat that accompanied terrible storms proved fatal for humans and cattle.<sup>62</sup>

In Hindustan (*India*) in 1022, during the reign of Masood I, the area experienced a great drought followed by a famine. The whole country was entirely depopulated.<sup>57</sup> [Hindustan is the land between the Himalayas and the Indian Ocean.]

About 1022 A.D., there was a great famine in *India*.<sup>179</sup>

There are records that indicate whole provinces in *India* were depopulated by famine in 1022 A.D.<sup>84</sup>

This year was remarkable for drought and famines in many parts of the world.<sup>57</sup>

In 1022, several regions of *China* experienced flooding.<sup>153</sup>

— Flood struck in Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Yangchow; in Hopei (now Hebei province) in northern *China* at Ts’ang; and in Honan (now Henan province) in central *China* at Kaifeng.

— During the period between 4 February and 4 March, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing. The land tax was remitted.

— During the period 2-31 July, floods struck Hopei province at Peiping.

— During the period between 28 October and 26 November, floods struck in Hopei province at Yen-shan and in Shantung (now Shandong province) on the east coast of *China* at Wu-ti. Houses were damaged by the floodwaters and many people drowned.

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#### **Within 1023 A.D. – 1064 A.D. China. Famine**

During the reign of Emperor Jin-Tsong [1023-1064], a long drought caused a famine in *China*. The emperor saved 500,000 of his subjects from perishing by the timely supplies he sent them of corn [grain] and rice.<sup>186</sup>

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**1023 A.D.** In 1023, several regions of *China* experienced flooding.<sup>153</sup>

— Flood struck in Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow.

— During the period between 25 January and 22 February, floods struck in Honan (now Henan province) in central *China* at Kaifeng and in Kiangsu province at Yangchow.

— During the period between 22 May and 20 June, floods struck Honan province at Hua.

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**1024 A.D.** In *Russia*, there was a major famine. There were 38 major famines in *Russia* between 1024 and 1936. Many of these famines were accompanied by such horrors as eating tree bark, grass, and dung, and cannibalism.<sup>96</sup>

In 1024 during the period between 5 February and 6 May, a severe drought engulfed *China*.<sup>153</sup>

In 1024 during the spring, there was a great drought in Honan province in *China*.<sup>165</sup>

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### **1025 A.D. – 1027 A.D. Egypt. Famine**

A famine took place in *Egypt* in 1025, during the rule of Caliphate of Zahir. The suffering was widespread. It became necessary to prohibit the slaughter of cattle and there was no meat to be had anywhere, as fowls, the common meat of *Egypt*, had quickly disappeared. The stronger among the population turned brigand and began to prey upon the weaker members of society. Caravans and pilgrims were attacked by Syrians bands, which began to invade border towns. People flocked to the palace in masses crying piteously for relief at the hands of the Commander of the Faithful. But no help was to be had at that quarter because the palace was very short of provisions. When the banquet for the Feast of the Sacrifice was spread, the slaves of the royal household broke in and swept the food from the tables. Slaves began to rise in revolt in all parts of the country and it became necessary for citizens to organize committees of safety for self-protection, the government granting permits to kill the bondmen. With an ample rise of the Nile River in 1027, however, the period of suffering came to an end.<sup>84</sup>

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**1025 A.D.** In *England*, there was a famine and plague from the greatest rains.<sup>57, 72, 91</sup>

In Flanders [now *Belgium*], it rained constantly from 15 October to April. This was followed by a plague, which swept away the greatest part of men. Afterwards there was a great famine.<sup>72</sup>

In 1025 during the period between 26 August and 24 September, a drought engulfed Shensi (now Shaanxi province) in central *China* at Sian. As a result due to the hardship, the land tax was remitted. Then during the period between 23 November and 22 December, floods struck Hupeh (now Hubei province) in central *China* at Hsiang-yang. Fields were damaged and the land tax was remitted.<sup>153</sup>

In 1025 during the autumn, there was a drought in Shensi province in *China*. The land tax was remitted.<sup>165</sup>

*Also refer to the section 1025 A.D. – 1027 A.D. for information on the drought and famine in Egypt during that timeframe.*

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**1026 A.D.** In 1026 in *Italy*, there was such a strong heat wave that many animals and people suffered greatly.<sup>62</sup>

In 1026, several regions of *China* experienced flooding.<sup>153</sup>

— Flood struck Honan (now Henan province) in central *China* at Chêng.

— During the period between 17 July and 14 August, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou, Nan-p'ing, and Shao-wu. Houses and fields were damaged by the floodwaters and many people drowned.

— During the period between 17 July and 14 August, floods struck in Honan province at Kaifeng and Loyang; in Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow; and in Hopei (now Hebei province) in northern *China* at Ta-ming. The land tax was remitted.

— During the period between 12 November and 11 December, floods struck Hupeh (now Hubei province) in central *China* at Ching-shan. Many people drowned.

*Also refer to the section 1025 A.D. – 1027 A.D. for information on the drought and famine in Egypt during that timeframe.*

**1027 A.D.** In 1027, several regions of *China* experienced flooding.<sup>153</sup>

— During the period between 10 April and 8 May, floods struck in Hupeh (now Hubei province) in central *China* at Hsiang-yang; in Anhwei (now Anhui province) in eastern *China* at Fou-yang; and in Honan (now Henan province) in central *China* at Hsü-ch'ang and Lin-ju.

— During the period between 5 August and 2 September, floods struck in Kansu (now Gansu province) in northwest *China* at T'ien-shui and in Kiangsu (now Jiangsu province) on the east coast of *China* at T'ai where many people drowned.

In 1027 during the period between 7 June and 4 August, a drought engulfed central *China* at Honan (now Henan province) at Kaifeng and Shensi (now Shaanxi province) at Sian. Then during the period 1-30 December, a drought struck Shensi province at Hua. The drought was accompanied by a plague of locust. As a result of the hardship, the land tax was remitted.<sup>153</sup>

In 1027 during the summer and autumn, there was a great drought in Honan and Shensi provinces in *China*. As a result, the land tax was remitted. The drought was accompanied by a plague of locusts.<sup>165</sup>

**1028 A.D.** In 1028 during the period between 28 April and 26 May, a drought engulfed *China*.<sup>153</sup>

In 1028 during the summer, there was a drought in *China*.<sup>165</sup>

In 1028, several regions of *China* experienced flooding.<sup>153</sup>

— During the period between 25 July and 22 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow, I-chêng, and Chinkiang. Houses were damaged by the floodwaters.

— During the period between 25 July and 22 August, floods struck Hopei (now Hebei province) in northern *China* at Hsiung and Pa.

— During the period between 23 August and 20 September, floods struck Hopei province at Ta-ming where the autumn land tax was remitted and at P'u-yang.

— During the period between 23 August and 20 September, floods struck Shensi (now Shaanxi province) in central *China* at Lin-t'ung. Many people drowned.

**1029 A.D.** In 1029 during the period between 16 February and 17 March, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming.<sup>153</sup>

### **1030 A.D. – 1032 A.D. France. Famine**

In *France* from 1030-32, the whole course of nature seemed to be upset, and there were intense cold in the summer and oppressive heat during the winter. Rains and frost came out of season and for three years there were neither a period for planting seeds or for harvesting. The miseries of mankind in *France* at that time were incredible. Also there was a fear of the coming of the end of the world coinciding with the 1,000<sup>th</sup> anniversary of the Crucifixion. Thousands upon thousands died of starvation, and the living were too weak to bury the dead. There were many horrible instances of cannibalism and human flesh was said to have been exposed for sale in the market at Tournus. In their maddened condition, the peasants exhumed human bodies from graves and gnawed the bones.<sup>84</sup>

One of the harrowing incidents of the time, which will give some idea of the insanity which suffering induced, occurred in the wood of Chatânay, near the town of Macon. A traveler and his wife stopped at a hut supposedly occupied by a holy hermit. Scarcely had they entered the adobe, however, when the woman discovered a pile of skulls in the corner. She and her husband fled to the town and when an investigation followed, it was found that the hermit had murdered and partly devoured 48 men, women and children.<sup>84</sup> [Chatânay is located in Burgundy in east-central *France*.]

Grass, roots, and white clay were the ordinary articles of food for the poorer classes during these terrible years. And as a result, the sufferers almost ceased to resemble human beings. Their stomachs became greatly distended, while almost all the bones of their bodies were visible beneath their leathery skin. Their very voices became thin and piping.<sup>84</sup>

Packs of raging wolves came out of the forests and fell upon the defenseless peasants. It seemed as if mankind in *France* could never recover.<sup>84</sup>

Raoul Glaber (from Medieval *France*) tells us that in the years 1030-32, the whole earth was so inundated with “continuous rain for three years” that there could not be found a furrow in the field for sowing. It followed that these floods caused an awful famine.<sup>61</sup>

Excessive rainfall and humidity was the main cause of the terrible famine of 1030 to 1033 in *France*. The ground was incessantly drenched by rainfall. Farmers waited in vain for a favorable time for sowing their crops. The soil remained so soaked for three years, that it didn’t offer a single furrow to receive grain. These floods offered a sad triumph over the weeds in the fields. Bushel of seed brought only a pint in the best land and the pint itself only a few grains.<sup>79</sup>

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**1031 A.D.** In *England*, there were extended general floods from rains.<sup>47, 72, 92</sup>

In *England*, there was a famine from great rains and locust.<sup>57, 72, 91</sup>

There were terrible tempests and great rains. This caused such inundations in rivers near the sea as overflowed the lands. Famine and plague followed. At the same time, famine and plague grievously oppressed Cappadocia (*Turkey*), *Armenia*, Paphlagonia (*Turkey*), and almost all *the East*. Many were forced to leave their country.<sup>72</sup>

In 1031 during the period between 23 June and 21 July, floods struck *China*.<sup>153</sup>

*Also refer to the section 1030 A.D. – 1032 A.D. for information on the famine in France during that timeframe.*

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**Winter of 1031 / 1032 A.D.** During the period between 17 December 1031 and 15 January 1032, there was a drought in *China*. There had been no snowfall during the winter.<sup>153</sup>

In 1031 during the winter, there was a drought in *China*.<sup>165</sup>

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**1032 A.D.** During 1032-1033, there was a great famine [in *France*].<sup>173</sup>

In 1032 during the period between 13 April and 11 May, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* and Anhwei (now Anhui province) in eastern *China*. Then during the period between 12 May and 10 June, floods struck Shantung (now Shandong province) on the east coast of *China* at Kuan. Farm fields were damaged by the floodwaters. Then during the period between



11 June and 9 July, a drought of long duration struck Honan (now Henan province) in central *China* at Kaifeng. Crops were damaged.<sup>153</sup>

In 1032 during the spring and summer, there was a drought of long duration in Honan and Kiangsu provinces in *China*.<sup>165</sup>

*Also refer to the section 1030 A.D. – 1032 A.D. for information on the famine in France during that timeframe.*

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**1033 A.D.** In Gaul [*Western Europe*] the winter was severe. In *Switzerland*, the Imperial Army of Emperor Conrad II suffered much from the cold.<sup>62</sup>

In 1033, there was a severe drought in Southern China during the period of 29 July - 27 August. Because of the severe drought, the locust, the famine and the plague, 20% to 30% of the people died.<sup>153</sup>

In 1033 during the autumn, there was a great drought in *China*. Typhus fever raged. The drought was accompanied by a plague of locusts. Because of the hardship, soup kitchens were opened.<sup>165</sup>

The weather in 1033 was ominous. The temperature in Gaul [*Western Europe*] was so unfavorable that farmers could not sow or harvest because the fields were constantly flooded. Because of the incessant rains, it was believed that it would take 3 years for the soil to become suitable for sowing furrows. A bushel of grain was sown in the fertile land. When harvested the grain yielded only a sixth of a bushel, hardly a handful. A plague started in the *East*. After ravaging *Greece*, the plague came to *Italy* and spread to Gaul [*Western Europe*], and did not even spare *England*. Individuals were forced to eat grass, and animals that had fallen [dead animals]. The people killed themselves in order to consume themselves. Some children were tempted with an egg or an apple in order to lure them away. These children were then kill for food to satisfy their hunger. This madness, the frenzy grew so that the animals were safe to escape death; when the people nourished themselves on human flesh, even though this crime was punishable with the stake [burning at the stake]. Some people who starved so long that when someone arrived to nurse them back to health, they ate a full meal and fell over dead [refeeding syndrome]. It was generally believed; the order of the seasons and the elements had ceased.<sup>62</sup>

On 9 July 1033, a bolt of lightning set the Church of Saint Michael's on fire in Hildesheim, *Germany*. [This would place the event on the year the church construction was completed and the church was consecrated.]<sup>172</sup>

The year 1033 in *France* was noted for its rain. But it was also distinguished for its great calamities. All the elements were engaged in a war for three years running. The seasons were contrary to sowing crops.<sup>79</sup>

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**1034 A.D.** In 1034 [in *France*], the weather was warm and produced an abundant harvest equivalent to five years of normal harvest. The harvest was rich in cereals, wine and fruits of all kinds.<sup>62</sup>

In 1034, several regions of *China* experienced flooding.<sup>153</sup>

— During the period between 18 July and 16 August, floods struck Anhwei (now Anhui province) in eastern *China* at Hsü-i.

— During the period between 17 August and 15 September, floods struck Hopei (now Hebei province) in northern *China* at P'u-yang.

— During the period between 16 September and 14 October, floods struck Kiangsi (now Jiangxi province) in southern *China* at Hsiu-shui. Two hundred families were flooded and over 370 persons drowned.

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**1035 A.D.** A frost on Midsummer Day, so vehement, that the grain and fruits were destroyed.<sup>2, 40, 41, 42, 43</sup>



A frost on Midsummer Day (21 June) struck *England* killing crops.<sup>28</sup> - destroyed the fruits of the earth.<sup>90</sup>

In 1035 [in *England*], there was a killer frost on Midsummer's day (June 24<sup>th</sup>) that destroyed the corn [grain] and fruit.<sup>212</sup>

In *England* in the year 1035, the frost on June 24 was still severe. All the grass and grain was lost. This produced a dearth.<sup>72</sup>

A frost in *England* on Midsummer Day; all grass, grain and fruit destroyed; a dearth.<sup>47, 93</sup>

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**1036 A.D.** In 1036 during the period between 27 June and 25 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Kan and Chi-an. Houses were damaged by the floodwaters. During the same period of time a drought of long duration struck Hopei (now Hebei province) in northern *China* at Ta-ming.<sup>153</sup>

In 1036 during the summer, there was a drought of long duration in Chihli province in *China*.<sup>165</sup>

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**1037 A.D.** In 1037 during the period between 16 June and 15 July, a drought engulfed *China*. Then during the period between 16 July and 13 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow. Dikes were damaged. Then during the period between 12 September and 11 October, floods struck Chekiang province at Shao-hsing. People drowned.<sup>153</sup>

In 1037 during the summer, there was a drought in *China*.<sup>165</sup>

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**1038 A.D.** In 1038, a terrible famine in Constantinople (now Istanbul, *Turkey*).<sup>72</sup>

[Another source places this event in 1035.] The *Byzantine Empire* was visited by a famine.<sup>57, 91</sup>

In 1038 [in *England*], there was a famine with a plague.<sup>72</sup>

In 1038, floods struck Szechwan (now Sichuan province) in southwest *China* at Ta. During the period between 5 July and 3 August, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou where houses were damaged by the floodwaters and many people drowned.<sup>153</sup>

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**1040 A.D.** In *Germany*, there were great floods.<sup>47, 72, 92</sup>

There were great inundations in *Germany*.<sup>72</sup>

In 1040, there was a famine [in *England*], more severe than any other.<sup>212</sup>

In 1040 during the period between 9 October and 7 November, floods struck Honan (now Henan province) in central *China* at Hua.<sup>153</sup>

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**1041 A.D.** On 11 January 1041, there was a strong storm surge along the *North Sea* coast.<sup>172</sup>

The whole year, 1041 was frightful in *England*, in both temperature and great excessive rains. This damaged corn [grains] and caused a great death of cattle. This destruction was far greater than anyone living ever remembered. Then began a famine that lasted seven years. On 3 November, there was a fearful tempest and great rain. In Flanders [now *Belgium*], the sea broke down its banks, and carried off all, far and near, with it into the ocean.<sup>72</sup>

[Another account places this event in 1042] In *England* in 1042, about this time came such a famine that a sextarius of wheat, which usually is a load for one horse, sold for 5 solidi and more. This lasted seven years.<sup>57, 91</sup>

In 1041 during the period between 28 September and 27 October, a drought engulfed *China*.<sup>153</sup>

In 1041 during the autumn, there was a drought in *China*.<sup>165</sup>

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**1042 A.D.** The summer of 1042 in northern *France* was very wet.<sup>79</sup>

In 1042 during the period between 20 June and 19 July, a drought engulfed *China*.<sup>153</sup>

In 1042 during the summer, there was a drought in *China*.<sup>165</sup>

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**1043 A.D.** In 1043, tempest and profound summer rains, harvest snow, scarcity of wine and corn [grain] prevailed in *France* and *Germany*.<sup>72</sup>

The year 1043 in northern *France* produced great rains. The summer was rainy and wintery.<sup>79</sup>

There were tempests all summer.<sup>72</sup>

The rains and storms in the summer of 1043 in *France* made the year similar to the winter. There was very little fruit and poor harvests.<sup>79</sup>

In 1043, there was a grievous famine over all *England*. Corn (grain) was the dearest ever known by anyone living.<sup>72</sup>

In 1043 during the period between 5 February and 8 August, a drought engulfed *China*.<sup>153</sup>

In 1043 during the spring and summer, there was a drought in *China*.<sup>165</sup>

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**Winter of 1043 / 1044 A.D.** In 1043, a great snow fell in harvest.<sup>72</sup>

The winter of 1043 was very cold. There was frost from 1 December to 1 March in Normandy, *France*.<sup>173</sup>

In 1044, the vine and fruit trees in *France* were killed [by the extreme cold].<sup>58, 80</sup>

In 1043 in northern *France*, heavy frosts lasted from early December until early March.<sup>79</sup>

During the winter of 1043-44, the winter was very harsh in *Germany* and *France*, and accompanied by frequent snow. The frost lasted from 1 December to early March. The vines were so damaged that the wine was extremely rare. The loss of the harvest produced a famine so great that many people were forced to eat unclean animals. The mortality was considerable.<sup>62</sup>

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**1044 A.D.** [In *Western Europe*] in 1044, the year was remarkable for the great abundance of rain showers and the unusual lack of fruits of the earth.<sup>62</sup>

In 1044 during the period 1-29 April, a drought engulfed the east coast of *China* in Chekiang (now Zhejiang province) and Kiangsu (now Jiangsu province) at Yangchow and Nanking.<sup>153</sup>

In 1044 during the spring, there was a drought in Chêhkiang, Kiangsu and Kiangsi provinces in *China*.<sup>165</sup>

[In *England*], there were tempest in November that produced floods.<sup>72</sup>

In 1044, there was “hunger all over *England*. Corn [grain] dearer than ever known.”<sup>212</sup>

The winter of 1044 [in *France*] was cold.<sup>173</sup>

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**1045 A.D.** In Flanders [now *Belgium*], there was an inundation from the sea.<sup>47, 72, 92</sup>

In 1045 during the period between 20 February and 20 March, a drought of long duration engulfed *China*.<sup>153</sup>

In 1045 during the spring, there was a drought of long duration in *China*.<sup>165</sup>

[In *England*] in 1045, it rained all November, summer rains, harvest snows, tempests with scarcity after.<sup>72</sup>

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**1046 A.D.** In *England*, there was a great rain flood causing a loss of cattle.<sup>47</sup>

In 1046, there was a flood of the Severn Valley in *England* from great rain floods; loss of cattle.<sup>72, 92</sup>

In *England*, an inundation of the River Severn, drowned an abundance of cattle.<sup>40, 41, 43</sup>

In 1046, there was a drought of long duration in Honan (now Henan province) in central *China* at Kaifeng. During the period of 7 July - 4 August, many people died from sun-stroke.<sup>153</sup>

In 1046 during the summer, there was a drought of long duration in *China*. Many died from sunstroke.<sup>165</sup>

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**1047 A.D.** The winter of 1047 [in *France*] was cold.<sup>173</sup>

There was such a large amount of snow in the West [*Western Europe*], that the forests were inaccessible.<sup>62</sup>

On 1 January 1047, snow fell to a great depth in the west of *England*.<sup>72</sup>

In 1047 in *Ireland*, there was a great famine and snow. In *England*, there was a famine from snow and frost.<sup>57, 91</sup>

In 1047, there was a famine [in *England*] that was caused by great snow and frost.<sup>72</sup>

In 1047, there was great snow. All summer there were tempests with rain, thunder and lightning, dearth and death.<sup>72</sup>

On 1 January, there fell in the west of *England*, a very great and deep snow, which broke down most woods. The snow laid on the ground until 1 March. The summer after had such tempests of thunder and lightning, that the growing of corn (grain) was burnt and blasted. Several towns were struck by lightning and reduced to ashes. There followed a great dearth [famine], and the death of people and cattle.<sup>72</sup>

There was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

In 1047-48, famine in *Scotland* extended over two years.<sup>57</sup>

In 1047 during the period between 29 January and 27 April, a severe drought engulfed *China*.<sup>153</sup>

In 1047 during the spring, there was a great drought in Honan province in *China*.<sup>165</sup>

**1048 A.D.** In 1048 [?], there was a great flood in *China*. The Yellow River cut a new course to the sea.<sup>142</sup>

In 1048, several regions of *China* experienced flooding.<sup>153</sup>

— During the period between 14 July and 11 August, floods struck Hopei (now Hebei province) in northern *China* at P'u-yang.

— During the period between 12 August and 10 September, floods struck in Hopei province at Ta-ming and in Honan (now Henan province) in central *China* at Chi, Kaifeng, and Loyang.

**1049 A.D.** The winter of 1049 [in *France*] was cold.<sup>173</sup>

In 1049 during the period between 5 February and 4 April, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming. Then during the period between 3 June and 2 July, a drought struck *China*.<sup>153</sup>

In 1049 during the summer, there was a drought in *China*.<sup>165</sup>

**1050 A.D.** In 1050 during the period between 26 March and 23 April, a drought engulfed *China*.<sup>153</sup>

In 1050, floods struck Hopei (now Hebei province) in northern *China* at Chêng-ting and Ting. During the period between 17 November and 16 December, floods struck Hopei province at Ta-ming.<sup>153</sup>

In 1050 during the spring, there was a drought in *China*.<sup>165</sup>

**1051 A.D.** There was a great barrenness of the land in *England*, and dearth, famine, want of bread and great mortality.<sup>72</sup>

[Another source places this event in 1050] In 1050 in *England*, there was a great famine and mortality; from barrenness of the land.<sup>57, 91</sup>

In 1051, there was a dreadful famine in Lincolnshire, *England*.<sup>212</sup>

The entire year of 1051 in northern *France* was very wet.<sup>79</sup>

The summer of 1051 [in *France*] was very poor.<sup>173</sup>

In 1051 there was a famine in *Mexico* that caused the Toltecs to migrate.<sup>57, 91</sup>

In 1051 during the period between 26 March and 10 June, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ing-ho and Chi [located at longitude 115.34° East and latitude 37.34° North]. Then during the period between 9 August and 7 September, floods struck in Hopei province at Ta-ming and in Shantung (now Shandong province) on the east coast of *China* at Kuan-t'ao.<sup>153</sup>

In 1051 during the spring and summer, there was a drought in Chihli province in *China*.<sup>165</sup>

**1052 A.D. – 1060 A.D. India and Afghanistan. Famine**

In Hindustan, from 1052-60, there was seven years of drought in Ghor [province in central *Afghanistan*] so that the earth was burned up, and thousands of men and animals perished with heat and famine.<sup>57</sup>

In 1055 A.D., there was a famine in Ghor [a ruined city, in the Maldah district of West Bengal, *India*].<sup>179</sup>

There are records that indicate whole provinces in *India* were depopulated by famine in 1052 A.D. The famine of such severity swept over Hindustan that the Mongol emperor himself was unable to obtain the necessities [food] for his household.<sup>84</sup> [Hindustan is the land between the Himalayas and the Indian Ocean.]

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**1052 A.D.** On St. Thomas's Eve [December 20] was such a hurricane in *England* as demolished many churches, blew down innumerable houses and broke down and rooted up trees.<sup>72</sup>

In 1052 during the period between 27 August and 25 September, floods struck in Hopei (now Hebei province) in northern *China* at Ta-ming and in Shensi (now Shaanxi province) in central *China* at Fu. Houses were damaged by the floodwaters.<sup>153</sup>

*Also refer to the section 1052 A.D. – 1060 A.D. for information on the drought and famine in India and Afghanistan during that timeframe.*

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**Winter of 1052 / 1053 A.D.** During the period between 24 December 1052 and 22 January 1053, there was a drought in *China*. There had been no snowfall during the winter.<sup>153</sup>

In 1052 during the winter, there was a drought in *China*. No snowfall.<sup>165</sup>

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**1053 A.D.** A year of heat and drought, which extended to the north of *France*.<sup>62</sup>

The summer of 1053 [in *France*] was a great [excessively hot] summer.<sup>173</sup>

In 1053, a persistent drought burned lands in the country of Caux [*Switzerland*].<sup>79</sup>

There was a famine in *England* after a comet.<sup>72</sup> The famine lasted two years.<sup>57, 91</sup>

In 1053 during the period between 13 November and 12 December, a drought engulfed *China*. The drought was accompanied by a plague of locusts.<sup>153</sup>

In 1053, there was a drought in *China*. The drought was accompanied by a plague of locusts.<sup>165</sup>

*Also refer to the section 1052 A.D. – 1060 A.D. for information on the drought and famine in India and Afghanistan during that timeframe.*

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**1055 A.D.** In London, *England*, nearly 400 houses were blown down by a storm.<sup>40, 41, 43, 56</sup>

A hurricane at Coventry, *England* blew down 400 houses.<sup>72</sup>

In 1055, there was a great famine.<sup>72</sup>

In 1055 during the period between 30 April and 28 May, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 1055 during the spring, there was a drought in Honan province in *China*.<sup>165</sup>

*Also refer to the section 1052 A.D. – 1060 A.D. for information on the drought and famine in India and Afghanistan during that timeframe.*

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**1056 A.D.** The winter of 1056 [in *France*] was mild.<sup>173</sup>

In 1056 during the period between 17 May and 15 June, floods struck in Hopei (now Hebei province) in northern *China* at Ta-ming.<sup>153</sup>

*Also refer to the section 1052 A.D. – 1060 A.D. for information on the drought and famine in India and Afghanistan during that timeframe.*

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**1057 A.D.** The winter of 1057 [in *France*] was cold.<sup>173</sup>

In 1057 in northern *France*, there was a large amount of snow and rain.<sup>79</sup>

There was a great snowfall [in *England*].<sup>72</sup>

In 1057, several regions of *China* experienced flooding.<sup>153</sup>

— Floods struck Hopei (now Hebei province) in northern *China* at Ta-ming.

— During the period between 5 February and 8 November, floods struck Anhwei (now Anhui province) in eastern *China* at Hsü-i.

— During the period between 5 July and 2 August, floods struck in Honan (now Henan province) in central *China* at Kaifeng and Loyang and in Hopei province at Ta-ming. Farm fields were damaged by the floodwaters.

— During the period between 3 August and 1 September, floods struck in Honan (now Henan province) in central *China* at Kaifeng and Loyang and in Hupeh (now Hubei province) in central *China* at Chiang-ling.

*Also refer to the section 1052 A.D. – 1060 A.D. for information on the drought and famine in India and Afghanistan during that timeframe.*

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**1058 A.D.** In 1058 during the period between 23 July and 21 August, floods struck in Honan (now Henan province) in central *China* at Yüan-wu. Fields were damaged. During the same period of time, a drought struck Szechwan (now Sichuan province) in southwest *China* at Fêng-chieh.<sup>153</sup>

In 1058 during the autumn, there was a drought in Sze-ch'wan province in *China*.<sup>165</sup>

*Also refer to the section 1052 A.D. – 1060 A.D. for information on the drought and famine in India and Afghanistan during that timeframe.*

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**1059 A.D.** In 1059, there was a great comet seen in *Poland*, followed by a severe famine.<sup>72</sup>

[Another account places the event in the year 1058] In 1058 in *Poland* there was a grievous famine.<sup>57, 72, 91</sup>

*Also refer to the section 1052 A.D. – 1060 A.D. for information on the drought and famine in India and Afghanistan during that timeframe.*

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**Winter of 1059 / 1060 A.D.** In 1059 in *England*, there was a severe winter with a great frost. This produced a severe plague and famine in 1060.<sup>47, 72, 93</sup>

The winter in *England* in 1059 was cold and long, very injurious to corn [grain], hence followed a famine and plague in 1060.<sup>72</sup>

The winter of 1060 was unusually hard and strong. It caused a very significant loss in the wheat and grape harvest. A terrible famine, affected many people there.<sup>62</sup>

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**1060 A.D.** The winter of 1060 [in *France*] was cold.<sup>173</sup>

In 1060 during the period between 6 May and 8 August, a drought engulfed Szechwan (now Sichuan province) in southwest *China* at San-t'ai. Then during the period between 30 July and 28 August, floods struck on the east coast of *China* in Kiangsu (now Jiangsu province) at Soochow and in Chekiang (now Zhejiang province) at Hu-chou.<sup>153</sup>

In 1060 during the summer and autumn, there was a drought in Sze-ch'wan province in *China*.<sup>165</sup>

*Also refer to the section 1052 A.D. – 1060 A.D. for information on the drought and famine in India and Afghanistan during that timeframe.*

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**1061 A.D.** The winter of 1061 [in *France*] was cold.<sup>173</sup>

In *England*, the River Thames frozen seven weeks.<sup>47, 72, 93</sup>

In 1061, floods struck on the east coast of *China* in Kiangsu (now Jiangsu province) and in Chekiang (now Zhejiang province). As a result, the land tax was remitted.<sup>153</sup>

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**1062 A.D.** In 1062 during the period between 12 April and 11 May, a drought engulfed *China*. Then during the period between 9 July and 7 August, floods struck Shansi (now Shanxi province) in northern *China* at Tai. During the period between 8 August and 5 September, floods struck in Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsin-i and in Hopei (now Hebei province) in northern *China* at Ta-ming.<sup>153</sup>

In 1062 during the spring, there was a drought in *China*.<sup>165</sup>

In 1062 [in *England*], there was a terrible thunder and lightning storm with subterranean motions.<sup>72</sup>

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**1063 A.D.** The winter in *Europe* was long and intensely cold and many people perished by cold and hunger.<sup>1</sup>

The winter of 1063 [in *France*] was very cold.<sup>173</sup>

The River Thames in *England* was frozen 14 weeks.<sup>2, 40, 41, 42, 43, 47, 72, 90, 93</sup>

In 1063, there was a great frost in *England*. The River Thames in London was frozen over for 13 or 14 weeks.<sup>212</sup>

In 1063, the River Thames in *England* was frozen over for thirteen weeks. All the rivers of the continent were frozen, and even south of the Alps, the Po River in northern *Italy* and many other streams were blocked by ice.<sup>63</sup>

In April of 1063 in [*Western Europe*], there was a tempest for four days together of cold, wind and deep snow which killed all fowls and cattle and damaged trees and vines.<sup>72</sup>



In the middle of April 1063 in *France*, there came four days of winter so harsh with winds and snow, as most trees and [grape] vines were killed, and the birds and livestock died from exposure to the cold.<sup>79</sup>

### 1064 A.D. – 1071 A.D. Egypt. Famine

A terrible 7-year famine struck *Egypt* beginning in 1064. To the hardships of starvation were added the miseries of civil warfare. Nasir-ed-dawla, commander-in-chief of the Fatamid army, upon being deposed by the Caliph Mustansir, quickly gained the support of bands of Arabs and Berbers. Black regiments were soon in control of all *Upper Egypt*. Forty thousand horsemen of the Lewata Berbers descended upon the delta of the Nile River and swept all before them, cutting dikes and destroying canals with the malign purpose of spreading starvation. Both Al-Fustat and Cairo in northern *Egypt* were cut off from supplies, and to add to these tribulations, the Nile failed to come to a flood in 1065.<sup>84</sup>

The peasantry, not daring to venture into the fields for fear of the armed bands of brigands, were unable to carry on any agricultural pursuits; so that the dearth of one year's harvest was prolonged into seven. Prices soared to heights never before reached in the near East. A single cake of bread sold for 15 dinars. Five bushels of grain sold for 100 dinars. Eggs were scarce at a dinar each. Cats and dogs brought fabulous prices, and women, unable to purchase food with their pearls and emeralds, flung their useless jewels into the streets. One woman according to a historian gave a necklace worth 1,000 dinars for a mere handful of flour. The caliph's stable, which had numbered 10,000 horses and mules, was reduced down to three scrawny nags.<sup>84</sup>

Rich and poor suffered on equal terms. Finally the desperate people resorted to revolting cannibalism. Human flesh, which was sold in the open market, was obtained in the most horrible manner. Butchers concealed themselves behind latticed windows in the upper stories of houses, which looked out upon busy thoroughfares. Letting down ropes to which were attached great meat hooks, these anglers for human flesh snared the unwary pedestrians, drew their shrieking victims through the air, and then prepared and cooked the food before presenting it for sale in the stalls on the street level.<sup>84</sup>

In *Egypt*, there was a drought, which caused the failure of the rising of the Nile River for seven year. This great drought produced a seven-year famine in the area.<sup>47</sup>

In 1064 in *Egypt*, there was a terrible famine, which lasted 7 years. The people driven to terrible expedients.<sup>91</sup>

Beginning in 1064 in *Egypt* and lasting for seven successive years, the overflow of the Nile River failed and with it almost the entire subsistence of the country. While the rebels interrupted supplies of grain from the north. Two provinces were entirely depopulated. In another, half of the inhabitants perished. While in Cairo, the people were reduced to the direst straits. Bread sold for 14 dirhems to the loaf. All provisions were exhausted. The worst horrors of famine followed. The wretched resorted to cannibalism. Organized bands kidnapped the unwary passenger in the desolate streets, principally by means of ropes furnished with hooks and let down from the latticed windows. In the year 1072, the famine reached its height. It was followed by a pestilence and this again was succeeded by an invading army.<sup>57</sup>

**1064 A.D.** A storm struck Edinburgh, *Scotland*.<sup>40, 41, 43</sup>

In 1064 during the period between 20 April and 18 May, many regions of *China* experienced a drought including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Kaifeng, Chêng, Hua, Ju-nan and Lin-ju.
- Shansi (now Shanxi province) in northern *China* at Lin-fên, Yung-chi, and Jung-ho.
- Shensi (now Shaanxi province) in central *China* at Yao.

- Anhwei (now Anhui province) in eastern *China* at Fou-yang.
- Shantung (now Shandong province) on the east coast of *China* at Ts'ao and P'u.
- Hopei (now Hebei province) in northern *China* at Yung-nien and Tz'ü.

In 1064 during the spring and summer, there was a drought in Chihli, Honan and Shantung provinces in *China*.<sup>165</sup>

In 1064, many regions of *China* experienced flooding.<sup>153</sup>

- Floods struck Honan (now Henan province) in central *China* at Shang-ch'iu, Huai-yang, Hsü-ch'ang, Lin-ju, Kaifeng, Ju-nan and Pi-yüan. As a result the land tax was remitted.
- Floods struck Anhwei (now Anhui province) in eastern *China* at Fou-yang, Fêng-yang, Hsü-i, Ho-fei, Fêng-t'ai, Po and Hsüan-ch'êng. As a result the land tax was remitted.
- Floods struck Shantung (now Shandong province) on the east coast of *China* at Ts'ao, P'u, Chi-ning, and Shan. As a result the land tax was remitted.
- Floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an and Kao-yu. As a result the land tax was remitted.
- Floods struck Hupeh (now Hubei province) in central *China* at Wuchang, Ên-shih, and Kuang-hua. As a result the land tax was remitted.
- Floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow. As a result the land tax was remitted.
- Floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang. As a result the land tax was remitted.
- Floods struck Szechwan (now Sichuan province) in southwest *China* at Chungking. As a result the land tax was remitted.
- During the period between 14 September and 12 October, floods struck Anhwei province as Su and Po.

*Also refer to the section 1064 A.D. – 1071 A.D. for information on the drought and famine in Egypt during that timeframe.*

**1065 A.D.** In 1065 during the period between 5 February and 6 May, a drought engulfed *China*. Then during the period between 31 August and 28 September, floods struck Honan (now Henan province) in central *China* at Kaifeng. Houses were damaged by the floodwaters and 1,580 persons drowned.<sup>153</sup>

In 1065 during the spring, there was a drought in *China*.<sup>165</sup>

*Also refer to the section 1064 A.D. – 1071 A.D. for information on the drought and famine in Egypt during that timeframe.*

**1066 A.D.** In *England*, there was a great frost.<sup>47, 72, 93</sup>

During the years 1066 to 1074, there was a famine in *Britain* due to wars, barbarities and hard frost.<sup>72</sup>

In 1066, there was a tremendous storm surge that destroyed the castle “Mellum” [east *Frisian* island].<sup>172</sup>

In 1066 during the period between 25 July and 23 August, a drought engulfed *China*.<sup>153</sup>

*Also refer to the section 1064 A.D. – 1071 A.D. for information on the drought and famine in Egypt during that timeframe.*

**Winter of 1066 / 1067 A.D.** During the winter, there was no snowfall in *China*.<sup>153</sup>

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**1067 A.D.** In 1067 there was a drought in Hopei (now Hebei province) in northern *China* at Peiping. During the period between 15 June and 13 July, there was a drought of long duration that struck *China*.<sup>153</sup>

In 1067 during the summer and autumn, there was a drought of long duration in *China*.<sup>165</sup>

*Also refer to the section 1064 A.D. – 1071 A.D. for information on the drought and famine in Egypt during that timeframe.*

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**Winter of 1067 / 1068 A.D.** The winter in *Europe* in the year 1067 was long and intensely cold and many people perished by cold and hunger.<sup>1</sup>

The winter of 1067 [in *France*] was cold. There was 6 consecutive weeks of frost.<sup>173</sup>

In 1067, the vine and fruit trees in *France* were killed [by the extreme cold].<sup>58, 80</sup>

During 1067-68, in *France*, the winter between St. Brice to St. Gregory (from 13 November 1067 until 12 March 1068) was extremely severe. The vineyards and forest trees bore no fruit. The mishap brought forth by this and the previous years infertility produced in *England* such a famine, that the unfortunates were forced to eat dog and horse meat, yes, even to eat human flesh.<sup>62</sup>

In *France*, a terrible winter began on 13 November 1067 and lasted until 12 March 1068.<sup>79</sup>

During the winter, there was no snowfall in *China*.<sup>153</sup>

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**1068 A.D.** Flood reigned in 1068 in northern *France*.<sup>79</sup>

In *England* in 1068, there was famine and plague after a severe winter.<sup>57, 91</sup>

The winter of 1068 [in *France*] was cold.<sup>173</sup>

The summer of 1068 was very poor [in *France*].<sup>173</sup>

In 1068 during the period between 6 February and 2 June, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 1068 during the summer and winter, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

In 1068, some regions of *China* experienced flooding.<sup>153</sup>

— Floods struck Shensi (now Shaanxi province) in central *China* at Pao-an. Crops and houses were damaged by the floodwaters. People drowned.

— During the period between 8 August and 8 November, floods struck Hopei (now Hebei province) in northern *China* at Pa.

— During the period 1-30 August, floods struck Hopei province at Ch'ing-ho and Chi [located at longitude 115.34° East and latitude 37.34° North]. People drowned.

*Also refer to the section 1064 A.D. – 1071 A.D. for information on the drought and famine in Egypt during that timeframe.*

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**1069 A.D.** The rivers froze in the north of *Germany*.<sup>62</sup>

In the year 1069 in *Germany*, the winter was harsh and long. There was a shortage of wine and fruit because of the extreme cold. The rivers were frozen over. King Henry IV came to the countries of the Saxons and caused such carnage that the area was depopulated.<sup>62</sup>

[A great famine affected *England* for several years. This was not the result of weather but rather by war and the invasion of the Normans.<sup>72</sup>]

[In *England* in 1069, there was a great dearth. The peasants of the north, unable any longer to secure dogs and horses to appease their hunger, sold themselves into slavery in order to be fed by their masters. All the land between Durham and York in northeastern *England* were laid waste, without inhabitants or people to till the soil for nine years. Some of the destitute resorted to cannibalism. A factor that contributed to this hardship was the taxes exacted by the conquerors. Peasants became discouraged, realizing that the fruits of their labor were taken from them as fast as they were earned.]<sup>84</sup>

[In 1069, the Normans desolated *England*, and in the following year famine spread all over *England*, “so that man, driven by hunger, ate human, dog and horse flesh;” some to sustain a miserable life sold themselves for slaves.]<sup>91</sup>

In 1069, there were plenty of good grapes [in *England*], but all wild fruit trees were barren.<sup>72</sup>

The winter of 1069 [in *France*] was cold.<sup>173</sup>

In 1069 during the period between 26 March and 22 May, a severe drought engulfed *China*.<sup>153</sup>

In 1069, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Chin-chiang. Crops, fields and houses were damaged by the floodwaters. During the period between 20 August and 17 September, floods struck Hopei (now Hebei province) in northern *China* at Ts’ang and Yen-shan where people drowned.<sup>153</sup>

In 1069 during the spring, there was a great drought in *China*.<sup>165</sup>

*Also refer to the section 1064 A.D. – 1071 A.D. for information on the drought and famine in Egypt during that timeframe.*

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**1070 A.D.** In *England*, the frost was severe.<sup>47, 72, 93</sup>

In *England* the winter was a most rigorous frost, all rivers were frozen up.<sup>72</sup>

The winter of 1070 [in *France*] was mild.<sup>173</sup>

The summer of 1070 [in *France*] was unfavorable.<sup>173</sup>

In 1070 during the period between 11 July and 6 October a drought engulfed Honan (now Henan province) in central *China* at Chi and Kaifeng; Hopei (now Hebei province) in northern *China* at Ta-ming; and Shensi (now Shaanxi province) in central *China* at Sian. The drought produced a famine. As a result of the hardship, the land tax was remitted.<sup>153</sup>

In 1070 during the summer and autumn, there was a drought in Chihli, Honan and Shensi provinces in *China*. The land tax was remitted.<sup>165</sup>

*Also refer to the section 1064 A.D. – 1071 A.D. for information on the drought and famine in Egypt during that timeframe.*

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**1071 A.D.** In 1071 during the period between 5 March and 2 April, a drought engulfed *China*. Then during the period between 31 July and 27 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow and Shao-hsing. During the period between 28 August and 25 September, floods struck Shensi (now Shaanxi province) in central *China* at An-k'ang where houses were damaged by the floodwaters.<sup>153</sup>

In 1071 during the spring, there was a drought in *China*.<sup>165</sup>

*Also refer to the section 1064 A.D. – 1071 A.D. for information on the drought and famine in Egypt during that timeframe.*

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**1072 A.D.** In 1072 during the period between 22 February and 22 March, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow and Shao-hsing. During the period between 5 February and 18 June, a drought struck Hopei (now Hebei province) in northern *China* at Ta-ming.<sup>153</sup>

In 1072 during the summer, there was a drought in Honan province in *China*.<sup>165</sup>

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**1073 A.D.** In *England*, famine followed by mort [death], so fierce that the living could take no care of the sick, nor bury the dead.<sup>91</sup>

In 1073 during the period between 8 June and 1 November, a drought engulfed *China*.<sup>153</sup>

In 1073 during the summer and autumn, there was a drought in *China*.<sup>165</sup>

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**1074 A.D.** The cold was very lively in *France* and most of the rivers froze.<sup>61</sup>

The winter was so severe, that all the rivers in Flanders [now *Belgium*] and *Germany* were completely frozen.<sup>62</sup>

In *France* in 1074, there were great frosts from 1<sup>st</sup> November to mid-April.<sup>79</sup>

The winter of 1074 [in *France*] produced a frost that began in November and lasted until April. There was a cold dry violent north wind. The mills were paralyzed by the cold. The army of Henry IV sorely lacked bread.<sup>173</sup>

In the year 1074, a very severe frost [in *Western Europe*] lasted from early November until mid-April. The cold, dry and cutting sharp wind was so intense that the rivers not only froze on the surface; but the rivers turned into solid blocks of ice. The army of King Henry IV suffered terribly from a lack of bread. The little grain that was available could not be ground into flour because the extreme cold caused a shutdown of the mills.<sup>62</sup>

In 1074 during the period between 5 February and 23 October, a drought of long duration engulfed several regions of *China* including:

- Hopei (now Hebei province) in northern *China* at Ta-ming.
- Shensi (now Shaanxi province) in central *China* at Sian.
- Shansi (now Shanxi province) in northern *China* at Yang-ch'ü.
- Honan (now Henan province) in central *China* at Loyang and Kaifeng.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.

During the period between 29 April and 28 May, the drought struck many regions.<sup>153</sup>

In 1074 during the spring, summer and autumn, there was a drought of long duration in Chihli, Honan, Kiangsu, Shantung and Shensi provinces in *China*.<sup>165</sup>

In 1074 during the period between 29 May and 26 June, floods struck in Honan (now Henan province) in central *China* at Shan and in Shansi (now Shanxi province) in northern *China* at P'ing-lu. [P'ing-lu is located at longitude 111.00° East and latitude 34.51° North]. During the period between 27 June and 26 July, floods struck in Kansu (now Gansu province) in northwest *China* at Lin-t'ao.<sup>153</sup>

In 1074 in the vicinity of Shanghai, *China*, it rained continuously from the 1<sup>st</sup> to the 6<sup>th</sup> month. The lakes overflowed. The land could not be cultivated. Houses were destroyed. The inhabitants discarded their lands and went away to beg.<sup>166</sup>

**1075 A.D.** In 1075, several regions of *China* experienced flooding.<sup>153</sup>

— During the period between 18 April and 17 May, floods struck Hunan province in south-central *China* at Changsha, Hêng-yang, Shao-yang and Tao. Houses were damaged by the floodwaters.

— During the period between 15 August and 12 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui.

In 1075, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 18 April and 17 May, a severe drought struck Hopei (now Hebei province) in northern *China* at Chêng-ting.

— During the period between 13 September and 12 October, a drought struck on the east coast of *China* in Kiangsu (now Jiangsu province) and Chekiang (now Zhejiang province).

— During the period between 13 September and 12 October, a drought struck in Kiangsu province at Yangchow and Nanking; in Hupeh (now Hubei province) in central *China* at Chiang-ling; and in Hunan province in south-central *China* at Changsha.

In 1075 during the summer and autumn, there was a great drought in Anhwei, Chêhkiang, Chihli, Hunan, Hupeh, Kiangsi and Kiangsu provinces in *China*.<sup>165</sup>

**1076 A.D.** In *Iraq*, the Tigris River overflowed and inundated Bagdad.<sup>47, 92</sup>

In 1076 during the period 3-31 August, floods struck Shansi (now Shanxi province) in northern *China* at Taiyuan. During the period between 31 October and 28 November, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ao-an and Ch'ao-yang. Houses were damaged by the floodwaters and people drowned.<sup>153</sup>

In 1076 during the period 1-30 September, a drought engulfed many regions of *China* including:<sup>153</sup>

— Hopei (now Hebei province) in northern *China* at Ta-ming.

— Honan (now Henan province) in central *China* at Loyang and Kaifeng.

— Shansi (now Shanxi province) in northern *China* at Yang-ch'ü.

— Shensi (now Shaanxi province) in central *China* at Sian.

In 1076 during the autumn, there was a drought in Chihli, Shansi, Shantung and Shensi provinces in *China*.<sup>165</sup>

**Winter of 1076 / 1077 A.D.** The winter in *Europe* was long and intensely cold and many people perished by cold and hunger.<sup>1</sup>



The winter of 1077 was an extremely severe winter (the Canossian winter) throughout *Europe* that lasted from late October to 15 April. The rivers were frozen from 26 November until mid-March. [This winter was one of the coldest and longest winters within the memory of man – The Rhine River was frozen into a solid mass from November till April.]<sup>172</sup>

The winter of 1077 was extremely cold in *Europe*. Lake Constance [situated in *Germany*, *Switzerland* and *Austria* near the Alps] froze. The trees and vines were destroyed. The winter was so cold that the land remained barren for several years afterwards. The Rhone, Danube, Po, Tiber, Elbe, Vistula and Loire rivers froze. The Rhine River froze from 17 November to 7 April. The first frost struck Augsburg, *Germany* on 1 November; Lagny, *France* on 17 November; and Saint-Amand, [*France*] on 19 November. The frost ended on 18 March at Saint-Amand; 1 April at Augsburg; and 22 April at Lagny.<sup>173</sup>

*Europe* experienced cold weather from November to April. The Rhine River was frozen. *France* experienced 4 ½ months of frost.<sup>28</sup>

The year 1076 was another very cold winter in *France*, which destroyed many trees and vines.<sup>61</sup>

The Rhine River in *Germany* by the Feast of St. Martins was frozen from 11 November 1076 until early April 1077. People crossed the river on the ice.<sup>62</sup>

The winter of 1076-77 in *France*, *England* and *Germany* was so severe, that the oldest people could not remember experiencing a similar cold winter; nor had anyone heard speak of it. The snow lasted from 1 November to 26 March. One could travel on the ice on the Rhine River from the Feast of St. Martins (11 November) until the end of March. The frost lasted 4½ months in the interior of *France*. The ground was frozen down to the roots of the [grape] vines in several areas. The shortage of grain was so great that few people had wheat from this year's harvest.<sup>62</sup>

Great winter in 1076-77 in northern *France* was accompanied by snow. The snow began to fall at the end of October 1076 and did not stop until 27 March 1077.<sup>79</sup>

In *France*, abundant snow fell at the end of October 1076 and continued with extreme cold until March 27, 1077.<sup>79</sup>

In *England*, there was frost from 1<sup>st</sup> November to 15<sup>th</sup> April. "In the tenth year of his [William the Conqueror] reign [which began on Christmas 1066 A.D.], the cold of winter was exceedingly memorable, both for sharpness and for continuance; for the earth remained hard frozen from the beginning of November until the midst of April then ensuing."<sup>47, 93</sup>

A frost in *England* from November to April (Some of these accounts show the frost occurred in the winter of 1075/76, but the tenth year of William the Conqueror's reign would begin in Christmas 1076).<sup>2, 40, 41, 42, 43</sup>

In 1075, there was a very severe frost [in *England*] that lasted from November until April.<sup>212</sup>

In 1076, there was a very severe frost in *England* that lasted from November until April.<sup>212</sup>

In *England* from 1 November 1076 to 15 April 1077 was one continuous hard frost.<sup>72</sup>

In 1076, there was dreadful frost in *England* from November to April.<sup>90</sup>

In 1076 or 1077, there was a frost in *England* from 1 November to 15 April.<sup>72</sup>



The River Thames in *England* was again frozen over.<sup>29</sup>

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**1077 A.D.** The summer of 1077 [in *France*] was favorable.<sup>173</sup>

In 1077 during the period between 25 April and 20 August, a severe drought engulfed Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 1077, several regions of *China* experienced flooding.<sup>153</sup>

— Floods struck Szechwan (now Sichuan province) in southwest *China* at Lu. The land tax was remitted.

— Floods struck Honan (now Henan province) in central *China* at Mêng. Granaries were damaged by the floodwaters. People drowned. The land tax was remitted.

— Floods struck in Hopei (now Hebei province) in northern *China* at Ts'ang and in Honan province at Chi. Houses and fields were damaged by the floodwaters. The land tax was remitted.

— During the period between 23 July and 20 August, floods struck Hopei province at P'u-yang. The land tax was remitted.

In 1077 during the spring, summer and autumn, there was a great drought in *China*.<sup>165</sup>

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**Winter of 1077 / 1078 A.D.** During the winter of 1077-78 in southern *France*, lightning and thunder storms broke out during the months of January and February 1078. These storms announced early dry hot weather.<sup>79</sup>

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**1078 A.D.** [In *France*] in 1078, the year was marked by drought and heat. As a result, the grass withered. But nevertheless the year produced a good harvest with fruit in June and the wine was very abundant.<sup>62</sup>

The summer of 1078 in *France* was very hot and very dry. The farmers harvested in August. The wine was plentiful and very good.<sup>79</sup>

The summer of 1078 [in *France*] was very hot. The harvest was a month early.<sup>173</sup>

[A famine occurred in *Constantinople* in 1078 which was caused not by weather but by mass migration. Many Asians for fear of the barbarians laying waste in the East fled to Constantinople but were pursued by famine and a grievous plague. So the living were too few to bury the dead.<sup>72</sup> In 1078 in Constantinople, there was a famine “from the multitudes of strangers” that fled to Constantinople.<sup>72, 91</sup>]

In 1078, several regions of *China* experienced flooding.<sup>153</sup>

— Floods struck Shantung (now Shandong province) on the east coast of *China* at Chang-ch'iu. Houses were damaged by the floodwaters and people drowned.

— Floods struck Anhwei (now Anhui province) in eastern *China* at Ch'ien-shan. Houses were damaged by the floodwaters and people drowned.

— During the period between 9 September and 8 October, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming. The land tax was remitted.

— During the period between 9 September and 8 October, floods struck Shantung province at Pin and Hui-min.

— During the period between 9 September and 8 October, floods struck Hopei province at Ts'ang.

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**1079 A.D.** In southwestern *Italy*, the Calore Beneventano River (also called the Calore Irpino River) was so frozen that you could cross it safely on foot.<sup>62</sup>

During the winter of 1079, the cold was very sharp in *Italy*.<sup>62</sup>

The weather in 1079 [in *France*] was unfavorable.<sup>173</sup>

In 1079 during the period between 5 February and 6 May, a drought of long duration engulfed Hopei (now Hebei province) in northern *China* at Ta-ming; Shensi (now Shaanxi province) in central *China* at Sian; and Honan (now Henan province) in central *China* at Kaifeng and Loyang.<sup>153</sup>

In 1079 during the spring and summer, there was a drought in Chihli, Shansi, Shantung and Shensi provinces in *China*.<sup>165</sup>

**1080 A.D.** There was a great famine in *Denmark*.<sup>57, 72, 91</sup>

The winter of 1080 [in *France*] was cold.<sup>173</sup>

In 1080 during the period between 5 February and 6 May, a drought engulfed the “north and west marches” in *China*. Then during the period between 22 May and 19 June, a drought engulfed *China*. [The north and west marches may refer to the boundary provinces of western *China* of Kansu, Sauchuan and Yunnan. Between these three provinces lie the vast area of *Southern Mongolia* and *Tibet*.]<sup>153</sup>

In 1080 during the spring, there was a drought in Chihli and Shansi provinces in *China*.<sup>165</sup>

In 1080 during the period between 20 July and 17 August, floods struck Hopei (now Hebei province) in northern *China* at P’u-yang.<sup>153</sup>

**1081 A.D.** The winter of 1081 [in *France*] was mild.<sup>173</sup>

In 1081 during the period between 12 May and 9 June, floods struck Hopei (now Hebei province) in northern *China* at P’u-yang. People drowned.<sup>153</sup>

**1082 A.D.** In *England*, there was a great famine.<sup>72</sup>

In 1082, a drought engulfed *China*.<sup>153, 165</sup>

In 1082, several regions of *China* experienced flooding.<sup>153</sup>

— Floods struck Hopei (now Hebei province) in northern *China* at Yung-ch’ing, Hsin-ch’êng, An-chih, Wu-ch’ing, and Hsiang-ho. Crops were damaged.

— Floods struck Liaoning province located in the southern part of *China*’s northeast at Pei-chên. Crops were damaged.

— During the period between 28 July and 26 August, floods struck Hopei province at Peiping.

— During the period between 8 August and 8 November, floods struck Honan (now Henan province) in central *China* at Yang-wu and Yüan-wu. Houses and fields were damaged by the floodwaters.

— During the period between 27 August and 24 September, floods struck Honan province at Yüan-wu.

— During the period between 25 September and 23 October, floods struck Honan province at Kaifeng and Hua.

— During the period between 24 October and 22 November, floods struck Shansi (now Shanxi province) in northern *China* at Kuo.

In 1082 during the 6<sup>th</sup> moon, there were excessive rains and [flood] calamities over Kiangsu and Chehkiang provinces in *China*.<sup>166</sup>

**Winter of 1082 / 1083 A.D.** The Po River in *Italy* in December froze.<sup>62</sup>

The winter in the year 1082 was severe in *Italy*. In the month of December, King Henry IV marched with his soldiers and a great number of citizens on the completely frozen Po River.<sup>62</sup>

**1083 A.D.** [In *Germany*] during the summer of 1083, the heat from the sun's glow was so strong that not only did men die, but also the heat brought about the demise of the fish in the ponds.<sup>62</sup>

In 1083, *China* experienced flooding. During the period between 20 May and 17 June, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 1083 during the summer, there was a drought in Honan province in *China*.<sup>165</sup>

**1084 A.D.** In 1084, several regions of *China* experienced flooding.<sup>153</sup>

— Floods struck Honan (now Henan province) in central *China* at Lin-chang. People drowned.

— Floods struck Honan province at Ch'in-yang. Houses were damaged by the floodwaters.

— Floods struck Hopei (now Hebei province) in northern *China* at Yung-nien. Houses were damaged by the floodwaters. The land tax was remitted.

— During the period between 6 May and 8 November, floods struck Hopei province at Tz'ü. Houses and crops were damaged by the floodwaters. People drowned.

— During the period between 6 July and 3 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ing-t'ien. Crops were damaged.

— During the period between 4 August and 2 September, floods struck Hopei province at Ta-ming. Houses were damaged and people drowned. Floods also struck Hopei province at Chêng-ting.

— During the period between 3 September and 2 October, floods struck Hopei province at Hsing-t'ai, Yung-nien, Chao and Tz'ü and in Honan province at An-yang. The city walls and army camps were damaged by the floodwaters.

**1085 A.D.** This was a sorrowful year in *England*, full of miseries for the great death of cattle, late ripening of corn [grains], and all fruits, abnormal temperatures, terrible thunder and lightning which was fatal to many.<sup>72</sup>

In 1085, there was an earthquake in *England*, followed by great cold.<sup>212</sup>

In 1085 during the period between 22 October and 19 November, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming.<sup>153</sup>

**Winter of 1085 / 1086 A.D.** In *England* in 1086, "The weather was so inclement that in the unusual efforts made to warm the houses [caused many accidental fires], nearly all the chief cities in the Kingdom were destroyed, including a great part of London and St. Paul's."<sup>47</sup>

From the 11<sup>th</sup> of November [1085] to the 1<sup>st</sup> of April 1086, there was so great a frost, the frozen Rhine River was passable on foot. There were excessive rains and great water floods in *Italy*, Flanders [now *Belgium*], and *England*. These floods softened the hills and overwhelming villages, carrying along with them much people. There was a great death of cattle this year and a sore distemperature of the air. Hence a great death of people both from fevers and famine. In many places, but chiefly in *Italy*, so prodigious were the inundations, that rocks by their fall demolished many towns [landslides]. The same year in *England*, peacocks and other tame fowl, left the houses and fled to the woods. Fishes were dead in the waters. There was terrible thunder and lightning, fatal to many people and much cattle; thence the scarcity of corn [grain] and death of cattle.<sup>72</sup>

During the winter, there was no snowfall in *China*.<sup>153</sup>

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**1086 A.D.** In *England*, there were heavy floods from rain.<sup>72, 92</sup> “In the twentieth year [of William the Conqueror], there fell such abundance of rain that the rivers did greatly overflow in all parts of the Realm. The springs also rising plentifully in divers [numerous] hills, so softened and decayed the foundations of them, that they fell down, whereby some villages were overthrown [landslides]. By this distemperature of weather many cattle perished, much grain upon the ground was either destroyed, or greatly impaired. Thereupon ensued first a famine, and afterwards a miserable mortality of men.”<sup>47</sup>

In 1086 in *England*, there was a great murrain of animals, and such intemperate weather that many people died of fever and famine. The famine was caused by excessive rains.<sup>91</sup> [A murrain is a highly infectious disease of cattle and sheep. It literally means "death" and was used in medieval times to represent just that.]

In 1086 in *England*, there was a famine from excessive rains, thunder, lightning, which caused great floods and death of cattle.<sup>72</sup>

There was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

In 1086 during the period between 18 January and 13 June, a drought of long duration engulfed *China*. Due to the hardship, the land tax was remitted.<sup>153</sup>

In 1086, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an and Tung-hai. During the period between 17 February and 17 March, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming where fields were damaged.<sup>153</sup>

In 1086 during the spring, summer and winter in *China*, there was a universal drought of long duration.<sup>165</sup>

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**1087 A.D.** In *England* there was great thunder and lightning. One half of all the people of *England* were seized with a violent burning fever, which began in 1086 and proved very fatal to multitudes. There was a general famine.<sup>72</sup>

There was a great thunder and lightning storm [in *England*].<sup>72</sup>

In 1087 in *England*, pestilence followed by famine, which caused great suffering.<sup>91</sup>

In the 21<sup>st</sup> year of William I in 1087, there was a famine in *England*.<sup>90</sup>

In 1087, there was a famine [in *England*].<sup>212</sup>

In 1087 in *Denmark*, King Olaf I inherited the surname the ‘Hungry’ in consequence of the famine in his reign.<sup>57, 91</sup>

In 1087 during the period between 5 May and 3 June, a drought engulfed *China*.<sup>153</sup>

In 1087 during the spring and summer, there was a drought in *China*.<sup>165</sup>

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**1088 A.D.** In Bagdad *Iraq*, the Tigris River overflowed and did much damage.<sup>47, 92</sup>

In 1088, there was a famine [in *England*] from bad air, thunder and lightning.<sup>72</sup>

In 1088 [in *England*], there was a great scarcity of corn [grain]. Some crops not ripe until the end of November.<sup>212</sup>

There was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

In 1088 during the period between 8 August and 8 November, a drought engulfed in central *China* in Honan (now Henan province) at Loyang and in Shensi (now Shaanxi province) at Sian.<sup>153</sup>

In 1088 during the autumn, there was a drought in Honan, Shansi and Shensi provinces in *China*.<sup>165</sup>

In 1088, a sea wind destroyed fields in the vicinity of Shanghai, *China*.<sup>166</sup>

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**1089 A.D.** In 1089 during the period between 14 April and 10 June, a drought of long duration engulfed Honan (now Henan province) in central *China* at Kaifeng. Then during the period between 6 May and 8 November, floods due to heavy rain struck *China*.<sup>153</sup>

In 1089 during the spring, there was a drought in Chihli, Honan and Shantung provinces in *China*.<sup>165</sup>

The summer of 1089 [in *France*] was favorable.<sup>173</sup>

In 1089, there was a dearth [in *England*]. In the summer there was a great scarcity of fruits, and the harvest [of grains] was not complete until 30 November.<sup>212</sup>

There was a great hurricane with terrible thunder and lightning [in *England*].<sup>72</sup>

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**1090 A.D.** In Constantinople (Istanbul, *Turkey*), there were great floods.<sup>47, 72, 92</sup>

In October 1090, there were thunder and lightning storms in *England*. There were great floods at Constantinople.<sup>72</sup>

In 1090 during the period between 4 March and 29 June, a drought engulfed northeast *China*. Also in 1090, floods struck on the east coast of *China* in Kiangsu (now Jiangsu province) at T'ai-t's'ang, Soochow and Sung-chiang; and in Chekiang (now Zhejiang province) at Hangchow, Chia-hsing and Hu-chou.<sup>153</sup>

In 1090 during the spring and summer, there was a drought in *China*.<sup>165</sup>

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**1091 A.D.** In *England* on the 5<sup>th</sup> of October, a great hurricane came from the southwest and struck several parts of the country. In London about 500 houses destroyed.<sup>57</sup>

A mighty storm struck on 5 October 1091 in several parts of *England*. The sky went very dark; the winds came from the southwest. Many churches were destroyed; and in London 500 houses fell.<sup>90</sup>

A storm struck in several parts of *England* on October 5<sup>th</sup>, especially at Winchelscomb (Winchcomb), in Gloucestershire, when the steeple of the church was thrown down.<sup>40, 41, 43</sup>

On 5 October 1091, there was a great southwest gale over most of *England*. In London, 500 houses were destroyed. Many churches were destroyed. It took off the roof of St. Mary-le-bow Church, and carried it a good ways. There were 4 beams in the church that were 26 feet [8 meters] long. These beams fell with such great force that they were driven into the streets (which were not then paved, but of Moorish ground) that they sunk down 20 feet [6 meters] in the street. As they could not be pulled up again, people were forced to saw them even with the [level] ground.<sup>212</sup>

A storm in London, *England* on October 17<sup>th</sup>, threw down 500 houses, unroofed Bow church and at Old Sarum (Salisbury), threw down the steeple along with many houses.<sup>40, 41, 43</sup>

In 1091 A.D., London, *England* was struck by a hurricane, which destroyed 500 houses and caused the death of 200 to 400 persons.<sup>197</sup>

[Another account places this event in the year 1090.] In 1090, there was a strong gale in *England*. In London, 600 houses were blown down.<sup>212</sup>

The roof and tower of Salisbury Church [in southwestern *England*] was broken down by thunder.<sup>72</sup> [This account places this event in 1092]

On 1 October in 1090 or 1091, there was a tempest of thunder and lightning in *England*; hurricanes and floods constantly.<sup>72</sup>

On 1 October, a terrible tempest of thunder and lightning struck several parts of *England*, but especially at Winchcomb in southwestern *England*, where it did great damage to a church, and left a most intolerable stench behind. On 17 October there was a most dreadful hurricane, which rent, blew down and scattered many thousands of houses in London, Salisbury, etc. At Constantinople (Istanbul, *Turkey*) there were great clouds, which demolished houses, filled valleys with water like a sea, drowned many people and cattle. It was a great hurricane.<sup>72</sup>

On 5 November 1091 at Coutances in northwestern *France*, a violent storm accompanied by lightning, thunder and earthquake occurred.<sup>79</sup>

On 6 November 1091, on the Feast of St. Edmund, there was a great flood in *England*. London Bridge was swept away by the force of the water.<sup>212</sup>

In 1091 during the period between 19 July and 17 August, floods struck on the east coast of *China* in Kiangsu (now Jiangsu province) at Soochow, Sung-chiang, and T'ai-ts'ang and in Chekiang (now Zhejiang province) at Hangchow, Chia-hsing, Hu-chou, Ningpo, Shao-hsing, Taichow, Chin-hua, Ch'ü, Chien-tê, Wên-chou and Li-shui.<sup>153</sup>

**1092 A.D.** The winter in *England* was severe. The great rivers were frozen.<sup>28</sup>

"The great streams [of *England*] were congealed in such a manner that they could draw two hundred horsemen and carriages over them; whilst at their thawing, many bridges, both of wood and stone, were borne down, and divers [numerous] water-mills were broken up, and carried away.<sup>29</sup>

In 1092 in *England*, there was a terrible flood, followed by a great frost, followed by a second flood "as the like was remembered by none." Many bridges were destroyed.<sup>212</sup>

There was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

In 1092 during the period 2-30 December, floods struck Hopei (now Hebei province) in northern *China* at T'ung. Crops were damaged by the floodwaters.<sup>153</sup>

**1093 A.D.** In *England*, there were great floods, and afterwards severe frost.<sup>47, 72, 92</sup>

[In *England*] in 1092 or 1093, there were great rains, then a sudden frost and a ruinous flood after.<sup>72</sup>

In 1093, there was a great frost in *England*. The River Thames and all the English rivers were so heavily locked in with ice that when the thaw came, bridges and mills were carried away.<sup>212</sup>

In *England* fell excessive rains, which raised such floods in 1093 as had not been known long before. All low grounds were flooded. After that came a sudden frost. The ice of the thaw carried down most of the stone and wooden bridges and water mills. Plagues and famine prevailed in *France* and *Germany* wherewith the poor being afflicted, vexed the rich with thefts and fires.<sup>72</sup>

In *Ireland*, “Great rains and inundations in summer and autumn.”<sup>47, 92</sup>

In *England*, great famine and mortality [death].<sup>57, 91</sup>

In 1093, floods struck in Hopei (now Hebei province) in northern *China* at Ch’ing-fêng and Ta-ming; in Honan (now Henan province) in central *China* at Kaifeng and Loyang; and in Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow. During the period between 8 August and 8 November, a drought engulfed *China*.<sup>153</sup>

In 1093 during the autumn, there was a drought in *China*.<sup>165</sup>

**Winter of 1093 / 1094 A.D.** During the winter, there was no snowfall in *China*.<sup>153</sup>

**1094 A.D.** There were great inundations throughout *Ireland*.<sup>47, 92</sup>

The year 1094 was called the rainy year. From October to April, the rain never ceased. This caused a plague and famine over *England*, *France* and *Germany*. In *England*, the famine was made significantly worse by King William Rufus’s strangling taxes. As a result, there was so great a mortality that scarce did the living suffice to bury the dead.<sup>72</sup>

In 1094, there was great mortality in London, *England*.<sup>212</sup>

In 1094, there was the heaviest rains, famines and a desolating plague.<sup>72</sup>

In 1094, there was a sea flood in North *Frisian* countries. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

The drought in 1094 in *France* was extraordinary.<sup>79</sup>

The summer of 1094 [in *France*] produced an extraordinary drought.<sup>173</sup>

The winter of 1094 in northern *France* was harsher than usual. The cruel winter raged for eight straight weeks. The severity of the cold froze animals and men.<sup>79</sup>

In 1094 during the period between 5 February and 6 May, a drought engulfed *China*.<sup>153</sup>

In 1094 during the spring, summer and winter, there was a drought in Honan province in *China*. There was no snowfall during winter.<sup>165</sup>

In 1094, floods struck in Shantung (now Shandong province) on the east coast of *China* at Ts’ao and P’u and in Honan (now Henan province) in central *China* at Huai-yang and Ju-nan. Crops were damaged by the floodwaters. During the period between 14 August and 12 September, floods caused by protracted



rains struck Honan province at Kaifeng. During the period between 12 October and 10 November, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming.<sup>153</sup>

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**1095 A.D.** A great snowstorm struck *Ireland* on January 3. Multitudes were killed.<sup>28</sup>

In 1095, there was great mortality in *Ireland*.<sup>212</sup>

In *England*, the winter was very severe.<sup>47, 72, 93</sup>

In *England*, there were terrible tempests in 1095 and excessive summer rains. Therefore the corn [grain] and fruits in many places were not good. It was a late harvest. Most of the corn [grain] was not harvested before November the 10<sup>th</sup>. After the rains, there was a great intemperature of the air and a most severe winter. All the rivers were so frozen that horses and loaded wagons went over them.<sup>72</sup>

There was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

[In *England*], there was a famine from summer rains, tempests and bad air.<sup>72</sup>

In 1095 during the period between 9 January and 7 February, floods struck Hopei (now Hebei province) in northern *China* at Yung-nien and Tz'ü.<sup>153</sup>

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**1096 A.D.** In *England*, the winter was very severe.<sup>47, 72, 93</sup>

The rains took up in harvest, then came most pernicious frosts which caused dearth and famine in *England*.<sup>72</sup>

[In *England*], there was a famine from rains in the summer.<sup>72</sup>

In *England*, there was a famine "Heavy-timed hunger that severely oppressed the earth." The famine was caused by "summer rains, tempests and bad air."<sup>57, 91</sup>

In 1096, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking and Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng, and Kuang-tê. Rivers and creeks dried up.<sup>153</sup>

In 1096, there was a great drought in Kiangsu province in *China*. The rivers dried up.<sup>165</sup>

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**1097 A.D.** In *England*, the winter was very severe.<sup>47, 93</sup>

[In *Europe*], the winter was very mild and produced many diseases. The large amount of rain that fell caused the rivers to overflow their banks.<sup>62</sup>

The winter of 1097 [in *France*] was very mild, the sweetest in many years.<sup>173</sup>

The great flood of 1097 in northern *France* did not permit the fall planting.<sup>79</sup>

In 1097 during the period between 13 June and 11 July, a drought engulfed the east coast of *China* in Kiangsu (now Jiangsu province) and Chekiang (now Zhejiang province). This caused a famine.<sup>153</sup>

In 1097 during the summer, there was a drought in Chêhkiang and Kiangsi provinces in *China*.<sup>165</sup>

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**1098 A.D.** In *England*, the winter was very severe.<sup>47, 93</sup>

[In *England*] another oppressive year for endless taxes and gels, and great rains, which scarce ever ceased; all low marshy grounds perished with floods and water.<sup>72</sup>

[In *England*], there was a famine from rains.<sup>72</sup>

[In *England*] in 1098, there were tempestuous seasons, rains, corn rotten, low grounds perished.<sup>72</sup>

In 1098, a drought engulfed southeast *China*. During the same year, floods struck in Hopei (now Hebei province) in northern *China* at P'u-yang and Ta-ming and in Honan (now Henan province) in central *China* at Kaifeng. During the period between 27 October and 25 November, floods struck in Hopei province in Ta-ming and in Honan province at Kaifeng.<sup>153</sup>

In 1098, there was a drought in Kiangsu and Shantung provinces in *China*.<sup>165</sup>

**1099 A.D.** In *England*, there were rains and sea floods, "fatal to much people and cattle."<sup>72</sup> Thames much flooded on the festival of St. Martin (November 11).<sup>47, 92</sup>

On 11 November 1099, there was a great inundation of the sea in *England*. "On the third day of the nones of November, the sea came out upon the shore, and buried towns and men very many, and oxen and sheep innumerable." "On St. Martin's mass-day, the 11<sup>th</sup> of Novembre, sprung up so much of the sea flood, and so myckle harm did, as no man minded that it ever afore did."<sup>212</sup>

In *England*, the winter was very severe.<sup>47, 72, 93</sup>

There were great inundations both by sea and rivers, drowning many cattle, people and towns in *England*. There was a severe winter and a great dearth of grain.<sup>72</sup>

In *England*, there was famine from excessive, heavy, long rain and floods.<sup>57, 72, 91</sup>

In 1099, during the period between 5 February and 6 May, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng. During the same year, floods struck on the east coast of *China* in Kiangsu (now Jiangsu province) at Soochow and in Chekiang (now Zhejiang province) at Hu-chou and Chia-hsing. During the period between 21 June and 20 July, floods struck in Shensi (now Shaanxi province) in central *China* at Sian; in Honan province at Loyang; and in Hopei province at Ta-ming. Houses were damaged by the floodwaters and people drowned. During the period between 21 July and 18 August, floods struck Hopei province at Ta-ming. Fields were damaged by the floodwaters.<sup>153</sup>

In 1099 during the spring, there was a drought in Honan province in *China*.<sup>165</sup>

**1100 A.D.** The sea overflowed 4,000 acres of Earl Godwin's land, in Kent, *England* since called Godwin sands.<sup>40, 41, 43</sup>

East of Kent, *England* inundated. Goodwin Sands formed.<sup>46</sup>

In the *English Channel*, Earl Godwin's lands, exceeding 4,000 acres, overflowed by the sea, and an immense sandbank formed on the coast of Kent, now known as the Godwin Sands.<sup>47, 92</sup>

In 1100, Earl Godwin's lands in *England*, exceeding 4,000 acres, was overflowed by the sea, and an immense sandbank formed on the coast of Kent, now known by the name of the Godwin sands.<sup>90</sup>

In the year 1100, there was an inundation of the sea in *England*. Earl Godwin's lands, exceeding 4,000 acres, overflowed by the sea, and an immense sandbank, known as the Godwin Sands, formed on the coast of Kent, over which the tide has ever since flowed. (Some sources give the year as 1099.)<sup>212</sup>

In 1100 in *England*, there was a surprising great tide.<sup>72</sup>

[Some accounts place this event in the year 1098 or 1099] On the 3<sup>rd</sup> of November in 1099, "as well in *Scotland* as in *England*, the sea broke in over the banks of many rivers, drowning divers [diverse] towns, and much people, with an innumerable number of oxen and sheep, when Earl Godwin's lands in Kent were covered with sands."<sup>69</sup> In 1098 the land of Goodwyn Sands was swallowed up by the sea.<sup>72</sup>

In *England* in the year 1100, there was a long and severe winter frost. In the spring, the River Thames rose up with such high tides that many towns were drowned. It did great damage to London and other places.<sup>72</sup>

The winter in 1100 in northern *France* was excessive.<sup>79</sup>

In 1100, a terrible famine struck *Europe*.<sup>155</sup>

[There was a famine in *Antioch* in 1100.<sup>72, 91</sup> But this famine was not caused by weather but by a long siege of the city and by warfare – the Crusades. Antioch is an ancient city on the eastern side of the Orontes River. It is near the modern city of Antakya in southern Turkey.]

**1101 A.D.** In 1101, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China*; Anhwei (now Anhui province) in eastern *China*; Chekiang (now Zhejiang province) on the east coast of *China*; Fukien (now Fujian province) on the southeast coast of *China*; Hunan province in south-central *China* at Changsha; Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ü; and Kiangsi (now Jiangxi province) in southern *China* at Shang-jao. During the period between 30 April and 29 May, a drought engulfed *China*.<sup>153</sup>

In 1101 during the summer, there was a drought in Chêhkiang, Fuhkien, Hunan, Kiangsi and Kiangsu provinces in *China*.<sup>165</sup>

In 1101, there was a frost in *England*.<sup>72</sup>

**1102 A.D.** In *England*, there was a drought with excessive heat.<sup>47, 72</sup>

[In *England*] the summer was extremely hot.<sup>62</sup>

[In *England*] was an excessively hot summer.<sup>72</sup>

In 1102 and 1116, high flood waters swept over a good portion of the land of the island of Helgeland which fell down and was thrown over [washed away].<sup>172</sup>

In 1102, a drought engulfed many regions of *China* including: Kiangsu (now Jiangsu province) on the east coast of *China*; Chekiang (now Zhejiang province) on the east coast of *China*; Kansu (now Gansu province) in northwest *China* at Lin-t'ao and Lin-hsia; Fukien (now Fujian province) on the southeast coast of *China* at Lung-ch'i, Chin-chiang and P'u-t'ien; and Hunan province in south-central *China* at Changsha, Hêng-yang and Pin.<sup>153</sup>

In 1102, there was a drought in Chêhkiang, Fuhkien, Hunan and Kiangsu provinces in *China*.<sup>165</sup>

In 1102 during the period between 16 August and 13 September, a flood struck *China*. Houses were damaged by the floodwaters.<sup>153</sup>

**1103 A.D.** [In *England*] on the Feast of Saint Lawrence [10 August] in the morning, there was a hurricane with terrible wind, which did great damage ever was known to all sorts of fruits.<sup>72</sup>

In 1103, floods struck Hopei (now Hebei province) in northern *China* at Wu-ch'ing.<sup>153</sup>

**1104 A.D.** There was a very great snow in February and great floods on the land. There was a mighty scarcity of corn [grain] and dearth from endless taxes and wars in *England*.<sup>72</sup>

At the summer solstice there was a storm at Herbipolis [Würzburg, *Germany*], wherein such a prodigious piece of ice fell out of the air, that when broken into four quarters, four men could not carry it.<sup>72</sup>

**1105 A.D.** [In *England*] in February, there was a great snowfall.<sup>72</sup>

In *England*, there were great floods, followed by famine.<sup>47, 92</sup>

[In *England*] in February 1105, there were great floods, dearth, and want of corn [grains].<sup>72</sup>

In 1105, floods struck on the east coast of *China* in Kiangsu (now Jiangsu province) at Soochow and in Chekiang (now Zhejiang province) at Hu-chou and Chia-hsing.<sup>153</sup>

**1106 A.D.** In *England*, there was an inundation from the sea.<sup>47, 72, 92</sup>

On the first of the Ides of June [in *England*], there was a great earthquake and several inundations of the sea.<sup>72</sup> [This event may have been a tsunami caused by a massive earthquake/landslide]

Men, cattle, grain, lands and buildings suffered much from thunder, lightning, rain, hail, high winds and tempest. Grains and fruits were beat down and broken. Barrenness of land from inundations, dearth from scarcity, plague from famine, all prevailed.<sup>72</sup>

In *England*, there was famine from barren lands and then plague.<sup>57, 72, 91</sup>

In 1106 during the period between 5 May and 3 June, floods struck on the east coast of *China* in Kiangsu (now Jiangsu province) at Soochow, Sung-chiang, and T'ai-ts'ang and in Chekiang (now Zhejiang province) at Hangchow, Chia-hsing, Hu-chou, Ningpo, Shao-hsing, Taichow, Chin-hua, Ch'ü, Chien-tê, Wên-chou, and Li-shui. Due to the hardship, the summer land tax was remitted.<sup>153</sup>

**1107 A.D.** In 1107, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming and Honan (now Henan province) in central *China* at Loyang. People drowned. During the period between 6 May and 8 August, floods struck Honan province at Kaifeng. During the period between 18 October and 16 November, floods struck on the east coast of *China* in Kiangsu (now Jiangsu province) at Soochow and in Chekiang (now Zhejiang province) at Hu-chou.<sup>153</sup>

In 1107, a drought engulfed Kansu (now Gansu province) in northwest *China* at T'ien-shui.<sup>153</sup>

In 1107, there was a drought in Shensi province in *China*.<sup>165</sup>

**1108 A.D.** A great part of Flanders [now *Belgium*] was overflowed by the sea.<sup>40, 41, 43</sup>

Most of *Flanders* drowned by the Sea.<sup>72</sup>

*Flanders* inundated.<sup>46</sup>

In 1108, *Flanders* was inundated by the sea, and the town and harbor of Ostend totally immersed.<sup>90</sup>

In *Flanders*, a terrible inundation forced many of the inhabitants to leave the country. Some settled in *England*. Nearly the whole of this country is believed to have been covered by the sea in early times. On this occasion the town of Ostend was immersed.<sup>47, 92</sup> [Ostend is now located in northern *Belgium*.]

In 1108 during the period between 8 August and 8 November, floods struck Hopei (now Hebei province) in northern *China* at Chü-lu. Then during the period between 7 September and 6 October, floods struck in Hopei province at Hsing-t'ai causing damage to houses.<sup>153</sup>

In 1108 during the period between 11 July and 4 December, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and Nanking; Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng, and Kuang-tê; and Kiangsi (now Jiangxi province) in southern *China*.<sup>153</sup>

In 1108 during the summer, autumn and winter, there was a great drought in Chêhkiang and Kiangsu provinces in *China*.<sup>165</sup>

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**1109 A.D.** [In *England*], the year 1109 was remarkable for thunder and lightning.<sup>72</sup>

In 1109 in *France*, particularly in Orleans and the province of Chartres, fever and sickness struck causing some deaths. Excessive rainfall drowned the crops. The grape harvest was almost a total failure. In areas where both the grain and grape harvest were affected, terrible famines decimated the population everywhere.<sup>170</sup>

For three consecutive years from 1109 to 1111, there was a terrible famine in *France*.<sup>170</sup>

In *Russia*, the water was high in the Dnieper, the Desna and the Pripet rivers.<sup>76</sup> [The Dnieper River runs through Belarus, southern Russia and Ukraine. The Desna River is a tributary of the Dnieper River. The Pripet River runs through the Ukraine and Belarus, and is a tributary of the Dnieper River.]

In 1109 during the period between 30 June and 29 July, floods struck Hopei (now Hebei province) in northern *China* at Chi. [Chi is located at longitude 115.34° East and latitude 37.34° North.] During the period between 30 July and 27 August, floods struck Kansu (now Gansu province) in northwest *China* at Wu-tu.<sup>153</sup>

In 1109, a drought engulfed several regions of *China*. Due to the hardship, the land tax was remitted. The regions affected were: Kiangsu (now Jiangsu province) on the east coast of *China*; Anhwei (now Anhui province) in eastern *China*; Chekiang (now Zhejiang province) on the east coast of *China*; Fukien (now Fujian province) on the southeast coast of *China*; and Hupeh (now Hubei province) in central *China* at Chiang-ling.<sup>153</sup>

In 1109, there was a drought in Chêhkiang, Fuhkien, Hupeh and Kiangsu provinces in *China*. The land tax was remitted.<sup>165</sup>

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**1110 A.D.** In *England* on 5 May, there was a great frost, which killed the blossoms of the trees. The River Trent was dry at Nottingham for 24 hours. Tempest pernicious to corn [grain] and destruction of all fruits. The people over all *England* were afflicted with sore diseases, especially an epidemic Erysipelas [a type of skin infection] wherein many died, the parts being black and shriveled up.<sup>72</sup> [Nottingham is located in Nottinghamshire in the east Midlands of England.]

In 1110, the River Trent at Nottingham, *England* was dry from morning until 3 p.m., for a mile [1.6 kilometers] in length, so that it could be passed with dry feet.<sup>212</sup>

In *England*, there were many tempests in the year 1110.<sup>72</sup>

In 1110, floods struck Szechwan (now Sichuan province) in southwest *China* at Fêng-chieh. During the period between 6 May and 8 August, floods struck Honan (now Henan province) in central *China* at Têng and Hsi-ch'uan.<sup>153</sup>

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**1111 A.D.** In *England* the winter long and very severe; great scarcity followed.<sup>57, 91</sup>

In *England* in 1111, there was a frost.<sup>72</sup>

In *England* in 1111, there was a long and severe frosty winter, very harmful to corn [grain]. Barrenness of land. There were great dearth, mortality of people, a grievous murrain [death caused by highly infectious disease] of cattle, and death of fowls. All tame fowls fled to the woods and fishes died in the water. A great tempest at Gloffaria with thunder and lightning.<sup>72</sup>

[In *England*], there was a famine from frost and barren land.<sup>72</sup>

In 1111, there was a great mortality of people in London, *England* that extended to cattle and fowls.<sup>212</sup>

In 1111 during the period between 10 May and 7 June, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.<sup>153</sup>

In 1111 during the summer, there was a drought in Kiangsu province in *China*.<sup>165</sup>

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**1112 A.D.** [In *England*], this was a most fruitful and plentiful year.<sup>72</sup>

In 1112, there was a plague in *England*.<sup>212</sup>

The summer of 1112 was very dry in southern *France*.<sup>79</sup>

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**1113 A.D.** In the year 1113, there was a frost in *England*.<sup>72</sup>

[In *England*], there was a great snowfall.<sup>72</sup>

In *England*, there was a drought and it was "so hot that grain, and some forests of wood, took fire."<sup>47, 72</sup>

[In *England*], the heat was in June 1113, so strong that the crops and even forests fell into fire.<sup>62</sup>

At Parma in northwestern *Italy* and Ravenna in northeastern *Italy*, it rained blood both in the towns and fields. It was the same in Emylia [Emilia] in northern *Italy*: so excessive was the heat of this month; that corn and some woods took fire and burnt. After this the people were afflicted with grievous and long diseases, especially dysentery, and a most destructive plague. By the breaking in of the sea, a great part

of Flanders [now *Belgium*] was drowned; whereupon a great number of Flemings fled to and became subjects of King Henry the 1<sup>st</sup> of England for some place to inhabit. And he gave them Pembrokeshire in southwestern Wales, where their posterity remains to this day.<sup>72</sup>

[In *England*] on 11 November 1113 or 1115, there was a tempest and hurricane.<sup>72</sup>

In 1113, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking and Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng, and Kuang-tê.<sup>153</sup>

In 1113, there was a drought in Kiangsu province in *China*.<sup>165</sup>

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**1114 A.D.** On 23 April 1114, there was so great a snowfall in Flanders [now *Belgium*] that it broke down the trees in many places.<sup>72</sup>

In May of 1114 in *England*, there was a great drought and want of water. In October, a terrible hurricane struck destroying houses, villages and woods. The sea shrunk in from its old boundaries, seamarks, and ordinary heights that a man might have walked on foot on the dry sands a whole day. Great rivers which used to ebb and flow twice in 24 hours became shallow, that in many places people might safely walk over. The River Thames was so low, that horses, men and children passed over it between London Bridge and the Tower. And under the bridge, the water scarcely reached the knee, the whole day and night of October 15. The water level in the River Medway at Kent was so low that the smallest vessels could not pass in the midst of the channel.<sup>72</sup>

On 4 April 1114, the River Thames in London, *England* was so dry that children waded over the river between the bridges and the town. Under London Bridge, the water was only knee deep. The river was dry for two days.<sup>212</sup>

On 6 October 1114, the River Medway, in Kent, *England* was almost dry. (The Saxon Annals give these two dates [April 4 and October 6] as both occurring on October 10.)<sup>212</sup>

In 1114 in *England*, the tides went out instead of coming; hence the rivers dried.<sup>72</sup>

In 1114 in *England*, the drought that began in 1113 continued and there was a great want of water.<sup>72</sup>

On 10 October 1114 in *England*, the rivers Thames and Medway dried up so that men could wade across on foot.<sup>170</sup>

In 1114 in *Germany*, the Hever Strom rose so high that the built up "Capell" by the [grandstand] was washed away by the water.<sup>172</sup>

In 1114, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ling.<sup>153</sup>

In 1114, there was a drought in Shantung province in *China*.<sup>165</sup>

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**Winter of 1114 / 1115 A.D.** The River Thames in *England* was frozen for 4 weeks.<sup>29</sup>

Several bridges in *England*, being made of timber, were broken down by the severe frost.<sup>40, 41, 42, 43, 212</sup>

During the winter of 1115 [in *England*], the frost was very severe, and many bridges were broken by the ice.<sup>212</sup>



In *England* there was a great frost; timber bridges broken down by weight of ice. This year was the winter so severe with snow and frost, “that no man who was living ever remembered one more severe; in consequence of which there was great destruction of cattle”.<sup>47, 93</sup>

In 1115, there was a frost in *England*.<sup>72</sup>

The winter was most severely cold, with great frost and snows. At the thaw, most of the bridges in *England* were broken and carried down. On 11 November, there was a most destructive hurricane. There were many storms and a great death of cattle this year.<sup>72</sup>

The winter was most rigorous with frost and snow and the destruction of cattle, that the oldest alive had never witnessed it in *England*.<sup>72</sup>

The frosts of 1115 in northern *France* began on December 22 and lasted until 25 February.<sup>79</sup>

The winter of 1115 [in *England*] was very cold. The English Channel froze. Stones were split in two from the cold.<sup>173</sup>

**1115 A.D.** In 1115 during the period between 24 June and 22 July, floods struck in Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking and in Anhwei (now Anhui province) in eastern *China* at Tang-tu and Hsüan-ch'êng. Then during the period between 22 August and 19 September, floods struck in Kiangsu province at Soochow and Wu-chin and in Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Chia-hsing.<sup>153</sup>

**1116 A.D.** A storm struck *England*.<sup>40, 41</sup>

In *England*, this was a sad rainy year. The summer began with terrible thunder and lightning, which did great damage. The rains began on 1 August and continued until the Feast of Candlemas [2 February]. There was great destruction of corn [grain] and all fruits.<sup>72</sup>

The winter of 1116 was very mild. There were strawberries at Christmas in Liège, *Belgium*.<sup>173</sup>

In *Ireland*, there was a great famine, “during which the people even ate each other.”<sup>57, 91</sup>

In 1102 and 1116, high flood waters swept over a good portion of the land of the island of Helgeland which fell down and was thrown over [washed away].<sup>172</sup>

In December 1116, there was a terrible thunder and lightning storm with hail [in *England*].<sup>72</sup>

**1117 A.D.** In *England*, there was a famine from tempest, hail, and a year's incessant rains.<sup>57, 72, 91</sup>

In 1117 in *England*, there was a scarcity of corn [grain] from great hail and tempest and incessant rains which lasted almost the entire year. Most bridges in *England* were broken down by floods and rains. On 1 November, there was a great tempest of thunder, lightning, clouds and hail. There were several other terrible and fatal tempests in December in many places at different times, as at Leodium [Liège, *Belgium*].<sup>72</sup>

The town of Wells in Somerset, *England* was partly burned down by lightning.<sup>72</sup>

In 1117, Hopei (now Hebei province) in northern *China* at Ho-chien and Ts'ang experienced extreme flooding with over a million people drowned.<sup>153</sup>

In 1117, torrential flooding along the River Arno in *Italy* swept away the original Roman-era wooden bridge Ponte Vecchio, which straddled the river in Florence.

On May 14, there was a sign by thunder at ten o'clock during evening service in St. Sophia in Novgorod [*Russia*]; one of the chanters, a clerk, was struck by the thunder, and the whole choir with the people fell prone [knocked unconscious], but the people remaining alive.<sup>76</sup>

In *Jerusalem* in 1117, there was famine. In May was a great plague of locust at *Jerusalem*, which ate up the herbs, trees, vines and sown corns.<sup>72</sup> [Plagues of locust can be triggered by weather conditions.]

**1118 A.D.** During Epiphany Week [Epiphany celebrated on January 6], there was great thunder and lightning, which killed many. In February, there was tempest, thunder, lightning with great hail and rain. On the Feast of Saint Thomas [December 21], there was a great hurricane in *England*.<sup>72</sup>

On May 7, 1118, a severe frost destroyed the [grape] vines in most areas but especially in Auxerre located in the Bourgogne region of northern *France*.<sup>79</sup>

On 21 December 1118, one of the strongest gales in living memory, struck [in Normandy, *France*] causing terrible havoc.<sup>170</sup>

In 1118, floods struck Anhwei (now Anhui province) in eastern *China* at Hsü-i damaging houses. During the period between 6 May and 8 August, floods struck in Kiangsu (now Jiangsu province) on the east coast of *China*; in Anhwei province; in Hupeh (now Hubei province) in central *China* at Chiang-ling; in Chekiang (now Zhejiang province) on the east coast of *China*; and in Szechwan (now Sichuan province) in southwest *China* at San-t'ai. During the period between 20 July and 18 August, floods swept through much of *China*.<sup>153</sup>

In 1118 during the 8<sup>th</sup> moon, there were freshets [floods] in the vicinity of Shanghai, *China* and four adjacent fus [prefectures].<sup>166</sup>

**1119 A.D.** There were constant inundations for so long that corn [grain] could neither be sown, nor reaped, not only in *Poland* but also in its neighboring countries.<sup>72</sup>

[In *England*], there was a violent tempest the whole day of Christmas.<sup>72</sup>

In 1119 during the previous winter, torrential rains fell in *France*. High floodwaters swept through homes in Rouen and Paris. Crops were damaged by the raging torrent of the overflowing Seine River. Then during Lent, a very strong wind blew over the Seine River and dried it up. One could cross from bank to bank on foot if he had the courage.<sup>170</sup>

The winter of 1119 was extremely wet in *France*. The Seine River overflowed in Paris. The floodwaters swallowed up homes.<sup>173</sup>

In 1119 during the period between 13 March and 11 April, a drought engulfed Honan (now Henan province) in central *China* at Lin-ju, Huai-yang and Ju-nan; and Anhwei (now Anhui province) in eastern *China* at Fou-yang. The drought led to a famine. Then during the period between 10 June and 9 July, floods struck Honan province at Kaifeng. Then during the period between 8 August and 8 November, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow. Then during the period 4-31 December, floods struck *China*.<sup>153</sup>

In 1119 during the spring and autumn, there was a drought in Honan and Kiangsu provinces in *China*.<sup>165</sup>

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**1120 A.D.** [There was a famine in Jerusalem, *Israel* not caused by weather. In Jerusalem in 1120, a famine caused by a “plague of mice and locusts.”<sup>57, 72, 91</sup>]

In July, there was a horrible tempest of hail at Treves [*Prussia*, now west-central *Germany*]. It overthrew many buildings. It did much damage at Halberstadt in central *Germany*, so that the ground in nine miles radius bore no corn. It killed most small birds and oxen. In *Germany*, the wolves tore and destroyed many people.<sup>72</sup>

In 1120, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.<sup>153</sup>

In 1120, there was a drought in Kiangsu province in *China*.<sup>165</sup>

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**1121 A.D.** In *England*, all three spring months dry with excessive heat.<sup>47</sup>

In *England* in 1121 or 1122, there was a drought and all three spring months were dry and had excessive heat.<sup>72</sup>

In *England* in 1121 or 1122, there was a “great famine from long and cruel frost.”<sup>57, 72, 91</sup>

[In *England*], after the Nones of April [the rains ceased] and a dearth ensued, the corn being parched in the ground from the excessive heat and drought of three spring months.<sup>72</sup>

In 1121 during the period between 16 July and 14 August, floods struck Hopei (now Hebei province) in northern *China* at Ch’ing-ho.<sup>153</sup>

In 1121, there were freshets [floods] in the vicinity of Shanghai, *China* and four adjacent fus [prefectures].<sup>166</sup>

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**Winter of 1121 / 1122 A.D.** During the winter of 1121-22 in *England*, the frost killed the grain crops, “and much people and cattle;” famine followed.<sup>47, 93</sup>

In 1121 or 1122, the frost in *England* killed cows and many people. Famine followed.<sup>72</sup>

[In *England*], on December 25<sup>th</sup> there was a terrible and general hurricane. Soon after there was a severe winter which not only killed the sown corn [grain] but people and cattle; hence a famine.<sup>72</sup>

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**1122 A.D.** In England on 11 April, there was a hurricane. On 26 August, there was a great hurricane.<sup>72</sup>

In 1122, *England* experienced the greatest dearth.<sup>72</sup> [This famine was made worst by “taxes, and Dane-gelt, endless.”]

Around the year 1122 there was a drought in Qercy [*Quercy, France*]. As a result there was a procession to pray for rain.<sup>173</sup>

In 1122, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tung-p’ing.<sup>153</sup>

In 1122 during the spring, there was a drought in Shantung provinces in *China*.<sup>165</sup>

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**1123 A.D.** In 1123, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping. During the period between 6 May and 8 August, a drought engulfed several regions that led to a famine. The regions affected were: Kansu (now Gansu province) in northwest *China* at T'ien-shui, Hopei province at Ta-ming, Honan (now Henan province) in central *China* at Kaifeng, and Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.<sup>153</sup>

In 1123 during the summer, there was a drought in Chihli, Kiangsu, Shantung and Shensi provinces in *China*.<sup>165</sup>

### **1123 A.D. – 1125 A.D. England, France and Germany. Famine**

In 1123 or 1124 in *England, France* and *Germany*, there were famines from terrible weather and the greatest plague.<sup>57, 72</sup>

In 1123 or 1124, there was a plague from great snows and frost, intemperate air, to March. Then changes to hailstorms, snow, rain and frosts.<sup>72</sup>

In 1124, a terrible plague and so great a famine afflicted *Germany*, that the third part of the people died; and scarce were there survivors to bury the dead.<sup>72</sup>

In the famine of 1125 in *Germany*, one half of the population died of hunger. During the Middle Ages it was the custom of the city authorities to drive the poor of the cities outside of the city walls in time of famine, where they were “left to die and devour one another”.<sup>155</sup>

In 1125, one-half the population of *Germany* died from starvation.<sup>96</sup>

In 1125 [in *England*], there was a famine from excessive rains that were incessant all summer.<sup>72</sup>

**Winter of 1123 / 1124 A.D.** [In *England*] in 1123, there was a very great and destructive snowfall.<sup>72</sup>

The vine and fruit trees in *France* were killed by the cold.<sup>58</sup>

In 1124, a very hard winter occurred [in *Germany*] and many people and especially poor people froze to death. The birds in the air and the fish in the ponds were cold. Even the winter wheat in the field was completely frozen out.<sup>172</sup>

After Whitsuntide [White Sunday - Pentecost], a sharp frost killed the trees.<sup>72</sup>

At Pentecost was a hard frost, which did harm to fruit trees and [grape] vines.<sup>72</sup>

*Also refer to the section 1123 A.D. – 1125 A.D. for information on the famine in France, Germany and England during that timeframe.*

**1124 A.D.** The many tempest in *England* were pernicious to corn [grain] and all fruits, so that at Candlemas [2 February], they were sold at a great price.<sup>72</sup> [The famine was made worst because of the “scandalous adulteration of money and grievous taxes”.]

In 1124 in *England*, “Such a famine prevailed that everywhere in cities, villages and crossroads lifeless bodies lie unburied.”<sup>91</sup> “By means of changing the coine all things became very deere, whereof an extreme famine did arise and afflict the multitudes of people, even to death.”<sup>57</sup>

In 1123 or 1125, terrible was the famine in *England* so as in towns, villages and highways, dead bodies lay unburied, dissolving into stinking slime. In May trees scarce budded, the ground was so chilled.<sup>72</sup>

In 1124, there was so great a dearth in *England* that a horse load of wheat sold for six shillings.<sup>212</sup>

There was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

There were great inundations at Rome, *Italy*. Famine so great that multitudes of both sexes died of hunger.<sup>72</sup>

In 1124, floods struck several regions of *China* including:<sup>153</sup>

— Hopei (now Hebei province) in northern *China* at Ta-ming.

— Honan (now Henan province) in central *China* at Kaifeng and Loyang.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, and T'ai-ts'ang.

— Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing, and Hu-chou.

— During the period between 8 November and 7 December, floods struck Hopei province at Pao-ting. Crops were damaged.

*Also refer to the section 1123 A.D. – 1125 A.D. for information on the famine in France, Germany and England during that timeframe.*

**Winter of 1124 / 1125 A.D.** In 1124, the frozen Rhine River in *Germany* was crossed by pedestrians.<sup>62</sup>

This winter of 1124-25 was harsher than usual, because of the accumulation of snow that fell incessantly. A significant number of children and even women died from the extreme cold. In ponds, the fish were trapped under the ice. The ice was so thick and firm that loaded wagons and the horses traveled on the Rhine River as on the mainland [in *Germany*]. A strange incident occurred Brabant: Countless numbers of eels were driven by the cold from the swamps and found refuge in barns, where they sought to hide; but the cold was so great that they died from lack of food and rotted. The cattle died in many areas. The bad weather was prolonged so that only in May did trees begin to bud and the grain and other cultivated plants begin to grow.<sup>62</sup>

The year 1125 was a very hard winter and snow [in *Germany*]. Many poor people traveling, the birds in the air, the grape vines, and the trees froze. The fish in the ponds died because of the thick ice. The choughs [bird - member of the crow family] crawled into the haystacks and froze. In June, the Wednesday after Pentecost, there was a big snowstorm especially in the Bohemian Mountains. Then the following Sunday came a big frost that froze all streams so hard that they could be crossed on foot. Then throughout the whole country, this was followed by a cruel famine, and death.<sup>172</sup>

The winter of 1125 was cold and very long. There was extraordinary cold in *Germany, France* and *Italy*. Frozen rivers were passable on horseback. The leaves appeared on trees in May.<sup>173</sup>

The [grape] vine and fruit trees in *France* were killed [by the extreme cold].<sup>58, 80</sup>

In 1125 in *France*, the winter had cold more severe than usual, and was accompanied by a large amount of snow. Alternating snows, rains and frozen juice [freezing rain/sleet] continued until March. Then continual rains destroyed all the seeds.<sup>79</sup>

During the winter, far greater and more frequent snows than ordinary fell whereby many poor people's children were killed, as were the fishes in ponds, even eels themselves. After this followed a great plague on man and beast, and great intemperature of air, even till March. From the variety of weather, snow,

rain, hail, frost, etc. came great damage. The spring came on slowly from cold nights, and daily heavy stormy showers. All seeds were drowned. Hence a plague in *France*.<sup>72</sup>

During the winter of 1124-25 in *France*, the thick ice on the rivers could carry loaded wagons. Many children and women died from the cold. Alternating thaws, rains and snows gave way to very severe cold that lasted until the middle of March. The trees did not begin blooming and the earth was not covered with greenery until the month of May.<sup>79</sup>

During the winter of 1125 [in *England*], the frost was “so intense that the eels were forced to leave the water, and were frozen to death in the meadows.” The dearest [scarcest] year known for wheat.<sup>212</sup>

*Also refer to the section 1123 A.D. – 1125 A.D. for information on the famine in France, Germany and England during that timeframe.*

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**1125 A.D.** In the Novgorod Republic [now part of *Russia*], there was a great storm with thunder and hail; it damaged houses and tore tiles off shrines; it drowned droves of cattle in the Volkhov River, while others hardly saved their lives.<sup>76</sup>

In *England*, there was a great flood on St. Lawrence’s Day (August 10).<sup>47, 72, 92</sup>

In 1125 in *England*, great flood on St. Lawrence’s Day; famine in consequence of destruction of crops.<sup>57, 91</sup>

In 1125, excessive constant daily rains the whole summer in *England*. Hence the most terrible famine through the whole nation on man and beast. On St. Lawrence’s Day was such a flood, as drowned many towns and much people. It carried down bridges, destroyed corn [grain] and meadows. A plague accompanied the famine, and the weather was so bad that it destroyed the corn and all fruits, as none living ever saw before. In *Germany* and *Italy* raged famine and pestilence.<sup>72</sup>

[Another source places this event in 1126] In 1126 in *England*, there were incessant rains during the summer, “when followed in all *England* a most unheard of scarcity. A sextarius of wheat sold for 20s [shillings].”<sup>57, 91</sup>

The summer of 1125 was rainy and damp [in *France*]. This led to poor harvests and cruel distress [famine].<sup>173</sup>

In 1125 in *France*, continuous rain took away almost all the seeds after the month of May.<sup>79</sup>

*Also refer to the section 1123 A.D. – 1125 A.D. for information on the famine in France, Germany and England during that timeframe.*

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**Winter of 1125 / 1126 A.D.** In the year 1125 the winter was again severe and the spring unhealthy. In *France* there was a great famine. In *Bohemia* [now western *Czech Republic*], the trees burst from the extreme cold and the rivers were frozen over.<sup>62</sup>

The harsh winter of 1126 in northern *France* lasted six weeks.<sup>79</sup>

The [grape] vine and fruit trees in *France* were killed by the cold.<sup>58</sup>

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**1127 A.D.** In the Novgorod Republic [now part of *Russia*], a blizzard fell thick over land, water and houses during two nights and four days. The water was high in the Volkhov River and snow lay on the

ground until James's day [May 1]. In the autumn the frost killed all the corn and the winter crop; and there was famine throughout the winter; an osminka [about 11½ pecks] of rye cost half a grivna [a circular ingot of silver].<sup>76</sup>

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**1128 A.D.** The famine that began in 1127 carried over and intensified in 1128 and becoming very cruel in the Novgorod Republic [now part of *Russia*]. One osminka [about 11½ pecks] of rye cost a grivna [a circular ingot of silver]. The people ate lime tree leaves, birch bark, pounded wood pulp mixed with husks and straw; some ate buttercups, moss, horseflesh. Many people dropped dead from hunger, their corpses lay in the streets, in the market place, and on the roads, and everywhere. They hired hirelings to carry the dead out of the town; the serfs could not go out; woe and misery on all! Fathers and mothers would put their children into boats in gift to merchants, [as slaves to the overseas merchants, who came up the river Volkhov from the Baltic to Novgorod in boats] or else put their children to death. Others were dispersed over foreign lands. Thus did our country perished. This year, the water was high in the Volkhov River, and carried away many houses.<sup>76</sup>

The frost in *England* was very severe.<sup>47, 93</sup> Severest.<sup>72</sup>

The year 1128 had the most terrible hard winter [in *England*]. In Easter fell much snow.<sup>72</sup>

In 1128 during the period between 5 February and 6 May, floods struck southeast *China*. Then during the period of 6 May and 8 August, a drought engulfed many regions of *China*. The drought was accompanied by a plague of locust. As a result of the hardship, the land tax was remitted.<sup>153</sup>

In 1128 during the autumn, there was a drought in *China*. The drought was accompanied by a plague of locusts.<sup>165</sup>

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**1130 A.D.** In *England*, there was the greatest drought and hottest years.<sup>47, 72</sup>

In 1130, there was a great famine in Rome, *Italy*.<sup>72</sup>

In Rome, *Italy* in 1130-31 there was a great famine.<sup>57, 91</sup>

In the famine in *France* during 1130-32, one man butchered and ate 48 people.<sup>155</sup>

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**1131 A.D.** In *England*, there was the greatest drought and hottest years.<sup>47, 72</sup>

In 1131, there was a great famine in Rome, *Italy*.<sup>72</sup>

In 1131, there was so great a drought in *France* that all the lakes, rivers, springs and wells dried up. This year and some after, was so great a dearth of domestic animals, as few survived. Oxen died so fast that out of 10 yoke, not one was left; and of every 200 or 300 swine, scarce one remained alive. Fowls also died; hence a great dearth of flesh [animal & fowl], butter, cheese and eggs.<sup>72</sup>

In the famine in *France* during 1130-32, one man butchered and ate 48 people.<sup>155</sup>

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**1132 A.D.** In *England*, there was a great dearth.<sup>72</sup>

In the famine in *France* during 1130-32, one man butchered and ate 48 people.<sup>155</sup>



In 1132 during the period between 17 May and 14 June, floods struck in Anhwei (now Anhui province) in eastern *China* at Hsi and in Chekiang (now Zhejiang province) on the east coast of *China* at Chien-tê. Crops were damaged by the floodwaters.<sup>153</sup>

In 1132, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin.<sup>153</sup>

In 1132, there was a great drought in Kiangsu province in *China*.<sup>165</sup>

In 1132 during the 11<sup>th</sup> moon, in the vicinity of Shanghai, *China*, at night there was a fierce wind, with lightning and solid hail of the size of lichis [lychee fruit], which destroyed dwellings and boats.<sup>166</sup>

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**Winter of 1132 / 1133 A.D.** During the winter the cold was so intense in *Italy*, that the Po River was frozen from Cremona (in northern *Italy*) to the *Adriatic Sea*. The wine froze and burst the casks, and the trees split with a great noise.<sup>1</sup>

In 1133, the Po River in *Italy* froze.<sup>58, 80</sup>

The Po River in *Italy* was frozen from Cremona to the sea.<sup>38</sup>

In 1133, the Rhône River in *France* froze.<sup>58, 80</sup>

During the winter of 1133 the Rhône River in southern *France* froze as well as the wine cellars froze.<sup>79</sup>

Since the water in tree sap acquires greater volume when it freezes in extreme cold, trees burst apart with a loud noise. In Strasbourg in northeastern *France* more fruit trees burst when the cold reaches -16° Reaumur (-20° C, -4° F). A great number of trees in *France* burst in the winter of 1133.<sup>58, 80</sup>

Heavily loaded carts passed along the frozen Rhône River in *France* on the 5<sup>th</sup> of January 1133; as they would on the mainland.<sup>61</sup>

In 1133, the Po River in *Italy* was frozen from Cremona to the *Adriatic Sea*. The Rhône River in *France* was frozen and people crossed it on the ice. Wine froze in the cellars.<sup>60, 62</sup>

In the year 1133 in *Italy*, there was a very severe winter. The Po River was frozen from Cremona to the [*Adriatic*] sea. A tremendous amount of snow covered the roads, rivers and streams were all frozen, everything, even the wine was frozen, and the oak and walnut trees were split, with a crash and were torn, and the olive trees and vines withered. This produced a very terrible shortage [of food], which forced, the following year, the inhabitants of the area of Padua, to feed on grass.<sup>62</sup>

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**1133 A.D.** In *France*, there were great floods from rain.<sup>47, 72, 92</sup>

In 1133, there were severe rains in *France* and a great intemperature of air.<sup>72</sup>

On 2 August 1133 [in *Germany*], there was an eclipse [darkness of the sun] of the type that the sun was completely covered. Following this for an entire month was unusual and unstable weather. The effects only began over a half a year and lasted two whole years. Without a doubt a part of the effects was the powerful hot summer of 1135. Due to great heat much water, lakes and ponds almost dried up and many forests caught fire because of the great heat and there was much loss of timber.<sup>172</sup>

In 1133 during the period between 7 May and 31 August, there was a drought of long duration that engulfed *China*. Then during the period 3-31 August, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Chin-chiang. The city walls were damaged by the floodwaters.<sup>153</sup>

In 1133 during the summer and autumn, there was a drought of long duration in *China*.<sup>165</sup>

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**Winter of 1133 / 1134 A.D.** On 28 December 1133, a blizzard struck Normandy [*France*]. “On Innocents’ day very heavy snow fell, which covered all the face of the earth and blocked the doors of houses with its drifts so that next day men and beasts could scarcely leave their shelters or find any means of providing for their needs. Many of the faithful never entered a church on that feast day, and the priests themselves in many places were totally unable to cross the thresholds of the churches because their way was blocked with snow-drifts. After six days the wind veered to the west and the snow melted, suddenly causing great floods. The rivers, swollen by the snow water, burst their banks and caused widespread loss to some people and gain to others. In villages and towns near by the floods rose to the roofs and drove people from their homes. Large stacks of hay were swept from the meadows, and barrels full of wine and other container vessels were carried away with all kinds of precious belongings.”<sup>170</sup>

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**1134 A.D.** In 1134 at Cashel in south-central *Ireland*, there was a great hail shower.<sup>93</sup>

The extreme drought of 1134 in northern *France* caused the failure of oats, barley and vegetables.<sup>79</sup>

In June 1134 in Normandy [*France*], blazing heat scorched the earth for fifteen days. Streams and pools of water dried up and flocks and herds suffered terribly from thirst. “Then one Saturday a great number of thirsty people plunged into the waters to cool themselves, and many in different places were drowned in the space of a single hour. In the region around us of which we were well informed thirty-seven men were drowned in the waters of pools and rivers.”<sup>170</sup>

In the first week of September 1134, many cities and villages in Normandy [*France*] were burnt to the ground including Le Mans, Chartres, Alençon, Nogent in Perche and Verneuil. The cause of the fires were undetermined and attributed to the flames of God’s wrath.<sup>170</sup>

In September or October 1134 in Flanders [now *Belgium*], “one night the sea poured over the land and, spreading rapidly for seven miles, overwhelmed churches and castles and cottages alike, and involved countless thousands of men and women of every order and rank in a common catastrophe.” “the flood swept away all, fair and ugly, men and women, alike and, choking them with water, quickly dragged them down to death.”<sup>170</sup>

— “One poor woman, who had recently given birth to a child, heard the roar of the raging water and leapt from her bed terrified, but she kept her head, snatched up the baby and a hen with its chickens, and quickly climbed on top of a haystack that was outside her cottage. The force of the rushing water, which was submerging everything, lifted up the hay and carried the stack for a long distance, eddying to and fro. So, by the pity of merciful God, the woman was saved from imminent death and snatched to safety by heaven, with the few poor possessions she had with her.”

— “A twelve-year-old boy told me that on that occasion he climbed quickly on to the gable of the roof and there escaped death; his father and mother, however, who were lower down, perished.”

— [These accounts appear to match that of a tsunami rather than a storm.]

In *Flanders*, there was an inundation from the sea.<sup>47, 72, 92</sup>

The sea broke in on the land and overflowed a great part of *Flanders* and the neighboring countries, killing many people and cattle. This was a rainy year.<sup>72</sup>

[Another account places this event in 1135] In 1135, an irruption of the ocean engulfed a large part of Flanders [now *Belgium*], Holland [now *the Netherlands*] and *Friesland*.<sup>79</sup> [Friesland is now north Netherlands and north Germany.]

[Another account places this event in 1136] The waters of the [English] Channel overflowed and swallowed part of Flanders with its inhabitants.<sup>79</sup>

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**Winter of 1134 / 1135 A.D.** On December 31 [in the Novgorod Republic which is now part of *Russia*], bad weather set in; frost and blizzard, very terrible!<sup>76</sup>

[In the area around Prague, *Czech Republic*], during the weekend of Pentecost (around the 20th of May) in 1135, a thick snow fell in some wooded areas. The next day there was a very lively cold. The frost damaged the crops of every kind. The weather especially damaged the autumn planted crops and the grape vines. The cold also destroyed a large number of trees, as well as bushes, which were frozen down to the roots. The cold froze gently running water [streams]. In *France*, the winter was rough and long. For the fruits of the soil, this year was very unfavorable. As a result of these unfortunate events, a terrible famine gripped the land.<sup>62</sup>

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**1135 A.D.** In *France* and *England*, there was a great drought.<sup>47, 72</sup>

In 1135 [in *Europe*], the heat and drought were extremely high. The pastures and the crops were scorched, and it was followed by a great dearth and famine. The rivers and springs dried up. The heaths of the mountains [small shrub with tiny evergreen leaves and pink or purple flowers] and the dry forests caught fire, allegedly from the glow of the sun's rays. The Rhine River [in *Germany*] was almost completely dry and could be crossed on foot in several places.<sup>62</sup>

In 1135, so great a drought and heat, that all grass and corn [grain] were burnt up. Dearth and a great famine followed. Rivers and springs were dried up. Mountains and woods were burnt up. And many places were said to be set on fire by the sun. The Rhine River was so dried up, that one might safely ford it in any place.<sup>72</sup>

In the year 1135, there was a mighty fierce summer [in *Germany*]. The water in large lakes, streams and ponds dried up. Many forest were burned up with great heat.<sup>172</sup>

The summer of 1135 was hot and dry. "Burnt earth" was everywhere in *France*.<sup>173</sup>

On 28 October 1135, a violent wind sprang up during the night [in Normandy, *France*]. The howling was dreadful. It carried away the roofs from countless homes along with churches and high towers. It cleared woods by tearing down a great number of trees.<sup>170</sup>

On 1 December, there was such dreadful thunder and lightning, which was very uncommon in *England* in the winter. Then came a tempest or hurricane.<sup>72</sup>

From 1135-37 in *England*, there was a great drought and famine.<sup>57, 72, 91</sup>

In 1135, many areas of *China* were engulfed by a drought including:<sup>153</sup>

— During the period between 14 June and 10 August, a drought of long duration engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing, Taichow, Ch'ü, Chien-tê, Wên-chou, Ningpo, Li-shui, Hangchow, Chia-hsing, Hu-chou and Chin-hua.

— During the period between 14 June and 10 August, a drought of long duration engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, T'ai-ts'ang and Nanking.

- During the period between 14 June and 10 August, a drought of long duration engulfed Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng, Tang-t'u and Kuang-tê.
- During the period between 14 June and 10 August, a drought of long duration engulfed Hunan province in south-central *China* at Changsha.
- During the period between 8 August and 8 November, a very severe drought engulfed Szechwan (now Sichuan province) in southwest *China*.

In 1135 during the summer and autumn, there was a drought of long duration in Chêhkiang, Hunan, Kiangsu and Sze-ch'wan provinces in *China*.<sup>165</sup>

In 1135 during the period between 8 August and 8 November, floods struck Szechwan (now Sichuan province) in southwest *China* at Chengtu.<sup>153</sup>

**1136 A.D.** At the summer solstice in 1136 in *France*, the weather was unusual due to the intense heat. This heat had a disastrous effect on people, the flocks and the fruits of the soil.<sup>62</sup>

On 27 October 1136 in *France*, there was a wind so violent that it knocked down a many buildings. The waters of the [English] Channel overflowed and swallowed part of Flanders [now *Belgium*] with its inhabitants.<sup>79</sup>

[In *England*] there was a frightful tempest with thunder, lightning and hail.<sup>72</sup>

In 1136 during the period 1-30 July, a drought engulfed Szechwan (now Sichuan province) in southwest *China* at Fêng-chieh, Mien-yang and Chengtu, and Hunan province in south-central *China* at Hêng-yang.<sup>153</sup>

In 1136 during the spring, there was a drought in Hunan and Sze-ch'wan provinces in *China*. The land tax was remitted.<sup>165</sup>

**Winter of 1136 / 1137 A.D.** During the period between 8 November 1136 and 5 February 1137, floods struck Kiangsi (now Jiangxi province) in southern *China* at P'o-yang. The city walls were damaged.<sup>153</sup>

**1137 A.D.** In *England*, there was a general drought, with great heat: hence famine."<sup>47, 72</sup>

[In *Europe*], the summer of 1137 was very hot and dry. The navigable rivers were so dry that they were crossed on foot in some places. In *France*, the springs and wells gave no more water, and many villagers were dying of thirst. In the midst of this consuming heat, several towns were burned on the same day, among others the cities of Mainz (Mayence) and Speyer in *Germany*. Underground fire appeared in *Italy* for three years and it was this year that Vesuvius erupted. The ordinary state of the waters was finally restored in the year 1139.<sup>62</sup>

The drought of 1137 in *France* broke out in March and lasted until September. The drought caused well, springs and rivers to dry up.<sup>79</sup>

In 1137 in northern *France*, the summer heat was stifling. It burned and overwhelmed.<sup>79</sup>

The summer of 1137 was dry from March to September [in *France*]. Tree ring data shows that there also was a drought in *Algeria* during this time.<sup>173</sup>

The summer of 1137 in *England* was exceedingly hot and droughty. Navigable rivers were so dried up in many places that they might be walked over on foot. Fountains and wells in *France* were so dried up that

many laborers died of thirst. From excessive heat, many towns took fire and were totally burned down as Moguntia (Mainz, *Germany*), Spira (Speyer in southeastern *Germany*), Gloffaria, all on the same day.<sup>72</sup>

In 1137, the whole world [likely *Europe*] suffered a severe drought. Brooks ran dry. Pools and water tanks [cisterns] dried up, and some rivers ceased to flow. Men and beasts suffered terribly from thirst. In some districts, men traveled seven leagues [21 miles, 34 kilometers] in search of water. Some died of excessive heat while carrying water on their backs for themselves and their households. In July and August [in *France*], the burning summer heat scorched mortal men. This heat wave ended on 13 September. Many kinds of pestilence struck people down.<sup>170</sup>

From this drought, and the inexpressible cruelties and barbarities of King Stephen's reign, arose a great dearth and famine in *England*.<sup>72</sup>

In 1137 during the period between 22 February and 18 August, a drought of long duration engulfed Kiangsu (now Jiangsu province) on the east coast of *China* and Anhwei (now Anhui province) in eastern *China*. As a result, the land tax was remitted.<sup>153</sup>

In 1137 during the spring and summer, there was a very severe drought in Anhwei, Kiangsi and Kiangsu provinces in *China*.<sup>165</sup>

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**1138 A.D.** On 9 March on the feast of the Forty Saints in Novgorod [*Russia*], there was great thunder, so that sitting in doors we heard it clearly.<sup>76</sup>

In 1138 during the period between 8 August and 5 September, floods struck *China*. Houses were damaged by the floodwaters and many people drowned.<sup>153</sup>

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**Winter of 1138 / 1139 A.D.** During the period between 8 November 1138 and 5 February 1139, a drought engulfed *China*.<sup>153</sup>

In 1138 during the winter, there was a drought in *China*.<sup>165</sup>

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**1139 A.D.** In 1139 during the period between 28 June and 26 August, a drought engulfed *China*.<sup>153</sup>

In 1139 during the summer, there was a drought in *China*.<sup>165</sup>

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**1141 A.D.** In 1141 a famine began in *England*, which lasted twelve years.<sup>57, 72, 91</sup>

In 1141 began in *England* a most dreadful and desolating famine, which continued 12 years. There was a long, rigorous, tempestuous frosty and snowy winter. At a place called Welsburn (now Wellesbourne, Warwickshire in the West Midlands of *England*), rose from the earth to the sky, a tempest of whirlwind and thick darkness [tornado]. It threw down 51 houses, carried off the roof of a church, and with it hailstones as big a pigeon's eggs. One killed a woman dead. It did great damage to shipping in Flanders [now *Belgium*].<sup>72</sup>

In 1141, a fearful storm of hail and rain broke out in Gaul [*France*] and Brittany [possibly *Great Britain*]. Terrible thunderclaps were heard accompanied by great flashes of lightning.<sup>170</sup>

In 1141 during the period between 4 August and 2 September, a drought engulfed *China*.<sup>153</sup>

In 1141 during the autumn, there was a drought in *China*.<sup>165</sup>

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**Winter of 1141 / 1142 A.D.** The winter of 1141-42 in northern *France* was very harsh.<sup>79</sup>

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**1142 A.D.** In 1142 during the period between 29 March and 5 June, a drought engulfed *China*. During the period between 8 August and 8 November, a drought struck in Honan (now Henan province) in central *China* at Loyang and in Kiangsu (now Jiangsu province) on the east coast of *China* east of the Huai River. During the period between 19 December 1142 and 17 January 1143, a drought struck in Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 1142 during the spring and autumn, there was a drought in Kiangsu, Shansi and Shensi provinces in *China*.<sup>165</sup>

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**Winter of 1142 / 1143 A.D.** The River Thames in *England* was frozen and crossed on foot.<sup>62</sup>

During the winter of 1142-43 in *England*, after the rains was a very hard winter. The River Thames and other rivers were frozen; so as men, horses and burdens [loaded wagons] might safely pass and repasts on the ice. The earth was covered with thick deep snow.<sup>72</sup>

In 1142, there was a frost in *England*.<sup>72</sup>

In the year 1143, in *France* and *Germany* there was a severe winter, and very thick snow covered the earth from the beginning of December to February. A terrible storm tore down houses and churches. When the thaw came, the melting snow brought floods. In *Germany*, the trees burst from the extreme cold and the [grape] vines froze. The famine continued to decimate the people.<sup>62</sup>

In *France* in 1142, the ground remained buried under a deep layer of snow from December 6 to February 2.<sup>79</sup>

In *France*, violent winds in January 1143 overturned many buildings and tore up the trees.<sup>79</sup>

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**1143 A.D.** In the Novgorod Republic [now part of *Russia*], all the autumn was rainy, from Our Lady's Birthday [September 25] to Korochun [the Winter Solstice – 21 or 22 December] & warm, wet; and the water was very high in the Volkhov River and everywhere, flooding carried away hay and wood. Lake Ilmen [at the north end lies Novgorod] froze in the night, and the wind broke up [the ice] and carried it into the Volkhov River, where it broke the bridge, it carried away four piles [bridge supports], never heard of more.<sup>76</sup>

In 1143, a drought engulfed Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 1143, there was a drought in Shensi province in *China*.<sup>165</sup>

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**1144 A.D.** In *England*, there was a drought that lasted during all the harvest months and long after.<sup>47, 72</sup>

In *England*, there was a terrible famine.<sup>72</sup>

On 14 February 1144, there was a dreadful hurricane. *England* was almost consumed by a general sore famine and civil wars. There was a most droughty harvest. There was neither rain nor dew until the Feast of Saint John the Baptist [June 24] and then no more for a long time afterwards.<sup>72</sup>

In 1144, several regions of *China* experienced flooding.<sup>153</sup>

During the period of 3 June - 2 July, the following areas were affected:

— Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua, Ch'ü, Lan-ch'i and



Chien-tê experienced flooding. At Lan-ch'i over 10,000 people were drowned.

— Kiangsi (now Jiangxi province) in southern *China* at Shang-jao experience flooding.

— Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou experience flooding.

During the period of 3 July - 31 July, the following areas were affected:

— Kiangsu (now Jiangsu province) on the east coast of *China* experienced flooding.

— Chekiang (now Zhejiang province) on the east coast of *China* experienced flooding.

— Fukien (now Fujian province) on the southeast coast of *China* experienced flooding.

Excessive rains delayed the [grain] harvest of 1144 in northern *France* until 25 August.<sup>79</sup>

**1145 A.D.** In the Novgorod Republic [now part of *Russia*], there were two whole weeks of great heat, like burning sparks, before harvest; then came rain, so that we saw not a clear day until winter; and a great quantity of corn and hay were unable to be harvested; and that autumn the water was higher than three years before; and in the winter there was not much snow, and no clear day, not until March.<sup>76</sup>

**1146 A.D.** In *France* there was a famine.<sup>57, 72, 91</sup>

The year 1146 was wet. This caused a calamity in wheat production, which led to famines. There were poor harvests in Reims, *France* and Aachen, *Germany*. The Rhine River flooded.<sup>173</sup>

In 1146, floods struck Szechwan (now Sichuan province) in southwest *China* at San-t'ai. Houses were damaged by the floodwaters.<sup>153</sup>

**1147 A.D.** [In *England*], there was a tempest with violent torrents [of rain].<sup>72</sup>

In 1147 during the 10<sup>th</sup> moon [in early winter], in the vicinity of Shanghai, *China*, there was wind, thunder, and hail like a shower of arrows, which destroyed houses and boats.<sup>166</sup>

**1148 A.D.** In *England* in April, there was great thunder and a hurricane for four days.<sup>72</sup>

In the Novgorod Republic [now part of *Russia*], there was rain with hail on June 27, a Sunday; and thunder set fire to the Church of the Holy Mother of God in the monastery of Zverinet.<sup>76</sup>

In 1148 during the period between 6 May and 8 August, a severe drought engulfed several regions of *China*. Due to the hardship, the land tax was remitted. The area affected included:

— Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing, Ningpo, Taichow, Ch'ü, Chien-tê, Wên-chou, Li-shui, Hangchow, Chia-hsing, Hu-chou and Chin-hua.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, T'ai-ts'ang, Yangchow and Nanking.

— Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng, Tang-t'u and Kuang-tê.

Then during the period between 16 August and 14 September, floods struck Chekiang province at Shao-hsing, Ningpo, and Chin-hua.<sup>153</sup>

In 1148 during the summer, there was a great drought in Chêhkiang, Kiangsi and Kiangsu provinces in *China*. As a result, the land tax was remitted.<sup>165</sup>

**Winter of 1148 / 1149 A.D.** In *England*, the winter was dry and warmest to 1<sup>st</sup> April, then coldest to 15<sup>th</sup> May.<sup>47, 72</sup>



**1149 A.D.** In *England*, the year was full of tempests of thunder and lightning, hail, rain, etc., which did inestimable, harm. The summer and harvest were excessively rainy. These rains did great damage to standing corn [grain] so that a dearth [famine] followed.<sup>72</sup>

[In *England*], there were five tempests of whirlwind, thunder, lightning and hail.<sup>72</sup>

In 1149, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin and Chinkiang.<sup>153</sup>

In 1149, there was a drought in Kiangsu province in *China*.<sup>165</sup>

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**Winter of 1149 / 1150 A.D.** The winter was severe in December 1149. The River Thames in *England* froze.<sup>28</sup>

In *England*, the winter of 1150 was remarkable for a severe frost, which commenced on the ninth of December, and continued till the beginning of March, during a great part of which time, the River Thames was frozen so hard as to allow carts and other carriages to pass over the ice.<sup>29</sup>

The frost in *England* continued from the 10<sup>th</sup> of December to the 19<sup>th</sup> of February.<sup>47, 72, 93</sup>

From 10 December 1149 to 19 February 1150, there was a very hard frost in *England*. The River Thames was so frozen that men went over [the ice] on foot and horseback. A terrible whirlwind, which broke down many houses, tore up trees by the root [tornado]. The earth was very barren.<sup>72</sup>

In 1149, the sea was frozen off the coast of Holland [now *the Netherlands*].<sup>62</sup>

In the year 1149, the winter was more severe in Flanders [now *Belgium*] than usual and lasted from early December to March. The sea was completely frozen and passable from a distance of more than three miles from the coast. The frozen waves appeared in the distance like towers. In Tournai, *Belgium*, there was great shortage of food.<sup>62</sup>

During the winter of 1150 [near *France*], the sea was frozen 3 miles [from shore] from December to February.<sup>173</sup>

The winter of 1150 in northern *France* was no less rigorous and continued for three months. Several people had their limbs frozen. This winter did not allow the spring farm work.<sup>79</sup>

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**1150 A.D.** [In *England*], there was a famine from rains, tempest, snow, frost and barren land.<sup>72</sup>

In 1150 and 1151, there was a great famine [in *England*].<sup>212</sup>

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**1151 A.D.** In *England*, the summer was dry and hot, but the harvest was early and good.<sup>47, 72</sup>

In 1150 and 1151, there was a great famine [in *England*].<sup>212</sup>

[In the area around *Belgium / Northern France*] the year 1151 promised abundant harvests, but the rain which fell beginning on the Feast of St. John [June 24] and continuing without interruption until mid-August, destroyed the goods of the earth. Very little fruit came to maturity. The wine was missing, because of the small quantity of grapes collected. And the wine produced turned into vinegar.<sup>62</sup>

The summer of 1151 [in *France*] was rotten. There were continual rains from 24 June to mid-August.

There were frequent storms, gales and fogs. A promising crop was destroyed.<sup>173</sup>

Excessive rainfall on [the Feast of] Saint John to mid-August in the year 1151 in northern *France* stemmed the crops from maturing, and caused enormous devastation.<sup>79</sup>

In 1151 or 1152, there were great and excessive rains, which fell this summer, hindered the growth of corn [grain]; hence a famine, together with a great mortality of people.<sup>72</sup>

In 1151-52, there was a famine in *Europe* and *Palestine*.<sup>57, 72, 91</sup> [Palestine is the region between the Mediterranean Sea and the Jordan River.]

**1152 A.D.** In *England* there was a drought from “13<sup>th</sup> March to harvest, neither rain nor dew. First, cold nights: frost, northerly winds; then greatest heat and dry, flies, gnats.”<sup>47, 72</sup>

In *Germany*, there were great floods on the Rhine River from excessive rains.<sup>47, 72, 92</sup>

In 1152 [in *France*] there was a grain famine.<sup>173</sup>

**1153 A.D.** In *Ireland*, a great famine raged in Munster, and spread all over *Ireland*.<sup>57, 91</sup>

In 1153, floods struck several regions of *China* including:<sup>153</sup>

— Szechwan (now Sichuan province) in southwest *China* at Chin-t’ang; Anhwei (now Anhui province) in eastern *China* at Hsüan-ch’êng; and Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang.

— During the period between 24 June and 22 July, floods struck Szechwan (now Sichuan province) in southwest *China* at San-t’ai. Due to the hardship, the land tax was remitted.

— During the period between 23 July and 21 August, floods struck on the east coast of *China* in Kiangsu province at Soochow and in Chekiang (now Zhejiang province) at Hu-chou, and Chia-hsing. As a result, the summer land tax was remitted.

— During the period between 23 July and 21 August, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Kuang-tsê. People drowned.

**1154 A.D.** There was a great frost in *England*.<sup>47, 72, 93</sup>

There was a general famine over all *Europe* and a great frost in *England*, thunder, lightning, rains, and a horrible tempest. Famines in *Scotland* with the plague.<sup>72</sup>

In *England*, there was a famine from rains, frost, tempest, thunder and lightning.<sup>57, 72, 91</sup>

In 1154 during the period between 7 November and 6 December, a drought engulfed several regions of *China*. Due to the hardship, the land tax was remitted. The area affected included:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing, Ningpo, Taichow, Ch’ü, Chien-tê, Wên-chou, Li-shui, Hangchow, Chia-hsing, Hu-chou and Chin-hua.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, and T’ai-ts’ang.

In 1154 during the summer, there was a drought in Chêhkiang and Kiangsi provinces in *China*. The land tax was remitted.<sup>165</sup>

**1155 A.D.** In July 1155, Mortain in Normandy in northwestern *France* was struck by thunder and storms with heavy rain.<sup>79</sup>

**1156 A.D.** In *England*, there were rain and floods, lasting all the harvest.<sup>47, 72, 92</sup>

In 1156 in *England*, thunder and tempests were very frequent in July. An abundance of rain followed, which began on 11 August. The rain hindered the reaping and sowing of corn [grains]; hence many great and long floods, which carried down houses, churches, etc. Then came the frost.<sup>72</sup>

In 1156 [in *England*], all harvest from August 11 there was no reaping or sowing but floods like seas.<sup>72</sup>

In 1156 in southern *France*, excessive drought brought about winter.<sup>79</sup>

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**1157 A.D.** There was a great frost in *Italy*.<sup>47, 72, 93</sup>

During the winter of 1157, there was an enormous amount of snow and the violence of the frost destroyed a large portion of the [grape] vines.<sup>62</sup>

In 1157, there was a terrible thunder and lightning storm in *Normandy* that was fatal to people and cattle.<sup>72</sup>

There was very much snow and frost in *Italy*. In summer afterwards was excessive heat and drought, followed by the plague. In June there was a great tempest, which did much damage to corn, trees, and buildings.<sup>72</sup>

In *Italy*, there was a famine after great snow and frost.<sup>57, 72, 91</sup>

In 1157, the summer was extremely hot and dry in *Italy*.<sup>62</sup>

In 1157, the summer was abnormally very hot [in *Germany*].<sup>172</sup>

In the Novgorod Republic [now part of Russia], in autumn there was very terrible thunder and lightning, and hail the size was larger than apples. This hailstorm occurred on 7 November at 5 o'clock at night.<sup>76</sup>

In 1157, floods struck several regions of *China* including:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang, Nanking and I-chêng.
- Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing.
- Anhwei (now Anhui province) in eastern *China* at Kuei-ch'ih.
- Kiangsi (now Jiangxi province) in southern *China* at Kiukiang and Nan-ch'ang.
- Hupeh (now Hubei province) in central *China* at Wuchang and Hanyang.

In 1157 during the period between 4 November and 3 December, a drought engulfed Szechwan (now Sichuan province) in southwest *China*. This drought caused a famine. Due to the hardship, the land tax was remitted.<sup>153</sup>

In 1157 during the autumn, there was a drought in Sze-ch'wan province in *China*. The land tax was remitted.<sup>165</sup>

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**1158 A.D.** In 1157 or 1158 in *Italy*, there was a great overflow of the Tiber River. In *Normandy*, there were great floods.<sup>47, 72, 92</sup>

In 1158, a large flood tore down many churches and houses and drowned many people and livestock [in *Germany*]. [This entry was listed under the category "storm surge", which might include an inundation of the sea.]<sup>172</sup>

In July 1157 or 1158, there were several lightnings and tempests in *Normandy*. In several places, many people were killed from lightning. A great inundation followed which hindered the reaping, fetching home and sowing of corn [grain]. There was a great inundation of the Tiber River in *Italy*. The River Thames in *England* dried up.<sup>72</sup>

In 1157 or 1158, from tempests, floods, corn [grain] was neither ripened, reaped, got, nor new sown [fall planting].<sup>72</sup>

In the Novgorod Republic [now part of *Russia*], there was great mortality in the people and a large number of horses also died; so that it was not possible to walk to the market place through the town, nor along the dike, nor out to the fields, because of the stench. Horned cattle also died.<sup>76</sup>

In 1158, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 28 June and 26 July, floods struck in Shensi (now Shaanxi province) in central *China* at Liao-yang and Ning-ch'iang and in Szechwan (now Sichuan province) in southwest *China* at Kuang-yüan. Houses and bridges were damaged by the floodwaters and many people drowned.

— During the period between 24 September and 23 October, floods struck on the east coast of *China* in Kiangsu (now Jiangsu province) at Soochow and in Chekiang (now Zhejiang province) at Shao-hsing and Hu-chou. As a result, the unpaid land taxes were remitted.

— During the period between 24 September and 23 October, floods struck Chekiang province at Hangchow, Chia-hsing, Hu-chou, Ningpo, Shao-hsing, Taichow, Chin-hua, Ch'ü, Chien-tê, Wên-chou, and Li-shui.

— During the period between 24 September and 23 October, floods struck Kiangsi (now Jiangxi province) in southern *China* at Kiukiang.

— During the period between 24 September and 23 October, floods struck Kiangsu province at Nanking, Chinkiang, Yangchow, Tung-hai, Wu-chin, Soochow, Sung-chiang and T'ai-ts'ang.

— During the period between 24 September and 23 October, floods struck Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng.

**1159 A.D.** In 1159 during the period between 20 February and 19 April, a drought engulfed *China*. During the period between 8 August and 8 November, a drought struck on the east coast of *China* in Kiangsu (now Jiangsu province) and in Chekiang (now Zhejiang province).<sup>153</sup>

In 1159 during the spring and autumn, there was a drought in Chêhkiang and Kiangsi provinces in *China*.<sup>165</sup>

In 1159, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Foochow. Houses were damaged by the floodwaters. During the period between 15 August and 13 September, floods struck Fukien province at Foochow.<sup>153</sup>

**1160 A.D.** In 1160 during the period between 5 February and 6 May, a drought engulfed Kansu (now Gansu province) in northwest *China* at Wu-tu, Ch'êng, and Hsi-ho, and Shensi (now Shaanxi province) in central *China* at Fêng. Then during the period between 6 June and 5 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Yü-ch'ien and An-chi. Then during the period between 8 August and 8 November, a drought engulfed the east coast of *China* in Kiangsu (now Jiangsu province) and Chekiang province.<sup>153</sup>

In 1160 during the spring and autumn, there was a very severe drought in Chêhkiang, Kiangsi, Shensi and Sze-ch'wan provinces in *China*.<sup>165</sup>

**1161 A.D.** In Sicily *Italy*, there was an inundation of the sea; drowned 5,000 persons; “floods in many rivers, multitudes of people lost.”<sup>47, 72, 92</sup>

In *Italy*, there was a tempest with hail the size of goose eggs.<sup>72</sup>

There was a great thunder and lightning storm [in *England*] that was fatal.<sup>72</sup>

At the village Landaaren [now Landavran in Brittany in northwestern *France*] at noon rose out of the earth a terrible whirlwind [tornado] and floods on high. The noise of spears and lances were heard in it, but no hand was seen. On the top were seen fowls flying in and about it [debris]. Soon after a grievous plague raged both there and in several places in *Normandy* and the neighborhood. There was a great famine and earthquake in several places including Antioch (*Turkey*), Tripoli (*Libya*), Damascus (*Syria*), etc. wherein 20,000 men were killed. In *Sicily*, the sea overflowed and drowned 5,000 people. In May fell great hailstones, the stones as large as geese eggs. There were also several tempests, inundations of rivers, and loss of much people.<sup>72</sup>

In the Novgorod Republic [now part of *Russia*], the sky stood clear all summer and all the corn was scorched, and in the autumn frost killed all the spring corn. During the winter the whole season stood with heat and rain, and there was thunder. We bought a little barrel [1 1½ pecks] for seven kunas [martenskins used as money]. Oh, there was great distress in the people and want!<sup>76</sup>

In 1161, there was a hurricane with a very strange whirlwind at Scandaroon [possibly in *Turkey*].<sup>72</sup>

In 1161 during the period between 23 August and 20 September, floods struck Hupeh (now Hubei province) in central *China* at Chien-shih. Many people drowned.<sup>153</sup>

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**1162 A.D.** In Holland [now *the Netherlands*], there was an inundation from the sea; many people and cattle lost.<sup>47, 72, 92</sup>

In *Holland*, there was a tempest of hail, and the sea overflowed.<sup>72</sup>

In 1162, there was said to have been a great famine all over the world.<sup>57, 91</sup>

In 1162, there were several large snowfalls [in *Germany*]. It covered tall houses and trees. One could not travel by horseback or on foot.<sup>172</sup>

On 10 February 1162, there was a great flood, and many thousands of people drowned in the Elbe and Weser rivers, along with countless cattles. One called this flood “the human trough” because people drowned one by one. The district of Dithmarschen in northern *Germany*, a collapse of the water pond released so much water that in the whole parish of Brunsbüttel only 30 people survived. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

In Lübeck [*Germany*], there was a tempest of wind, thunder and lightning.<sup>72</sup>

In 1162, there was a general famine [in *Europe*] that was still terrible. But in *Poland*, it was a great famine.<sup>72</sup>

On 14 March 1162, there was a great tempest of wind, thunder and lightning at Lübeck in northern *Germany*, which burnt and overthrew many houses. The sea overflowed farther in *Friesland* than ever was known. Even Hadelen, and all the low country of Albia and Wirra were flooded and many thousands of people and cattle drowned. At the same time hail made fearful havoc of men, beasts, trees, and horses.

In *Poland* there was a famine. In *Mediolana* [*Mediolanum* or *Milan, Italy*] fell twelve great snows, which greatly afflicted both animals and vegetables. A great famine still reigned over most parts of the world. Famine, plague and war sorely afflicted the people of *Mediolana*.<sup>72</sup> [Much of *Friesland* is currently under the *Zuider Zee*. The remaining *Friesland* (*Frisian*) territories consisted of: West Friesland, which remained a part of *Holland* and became a part of *North Holland* around 1800. The current region of *West Friesland* is smaller than historical *West Friesland*. *Friesland* is now a Dutch province. East Frisia became a part of the Kingdom of *Prussia* and was formerly a district of the federal state of *Lower Saxony* in the Federal Republic of Germany. North Frisia was a part of the Danish duchy of *Schleswig* and is now part of the German state of *Schleswig-Holstein*. The Frisian Islands off the coast of the Netherlands and Germany are the leftover dunes of flooded lands.]

In 1162 during the period between 16 May and 14 June, floods struck *China*. Houses were damaged by the floodwaters and people and cattle drowned. During the period between 14 July and 12 August floods struck on the east coast of *China* in *Kiangsu* (now *Jiangsu* province) at *Sung-chiang* *Soochow*, and *T'ai-ts'ang*; and in *Chekiang* (now *Zhejiang* province) at *Hangchow*, *Chia-hsing* and *Hu-chou*. Houses and fields were damaged by the floodwaters and ships were wrecked.<sup>153</sup>

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**1163 A.D.** There were famine and plague in *Aquitania*.<sup>72</sup> [*Aquitania* or the Duchy of *Aquitaine*, currently is a region of southwestern *France* between *Bordeaux* and the *Pyrenees*.]

In 1163, floods struck many regions of *China* including:<sup>153</sup>

— *Anhwei* (now *Anhui* province) in eastern *China* at *Hsüan-ch'êng* and *Kuang-tê*. As a result, the land tax was remitted.

— *Kiangsu* (now *Jiangsu* province) on the east coast of *China* at *Nanking*, *Chinkiang*, *Sung-chiang*, *Soochow* and *T'ai-ts'ang*. As a result, the land tax was remitted.

— *Chekiang* (now *Zhejiang* province) on the east coast of *China* at *Hangchow*, *Chia-hsing*, *Hu-chou*, *Ningpo*, *Shao-hsing*, *Taichow*, *Chin-hua*, *Ch-ü*, *Chien-tê*, *Wên-chou*, and *Li-shui*. As a result, the land tax was remitted.

— During the period between 31 August and 29 September, floods struck *Kiangsu* province at *Soochow*, *Sung-chiang*, and *T'ai-ts'ang*. The floods were caused by a typhoon and heavy rains.

— During the period between 31 August and 29 September, floods struck *Chekiang* province at *Hangchow*, *Chia-hsing*, *Hu-chou*, *Ningpo*, *Shao-hsing*, *Taichow*, *Chin-hua*, *Ch-ü*, *Chien-tê*, *Wên-chou*, and *Li-shui*. The floods were caused by a typhoon and heavy rains.

In 1163 during the period 2-30 August, a drought engulfed *Kiangsu* (now *Jiangsu* province) on the east coast of *China*, *Chekiang* (now *Zhejiang* province) on the east coast of *China*, and *Honan* (now *Henan* province) in central *China* at *Loyang*. In *Loyang*, the drought was a great drought. The land tax was remitted.<sup>153</sup>

In 1163 during the autumn, there was a great drought in *Chêhkiang* and *Kiangsi* provinces in *China*. As a result, the land tax was remitted.<sup>165</sup>

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**1164 A.D.** In 1164, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 21 June and 20 July, floods struck in *Kiangsu* (now *Jiangsu* province) on the east coast of *China* at *Nanking* and *Chinkiang* and in *Anhwei* (now *Anhui* province) in eastern *China* at *Hsüan-ch'êng* and *Kuang-tê*.

— During the period between 21 July and 19 August, floods struck in *Kiangsu* province at *Nanking*, *Chinkiang*, *Soochow*, *Wu-chin*, *Chiang-yin* and *Yangchow*. Houses were damaged by the floodwaters and many people drowned.



— During the period between 21 July and 19 August, floods struck in Anhwei province at Hsüan-ch'êng, Kuei-ch'ih, Ho-fei, Ho, Kuang-tê, Shou, and Wu-wei. Houses were damaged by the floodwaters and many people drowned.

— During the period between 21 July and 19 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Chia-hsing. Houses were damaged by the floodwaters and many people drowned.

— During the period between 21 July and 19 August, floods struck in Honan (now Henan province) in central *China* at Huang-ch'uan.

— During the period between 20 August and 17 September, floods struck in Kiangsu province at Yangchow.

In 1164, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping. During the period between 5 February and 6 May, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Taichow and Fukien (now Fujian province) on the southeast coast of *China* at P'u-t'ien, Lung-ch'i and Foochow.<sup>153</sup>

In 1164 during the spring, summer and autumn, there was a drought in Chêhkiang and Fuhkien provinces in *China*.<sup>165</sup>

In Senon, in northeastern *France*, there was darkness and then a tempest of thunder.<sup>72</sup>

In 1164 there was a strong storm in *Germany*. The strong wind threw down many houses, trees and churches.<sup>172</sup>

On 17 February 1164, a storm surge caused a flood. The southern North Sea coast was probably more severely affected than the west coast of Schleswig-Holstein. It affected mainly East Friesland and the Weser-Elbe region, said there were initial dips of the Jade Bay in northwestern *Germany*. The flood affected 20,000 people between the Rhine and the Elbe rivers. The first break of the Jade Bay was directed to the southwest. Along the Weser [river], salt water covered the country up to 12 miles inland.<sup>172</sup>

**1165 A.D.** In *Sicily*, there was an irruption of the sea; 12,000 people drowned.<sup>47, 72, 92</sup>

On Sexagesima Sunday (second Sunday before Lent), the sea swelled and rose three days together, and in *Sicily* it drowned 12,000 people.<sup>72</sup>

In *Italy* [during the summer], red-hot winds dried up all the plants.<sup>62</sup>

In 1165 during the period between 13 February and 13 March, a drought engulfed *China*. Then during the period between 10 July and 8 August, floods struck in Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin and in Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou. Fields were damaged.<sup>153</sup>

In 1165 there were droughts and floods in China. These were accompanied by a plague of locusts. The land tax was remitted.<sup>165</sup>

In 1165, in the vicinity of Shanghai, *China*, people were forced by hunger to eat bran [the hard outer layer of grain].<sup>166</sup>

**Winter of 1165 / 1166 A.D.** In the Novgorod Republic [now part of *Russia*], during the winter, there was severe frost.<sup>76</sup>



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**1166 A.D.** In 1166, a typhoon struck Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou during the period 27 August - 25 September. Houses were damaged and over 20,000 people were drowned.<sup>153</sup>

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**1167 A.D.** In 1167 during the period between 5 February and 14 September, a drought engulfed Szechwan (now Sichuan province) in southwest *China* at Mien-yang, Chien-ko, Kuang-han and Pei-ch'uan.<sup>153</sup>

In 1167 during the autumn, there was a very severe drought in Sze-ch'wan province in *China*.<sup>165</sup>

In 1167, floods struck many regions of *China* including:<sup>153</sup>

— Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng and Kuang-tê.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking, and Chinkiang.

— Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang.

— During the period between 19 June and 17 July, floods struck in Anhwei province at Ho-fei and Ch'ien-shan and in Hupeh (now Hubei province) in central *China* at Ch'i-ch'un. Crops were damaged by the floodwaters and people and cattle drowned.

— During the period between 19 June and 17 July, floods struck in Fukien (now Fujian province) on the southeast coast of *China* at Chin-chiang and in Kiangsu province at Sung-chiang, T'ai-ts'ang and Soochow.

— During the period between 19 June and 17 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing, Hu-chou, Ningpo, Shao-hsing, Taichow, Chin-hua, Ch-ü, Chien-tê, Wên-chou, and Li-shui.

— During the period between 18 July and 16 August, floods struck Chekiang province at Hangchow. Two hundred eighty families were flooded and many people drowned.

— During the period between 15 September and 14 October, floods struck Chekiang province at Hu-chou, Chia-hsing, and Shang-yü.

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**1168 A.D.** In 1168 during the period between 7 July and 4 August, a drought that led to a famine struck the following regions of *China*:<sup>153</sup>

— Szechwan (now Sichuan province) in southwest *China* at Ch-iung-lai.

— Hunan province in south-central *China* at Hêng-yang.

— Hupeh (now Hubei province) in central *China* at Hsiang-yang.

— Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang.

— Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou.

In 1168 during the summer, there was a drought in Hupeh province in *China*.<sup>165</sup>

In 1168, floods struck several regions of *China* including:<sup>153</sup>

— Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.

— Kiangsi (now Jiangxi province) in southern *China* at P'o-yang and Shang-jao.

— Chekiang (now Zhejiang province) on the east coast of *China* at Chu-chi. Crops were damaged by the floodwaters.

— During the period between 7 July and 4 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Ho-tsê.

— During the period between 5 August and 3 September, floods struck Anhwei (now Anhui province) in eastern *China* at Hsi.

— During the period between 5 August and 3 September, floods struck Chekiang province at Ch'ü. Houses and crops were damaged by the floodwaters. The city walls were damaged. Cattle drowned.

The summer of 1168 was hot and dry. In June, the Sarthe River in *France* dried up.<sup>173</sup>

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**1169 A.D.** In 1169 during the period between 6 May and 8 August, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* east of the Huai River. During the period between 27 June and 25 July, a drought engulfed *China*. Then during the period between 26 July and 23 August, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou. Houses were damaged by the floodwaters and many people drowned. Then between 22 October and 20 November, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou and Taichow. Houses and fields were damaged. People and cattle drowned.<sup>153</sup>

In 1169 during the summer, there was a drought in Kiangsu province in *China*.<sup>165</sup>

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**1170 A.D.** In *Holland, Friesland, and Utrecht*, there was a terrible flood. In the latter province the water rose to so great a height that the people were able to catch fish with nets within the walls of the town.<sup>47, 92</sup> [Utrecht is now located in the northern Netherlands.]

In 1170, sea water was driven up very high by the great storm winds [in *Germany*].<sup>172</sup>

The months of January and February 1170 produced violent lightning and thunder storms in *France*.<sup>79</sup>

In 1170 during the period between 6 May and 8 August, a drought engulfed many regions of *China* including: Kiangsu (now Jiangsu province) on the east coast of *China*; Chekiang (now Zhejiang province) on the east coast of *China*; Fukien (now Fujian province) on the southeast coast of *China*; Kiangsi (now Jiangxi province) in southern *China*; Kiangsu province at Nanking; and Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng, and Kuang-tê.<sup>153</sup>

In 1170 during the summer, there was a drought in Chêhkiang and Fuhkien provinces in *China*.<sup>165</sup>

In 1170 during the period between 18 May and 15 June, floods struck several regions of *China* including:<sup>153</sup>

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Nanking, and Chinkiang. Houses and fields were damaged by the floodwaters.

— Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng and Kuang-tê. Houses and fields were damaged by the floodwaters.

— Kiangsi (now Jiangxi province) in southern *China* at Kiukiang and [Unknown – Chiang-hsi-chün]. Houses and fields were damaged by the floodwaters.

— Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou, Hu-chou, and Chia-hsing. Houses and fields were damaged by the floodwaters.

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**Winter of 1170 / 1171 A.D.** During the winter of 1170-71 in southern *France*, a horrific lightning and thunder storm broke out on 30 December 1170. Another horrific storm took place on 30 January 1171.<sup>79</sup>

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**1171 A.D.** In *England*, there was an inundation of the sea; harvest destroyed in many places.<sup>47, 72, 92</sup>

On Quadragesima [Sunday occurring after Ash Wednesday], there was a great inundation of the sea. The harvest in many places was lost and carried off by the waves. A plague on man and beasts. On 25 December 1171, there was terrible thunder and hail in *England*, which killed birds, beasts and people. The storm struck *England, Ireland, France* and *Scotland*. At night fell a most terrible tempest. The lightning did great damage.<sup>72</sup>

There was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

In 1171 during the period between 7 February and 8 March, floods struck Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

During the winter of 1171-1172, a storm [with the intensity of a major hurricane] slammed into the shores of South Wales and other western seaports. “At the time when Henry II, King of the English, was wintering in Ireland, a curious phenomenon occurred here [Newgale Sands, *Wales*]. The wind blew with such unprecedented violence that the shores of South Wales were completely denuded of sand, and the subsoil, which had been buried deep for so many centuries, was once more revealed. Tree-trunks became visible, standing in the sea, with the tops lopped off, and with the cuts made by the axes as clear as if they had been felled only yesterday. The soil was pitch-black, and the wood of the tree-trunks shone like ebony. By this strange convulsion of nature, the element through which ships were wont to move so freely became impassible to them, and the sea-shore took on the appearance of a forest grove, cut down at the time of the [Great] Flood, or perhaps a little later, but certainly very long ago, and then by slow degrees engulfed and swallowed up by the waves, which encroach relentlessly upon the land and never cease to wash it away. The tempest raged so fiercely that conger-eels and many other sea-fish were driven up on the high rocks and into the bushes by the force of the wind, and there men came to gather them.”<sup>169</sup>

In 1171 during the period between 5 February and 6 May, a drought engulfed many regions of *China* including:

- Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and Nanking.
- Anhwei (now Anhui province) in eastern *China* at Tang-t’u, Hsüan-ch’êng, and Kuang-tê.
- Kiangsi (now Jiangxi province) in southern *China*.
- Hunan province in south-central *China* at Changsha.
- Hupeh (now Hubei province) in central *China* at Chiang-ling.
- Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua and Chia-hsing.
- Hopei (now Hebei province) in northern *China* at Peiping and Ta-ming.
- Shansi (now Shanxi province) in northern *China* at Tatung and Yang-ch’ü.
- Honan (now Henan province) in central *China* at Kaifeng.
- Shensi (now Shaanxi province) in central *China* at Sian.

Then during the period between 6 May and 8 November, a drought engulfed Kiangsi province at Kiukiang, Nan-ch’ang, Kao-an, P’o-yang, Hsing-tzū, and Ch’ing-chiang; Hunan province at Changsha; and Hupeh province at Yang-hsin.<sup>153</sup>

In 1171 during the spring and winter, there was a drought in Chêhkiang, Hunan, Hupeh, Kiangsi and Kiangsu provinces in *China*. The land tax was remitted.<sup>165</sup>

**1172 A.D.** In *Ireland*, “great floods destroyed numbers of men.”<sup>47, 92</sup>

There was a terrible tempest of thunder and lightning with a hurricane in *Britain* and *France*.<sup>72</sup>

After Christmas in the year 1172, there was a great mortality in *Ireland*. As a result, King Henry II was forced to quit the country.<sup>212</sup>

In *Germany*, great floods on the Rhine River.<sup>47, 72, 92</sup>

In 1172, there was a great inundation on the Rhine River.<sup>72</sup>

[In *Europe*], the winter was so mild that the trees remained covered with green foliage. Towards the end of January, the birds were nesting and in February, they were having their young. There were also large

storms and much rain. In January, there was often thunder, and the fire from heaven damaged many houses and churches.<sup>62</sup>

The winter of 1172 was an extremely mild winter [in *France*]. In late January in *Belgium*, there were leaves on the trees. By mid-February, the birds had built their nest and their eggs hatched.<sup>173</sup>

In 1172, a severe drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang, Kiukiang, Kao-an, and Ch'ing-chiang and Hupeh (now Hubei province) in central *China* at Yang-hsin.<sup>153</sup>

In 1172 during the summer, there was a drought of long duration in Chêhkiang, Chihli, Fuhkien, Kiangsu, Shansi, Shantung and Shensi provinces in *China*.<sup>165</sup>

In 1172, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 25 May and 22 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Kan, Ta-yü, Nan-ch'ang, Chi-an, Kao-an, and Ch'ing-chiang. Houses, city walls and crops were damaged by the floodwaters.

— During the period between 23 June and 22 July, floods struck Szechwan (now Sichuan province) in southwest *China* at Yüeh-shan, Mei-shan, Ch'iung-lai, Kuan, and Chin-t'ang.

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**1173 A.D.** In Holland [now *the Netherlands*], a great flood considerably extended the limits of the Zuyder-zee.<sup>47, 92</sup> [Zuyder-zee or Zuiderzee at the time was a shallow bay of the North Sea in the northwest region of the Netherlands. Today the Zuyder/Zuiderzee as such no longer exists. It is now two Lakes. After centuries of North Sea storm surges that breached barrier dunes and dikes, it is now enclosed by a 32 kilometer dam wall, the Afsluitdijk. This was constructed in the aftermath of the flood of January 1916. At its completion in 1932, the Zuiderzee became the IJsselmeer Lake, enabling large areas of water to be reclaimed for farming and housing. Then in 1975, the IJsselmeer Lake was split in two by the completion of the Houtribdijk, now called Markerwaarddijk, 28 kilometers long creating the Markermeer Lake and making it hydrologically separate from the IJsselmeer Lake. The province of Flevoland was created in 1986 from the polders reclaimed from the IJsselmeer. Polders are low-lying tracts of land enclosed by embankments (barriers) known as dikes.]

In January 1173, there were frequent thunder and lightning, which damaged houses and churches.<sup>72</sup>

There was a terrible thunder and lightning storm [in *England*] that was fatal.<sup>72</sup>

In 1173 during the period between 6 March and 13 April, a drought of long duration engulfed several areas of *China*. The drought caused crop damage. The region affected included:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing, Ningpo, Taichow, Ch'ü, Chien-tê, Wên-chou, Li-shui, and Chin-hua.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.

— Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng and Kuang-tê.

— Kiangsi (now Jiangxi province) in southern *China*.

— Hupeh (now Hubei province) in central *China* at Chiang-ling.

In 1173 during the spring, there was a drought of long duration in Chêhkiang, Fuhkien, Hupeh and Kiangsi provinces in *China*.<sup>165</sup>

In 1173, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 12 June and 11 July, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking. Houses and fields were damaged by the floodwaters.

— During the period between 12 June and 11 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang, Chi-an, P'o-yang, Shang-jao, and Kiukiang. Houses and fields were damaged by the floodwaters.

— During the period between 12 June and 11 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chien-tê. Houses and fields were damaged by the floodwaters.

— During the period between 12 June and 11 July, floods struck Anhwei (now Anhui province) in eastern *China* at Kuei-ch'ih and Kuang-tê. Houses and fields were damaged by the floodwaters.

— During the period between 12 July and 10 August, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling.

**1174 A.D.** [In *France*] in the year 1174, the rain lasted from the Feast of St. John's [June 24] to the end of the year. There was a lack of wine and all fruits. The area around Metz in the Lorraine region of northeastern *France* experienced a flood.<sup>62</sup>

The year 1174 was a year of universal rains.<sup>72</sup>

In 1174, a drought engulfed several regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing, Ningpo, Taichow, Ch'ü, Chien-tê, Wên-chou, Li-shui, and Chin-hua.

— Hunan province in south-central *China* at Changsha.

In 1174, there was a drought in Chêhkiang, Hunan and Sze-ch'wan provinces in *China*.<sup>165</sup>

In 1174 during the period between 31 July and 28 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow. Dikes and fields were damaged. Over 630 families were flooded.<sup>153</sup>

**1175 A.D.** In 1174 the whole world was afflicted with cloudy corrupt air, which occasioned a most universal cough and catarrh [a disorder of inflammation of the mucous membranes], which was fatal to many. As a result in 1175, both *England* and the neighboring countries groaned under a grievous mortality of people, soon followed by a great dearth and famine.<sup>72</sup>

In 1175 in *England*, pestilence, followed by a great dearth.<sup>57, 91</sup>

In 1175 in *France*, there was a very great flood in November. The flood destroyed the farms and the seed.<sup>79</sup>

In 1175, the Seine River in *France* flooded several times.<sup>173</sup>

The summer rains in 1175 in northern *France* prevented the grain harvest of August and the grape harvest in autumn. There was disastrous overflow of several rivers, particularly the Seine River, around Christmas.<sup>79</sup>

In 1175 during the period between 17 September and 16 October, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow. During the same period of time, a drought engulfed Kiangsu province, Anhwei (now Anhui province) in eastern *China*, and Chekiang (now Zhejiang province) on the east coast of *China*.<sup>153</sup>

In 1175 during the autumn, there was a drought in Chêhkiang and Kiangsu provinces in *China*.<sup>165</sup>

**1176 A.D.** In Lincolnshire *England*, there was an inundation of the sea. This also struck Holland [now *the Netherlands*].<sup>47, 72, 92</sup>

In *England*, there was frost from Christmas to Candlemas.<sup>47, 72, 93</sup>

In *Wales*, a great famine and mortality [death].<sup>57, 91</sup>

In 1176, there was a great inundation of the sea in Holland and other marshes in Lincolnshire, *England*, which swallowed up much cattle and people. It took two days for the waters to return to their normal boundaries. It was constant hard frost and much snow from Christmas to Candlemas. At Easter, there was a terrible hurricane.<sup>72</sup>

[In *England*] there were many and great hurricanes during the year and a most temperate winter.<sup>72</sup>

In 1176 in northern *France*, a large frost stretched from December 13 to March 15.<sup>79</sup>

In the Novgorod Republic [now part of *Russia*] in the springtime, the Volkhov River flooded for five days.<sup>76</sup>

In 1176, a drought accompanied by a plague of locust engulfed several regions of *China* including:<sup>153</sup>

- Hopei (now Hebei province) in northern *China* at Ta-ming.
- Honan (now Henan province) in central *China* at Kaifeng.
- Shensi (now Shaanxi province) in central *China* at Sian.
- Shansi (now Shanxi province) in northern *China* at Tatung and Yang-ch'ü.
- Liaoning province located in the southern part of *China*'s northeast.

During the period between 5 February and 8 August, a drought engulfed the following regions of *China*:

- Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin.
- Honan (now Henan province) in central *China* at Loyang.
- Hupeh (now Hubei province) in central *China* at Chiang-ling.
- Kansu (now Gansu province) in northwest *China* at Chin-yang [uncertain name].
- Shensi (now Shaanxi province) in central *China* at Nan-chêng.

In 1176 during the spring, there was a drought in Chihli, Honan, Hupeh, Kiangsu, Shantung and Shensi provinces in *China*.<sup>165</sup>

In 1176, floods struck several regions of *China* including:<sup>153</sup>

- Chekiang (now Zhejiang province) on the east coast of *China* at Yü-yao and Hangchow where fields were damaged by the floodwaters; at Hu-chou and Chia-hsing where crops were damaged; and at Ch'êng.
- Anhwei (now Anhui province) in eastern *China* at Kuang-tê.
- During the period between 5 September and 4 October, floods struck Chekiang province at Taichow, Shao-hsing and Chin-hua.

**1177 A.D.** In 1177 [in *Western Europe*], the summer was very dry and very hot and the drought was so strong that the seeds were lost, and there were no grain or hay. The harvest began in August, and the wine was excellent.<sup>62</sup>

In 1177, the summer and harvest was so great a drought that the seed sown was lost. During the harvest, there were great rains, floods and shipwrecks. On the Feast of Saint Mary Magdalen [July 22], there was thunder and a storm, which laid [flattened] corn and killed birds. No corn [grain] or hay was harvested. On 3 December at night rose a most violent tempest. Their came a terrible hurricane with south-west winds which overthrew churches, houses, trees, etc. It was a most tempestuous stormy winter.<sup>72</sup>



[In *England*], all harvest sore rains.<sup>72</sup>

In 1177, a drought engulfed Hupeh (now Hubei province) in central *China* at Hsiang-yang.<sup>153</sup>

In 1177, there was a drought in Hupeh province in *China*.<sup>165</sup>

In 1177, floods struck several regions of *China* including:<sup>153</sup>

— Floods damaged dikes in Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chên-hai, Ningpo and Shang-yü. Also in Chekiang province, floods struck Yü-yao damaging dikes and drowning over 40 persons.

— During the period between 30 May and 27 June, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou and Nan-p'ing. Several thousand families were flooded.

— During the period between 27 July and 25 August, floods struck Honan (now Henan province) in central *China* at Fêng-ch'iu.

— During the period between 24 September and 23 October, floods damaged dikes in Chekiang province at Hangchow.

**1178 A.D.** There was a shower of great hail that killed men, sheep and goats. Later there was a tempest of thunder and lightning at York, *England*. On the Ides of January, the sea broke in on the marshes and drowned people, villages and cattle innumerable.<sup>72</sup>

In 1178, there was a drought in Quercy, *France* and a famine.<sup>173</sup>

In 1178, a drought engulfed several regions of *China* including:<sup>153</sup>

— Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow, Wu-chin, Chinkiang and Nanking.

— Szechwan (now Sichuan province) in southwest *China* at Mien-yang.

— Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng, and Kuang-tê.

— Kiangsi (now Jiangxi province) in southern *China*.

In 1178, there was a drought in Kiangsu province in *China*.<sup>165</sup>

In 1178, floods struck several regions of *China*. As a result of the hardship, the land tax was remitted. The regions affected include:<sup>153</sup>

— Fukien (now Fujian province) on the southeast coast of *China* at P'u-t'ien and Fu-ch'ing. Houses and granaries were damaged by the floodwaters and many people drowned.

— During the period between 18 June and 16 July, floods struck Fukien province at Ku-t'ien. Houses and fields were damaged.

— During the period between 17 July and 14 August, floods struck Kansu (now Gansu province) in northwest *China* at Wu-tu. The city walls were damaged by the floodwaters.

**Winter of 1178 / 1179 A.D.** In 1179 [in *Europe*] in the second week of January, the snow fell in abundance, a very strong and unpleasant frost ensued and lasted until mid-February, during the remaining part of this month and also in March and April a continuously blowing cold east wind was still palpable. Very large mortality among the cattle and sheep resulted from this cold.<sup>62</sup>

The year 1179 produced [in *Germany*] a cold winter and much snow that began on New Years day and lasted until Candlemas [2 February]. As the winter progressed, there were great floods that filled all the cellars in Wroclaw [now a city in *Poland*], such that one could go to many places [in the city] by boat. The flooding did great damage to bridges and mills. Due to this cold winter and large floods over 2,000



people perished.<sup>172</sup>

In 1179 in *England*, “Many floods from a most severe winter.”<sup>47, 72, 92</sup>

The *French* historians cite great mortality of animals due to cold during 1179.<sup>58, 80</sup>

There was a severe winter. There were several great inundations carrying down bridges, houses and people. On 5 January, there was terrible thunder and lightning with a hurricane and hail in Kent, *England*.<sup>72</sup>

**1179 A.D.** In *England* on the 5<sup>th</sup> of June, a hurricane struck *England* producing hail, thunder and lightning.<sup>57, 72, 93</sup>

In 1179, floods struck several regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou and Taichow. And at Yüen-ch’ing over 100 persons drowned.

— During the period between 6 May and 8 August, floods struck Chekiang province at Ch’ü.

— During the period between 8 August and 8 November, floods struck in Anhwei (now Anhui province) in eastern *China* at Hsüan-ch’êng; in Kiangsi (now Jiangxi province) in southern *China* at Kiukiang; and in Chekiang province at Wên-chou, Taichow, Hu-chou and Chia-hsing. Fields were damaged by the floodwaters.

**1180 A.D.** In 1180, floods struck Honan (now Henan province) in central *China* at Chi. During the period between 26 May and 24 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at I-ch’un and Fên-i. In Kiangsi province, the land tax was remitted.<sup>153</sup>

In 1180 during the period between 5 February and 6 May, a drought engulfed Hunan province in south-central *China* at Changsha. Then during the period between 27 April and 20 October, a severe drought engulfed many regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua and Shao-hsing.

— Kiangsi (now Jiangxi province) in southern *China* at Nan-ch’ang, Chi-an, P’o-yang, Shang-jao, Kiukiang, Kao-an, Lin-ch’uan, Ch’ing-chiang and Hsing-tzū.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking, Wu-chin and Chinkiang.

— Hupeh (now Hubei province) in central *China* at Chiang-ling, Ch’i-ch’un, Huang-kang, Hêng-yang and Yang-hsin.

— Anhwei (now Anhui province) in eastern *China* at Hsi, Kuei-ch’i, Ch’ien-shan, Ho and Wu-wei.

— Hunan province in south-central *China* at Ling-ling.

— Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Kuei-p’ing.

In 1180 during the spring, summer and autumn, there was a great drought in Anhwei, Chêhkiang, Hunan and Kiangsi provinces in *China*.<sup>165</sup>

In 1180, the winter [in *Germany*] was very mild, and as a result the grains and fruits ripened very early.<sup>172</sup>

**1181 A.D.** On 3 June in Novgorod [*Russia*], the Varangian church in the marketplace was set on fire by thunder at 10 o’clock in the evening, and the church of St. Ioan in Ishkovo was burnt. The same year a fire broke out in Slavno, from Kosnyatin’s, and two churches were burnt: that of St. Mikhail and that of the Holy Fathers, and many houses along the bank, even as far as the Stream.<sup>76</sup>

There was a general and great famine over *England* and *Wales*. There was terrible thunder and lightning on 16 August.<sup>72</sup>

In 1181, Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing experienced great flooding. Over 13,000 families flooded. Crops and dikes were damaged. Anhwei (now Anhui province) in eastern *China* at Hsi experienced flooding. Kiangsi (now Jiangxi province) in southern *China* at Kiukiang experienced flooding. During the period 12 August - 10 September, Chekiang (now Zhejiang province) on the east coast of *China* at Chien-tê experienced great flooding. Houses were damaged and 19,540 families flooded.<sup>153</sup>

During the period between 12 August 1181 and 6 January 1182, a drought engulfed many regions of *China*. As a result the land tax was remitted. These areas were also affected by floods. The regions affected by drought included:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China*.
- Chekiang (now Zhejiang province) on the east coast of *China*.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-yin and Yangchow.
- Honan (now Henan province) in central *China* at Loyang.
- Hupeh (now Hubei province) in central *China* at Chiang-ling.
- Szechwan (now Sichuan province) in southwest *China* at San-t'ai and Fêng-chieh.

In 1181 during the autumn, there was a drought in Chêhkiang, Hupeh, Kiangsi, Kiangsu and Sze-ch'wan provinces in *China*. This year also brought floods. The land tax was remitted.<sup>165</sup>

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**1182 A.D.** In 1182 during the period between 3 June and 30 August, a drought engulfed many regions of *China* including:<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Chiang-ling, An-lu, Hsiang-yang, Wuchang, Mien-yang, Hanyang and Ching-mên.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang.
- Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou, Li-shui, Chin-hua, Chiang-shan, Chên-hai, Hsiang-shan, Shang-yü and Chêng.
- Kiangsi (now Jiangxi province) in southern *China* at Chi-an, Ch'ing-chiang, Nan-ch'êng, Nan-ch'ang, Lin-ch'uan, Kao-an and I-ch'un.
- Hunan province in south-central *China* at Changsha.
- Szechwan (now Sichuan province) in southwest *China* at Chungking, Kuang-yüan, Lang-chung, Chung, Fou-ling, Ho-ch'uan, An-yüeh, Tzû-chung, Ch'ü, Wan, Nan-ch'uan, Kuang-an, and Liang-an.
- Honan (now Henan province) in central *China* at Pi-yüan and Hsin-yang.

In 1182 during the summer and autumn, there was a drought in Chêhkiang, Hupeh, Kiangsi and Sze-ch'wan provinces in *China*.<sup>165</sup>

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**1183 A.D.** In 1183 in *France*, an unusual drought was accompanied by great heat. It withered away in many places the rivers, springs and wells.<sup>79</sup>

During the summer of 1183 [in *France*], the weather was extraordinarily hot and dry.<sup>173</sup>

In 1183, there was a great famine severely afflicting both *England* and *Wales*.<sup>57, 91</sup>

In 1183 during the period between 5 February and 8 August, a drought engulfed many regions of *China* including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Loyang.
- Shensi (now Shaanxi province) in central *China* at An-k'ang.
- Hunan province in south-central *China* at Li.
- Szechwan (now Sichuan province) in southwest *China* at Nan-ch'uan.

- Hupeh (now Hubei province) in central *China* at Chiang-ling, Yang-hsin and Ching-mên.
- Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng, and Kuang-tê.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking and Chinkiang.
- Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing.

In 1183 during the spring and autumn, there was a drought in Chêhkiang, Fuhkien, Hupeh, Hunan, Kiangsu and Sze-ch'wan provinces in *China*.<sup>165</sup>

In 1183, floods struck many regions of *China* including:<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Hsiang-yang. Houses were flooded.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking and Chinkiang.
- Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng and Kuang-tê.
- Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo, Shao-hsing, Taichow, Ch-ü, Chin-hua, Chien-tê, Wên-chou, and Li-shui.
- Kiangsi (now Jiangxi province) in southern *China* at Chi-an and Sui-ch'uan. Houses were damaged by the floodwater. Many people drowned.
- During the period between 23 May and 21 June, floods struck Kiangsi province at Shang-jao. Houses and the marketplaces were damaged by the floodwaters.
- During the period between 20 August and 18 September, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hai-k'ang. Many people drowned.
- During the period between 19 September and 17 October, floods struck in Fukien (now Fujian province) on the southeast coast of *China* at Foochow and in Honan (now Henan province) in central *China* at Changsha. Over 890 families flooded.

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**1184 A.D.** On 7 June 1184 in northern *France*, frost burnt the [grape] vines and [grain] harvest.<sup>79</sup>

There was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

In 1184, floods struck many regions of *China* including:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking and Kiangsi (now Jiangxi province) in southern *China* at Kiukiang.
- During the period between 12 May and 9 June, floods struck Anhwei (now Anhui province) in eastern *China* at Ho. Houses and fields were damaged by the floodwaters.
- During the period between 10 June and 9 July, floods struck Kansu (now Gansu province) in northwest *China* at Wu-tu. Houses were damaged.
- During the period between 10 July and 7 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. Houses and crops were damaged by the floodwaters.
- During the period between 8 August and 6 September, floods struck in Anhwei province at Kuang-tê and Hsüan-ch'êng; in Kiangsu province at Nanking, Chinkiang, Soochow, Sung-chiang, and T'ai-ts'ang; and in Chekiang province at Hangchow, Chia-hsing, and Hu-chou.

During the period between 12 May 1184 and 1 April 1185, a drought of long duration engulfed several regions of *China* including:<sup>153</sup>

- Fukien (now Fujian province) on the southeast coast of *China*.
- Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea in the area south of Yang-ch'un.
- Kiangsi (now Jiangxi province) in southern *China* at Chi-an, Kan and Nan-ch'êng.
- Shensi (now Shaanxi province) in central *China* at Nan-chêng.
- Kansu (now Gansu province) in northwest *China* at Chin-yang [uncertain location] and Hsi-ho.

In 1184 during the summer and autumn, there was a drought in Fuhkien and Kiangsi provinces in

*China*.<sup>165</sup>

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**Winter of 1184 / 1185 A.D.** In 1184-1185 in *Germany*, there was a very severe winter. But the following year [1186] in January the weather was like the month of April. In February, there were beautiful spring days. At the end of May began the grain harvest. In August, there was the grape harvest.<sup>172</sup>

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**1185 A.D.** During the period between 12 May 1184 and 1 April 1185, a drought of long duration engulfed several regions of *China* including:<sup>153</sup>

- Fukien (now Fujian province) on the southeast coast of *China*.
- Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea in the area south of Yang-ch'un.
- Kiangsi (now Jiangxi province) in southern *China* at Chi-an, Kan and Nan-ch'êng.
- Shensi (now Shaanxi province) in central *China* at Nan-chêng.
- Kansu (now Gansu province) in northwest *China* at Chin-yang [uncertain location] and Hsi-ho.

In 1185, floods struck several regions of *China* including:<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Wuchang. Houses were damaged by the floodwaters.
- During the period between 29 June and 28 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua and Fu-yang. Houses and crops were damaged by the floodwaters.
- During the period between 27 August and 25 September, floods struck Chekiang province at An-chi. Houses and crops were damaged by the floodwaters and 1,000 persons drowned.
- During the period between 26 September and 24 October, floods struck Chekiang province at Hu-chou and Taichow.

In 1185, the winter [in *Northwestern Europe*] was severe.<sup>62</sup>

In December 1185, there was a hurricane with thunder and lightning.<sup>72</sup>

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**1186 A.D.** This year in *Germany* the winter was warmer than had known for a long time. The vegetation was very advanced. The harvest took place in May and the grape harvest in August. In *France*, the trees were blooming in the middle of winter.<sup>62</sup>

In 1184-1185 in *Germany*, there was a very severe winter. But the following year [1186] in January the weather was like the month of April. In February, there were beautiful spring days. At the end of May began the grain harvest. In August, there was the grape harvest.<sup>172</sup>

The year 1186 was "a strange year," in *Germany*. First there was a very mild winter in 1185-1186. Then in January 1186, the trees began to bloom. The chicken and forest birds laid eggs and hatched off in February. In May, the grains were harvested. In early August, the grapes in the vineyards were ripe, so they began to harvest grapes. There is much goods and [food] grown.<sup>172</sup>

In 1186 [in *France*], the harvest took place in May and the grape harvest for the wine in August.<sup>62</sup>

In 1186, there was an eclipse of the sun in *Poland* and *Russia* and the hottest winter that ever was felt in these parts. The harvest was in May and the vintage in August [the earliest harvest]. Then came a sweeping plague. In Corinthia, great swarms of locusts, with prodigious large bodies eat up all sorts of green vegetables, hence a barrenness of land, dearth, famine and pestilence.<sup>72</sup> [Corinthia may refer to the Duchy of Carinthia, which is today part of southern *Austria*, north *Slovenia* and northeast *Italy*]

In 1186, a drought engulfed Kiangsi (now Jiangxi province) in southern *China*. Then during the period between 15 September and 13 October, floods struck Honan (now Henan province) in central *China* at Chi.<sup>153</sup>

In 1186, there was a drought in Kiangsi province in *China*.<sup>165</sup>

**1187 A.D.** In *England*, there were great floods.<sup>47, 72, 92</sup>

There was a grievous and pestilent mortality of men and cattle in *England*. There were great floods and inundations.<sup>72</sup>

In 1187, a terrible famine struck *Europe*.<sup>155</sup>

The summer of 1187 was excessively hot causing a drought [in *France*]. The city of Chartres in northern France caught fire.<sup>173</sup>

In 1187 [in *Germany*], the winter lasted so long that spring planting was delayed until the end of May.<sup>172</sup>

In Novgorod [*Russia*], there was very terrible thunder and lightning. [The people] having come with crosses from St. Sophia to St. Michael's and singing nine hymns, the thunder and lightning struck and all the people fell, and the church caught fire, but by the mercy of God and by the prayers of St. Michael, there was no harm done to the church; but two men were dead.<sup>76</sup>

In 1187, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 11 April and 9 May, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Ch'ang-t'ing. Over 100 families flooded.

— During the period between 2 November and 1 December, floods struck Honan (now Henan province) in central *China* at Chi, Ch'in-yang, Mêng, and Chêng. The corvée was remitted. [Corvée, under the feudal system, is compulsory, unpaid labor demanded by a lord or king.]

In 1187 during the period between 9 June and 1 November, a drought of long duration engulfed several regions of *China* including:<sup>153</sup>

— Kiangsu (now Jiangsu province) on the east coast of *China* in the area south of Chin-kiang.

— Chekiang (now Zhejiang province) on the east coast of *China*.

— Kiangsi (now Jiangxi province) in southern *China*.

— Fukien (now Fujian province) on the southeast coast of *China*.

— Anhwei (now Anhui province) in eastern *China* at Fêng-yang.

In 1187 during the summer and autumn, there was a very severe drought in Chêhkiang, Kiangsu and Kiangsi provinces in *China*.<sup>165</sup>

**1188 A.D.** In *England*, there were inundations of the sea that “killed very much people and cattle.”<sup>47, 72, 92</sup>

On Sunday 6 July 1188, rose a tempest of wind, rain, thunder, lightning, and hail the size of pigeon's eggs. The sea overflowed its banks a great height and killed many people and cattle in *England*.<sup>72</sup>

[The summer of] 1188 produced extraordinary heat and droughts. In many places, rivers, springs and wells dried up. *France* also suffered another misfortune because of the multiple fires [that were spawned].<sup>62</sup>

The drought of 1188 in *France* produced similar effects as the weather of 1183. [It withered away in many places the rivers, springs and wells.]<sup>79</sup>

The heat and drought of 1188 in *France* completely dried up rivers, springs and wells. The dryness also led to a large number of fires at Tours, Chartres, Beauvais, Auxerre, Troyes, etc.<sup>79</sup> [Tours is located in central *France*. Chartres, Beauvais, Auxerre, Troyes are located in northern *France*.]

The summer of 1188 [in *France*] was extremely hot and dry. There were numerous fires.<sup>173</sup>

In 1188, there was a great scarcity of food in north of *Ireland*.<sup>57, 91</sup>

In 1188, a drought engulfed Anhwei (now Anhui province) in eastern *China* at Ch'ien-shan.<sup>153</sup>

In 1188, there was a drought in Anhwei province in *China*.<sup>165</sup>

In 1188, floods struck many regions of *China* including:<sup>153</sup>

— Anhwei (now Anhui province) in eastern *China* at Ho-fei. The city walls were damaged by the floodwaters.

— Hupeh (now Hubei province) in central *China* at Wuchang. Three thousand houses were damaged by the floodwaters.

— Hupeh province at Chiang-ling, An-lu, Mien-yang, and Hanyang.

— Hunan province in south-central *China* at Ch'ang-tê, Yüeh-yang, and Li.

— During the period between 28 May and 26 June, floods struck Anhwei province at Ch'i-mên. Houses and crops were damaged and many people drowned. During the same period, floods struck other regions of Anhwei province at Fêng-yang, Wu-wei, Shou and Hsü-i. Houses and crops were damaged by the floodwaters.

— During the period between 28 May and 26 June, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an and Kao-yu. Houses and crops were damaged.

— During the period between 26 July and 23 August, floods struck in Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou; in Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang, I-ch'un, Lin-ch'uan and Ch'ing-chiang; and in Chekiang (now Zhejiang province) on the east coast of *China* at Huang-yen where fields were damaged.

**1189 A.D.** A sore famine, and a very great mortality continued.<sup>72</sup>

In 1189 [in *England*], there was a great hurricane with thunder and lightning.<sup>72</sup>

In 1189, floods struck many regions of *China* including:<sup>153</sup>

— Fukien (now Fujian province) on the southeast coast of *China* at Ch'ang-t'ing. Fifteen hundred families were flooded and 3,000 persons drowned.

— Kiangsi (now Jiangxi province) in southern *China* at Fên-i.

— During the period between 18 April and 16 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hsin-ch'ang. Houses, fields and crops were damaged by the floodwaters.

— During the period between 17 May and 15 June, floods struck Hunan province in south-central *China* at Ch'ang-tê, Yüan-ling, Chih-chiang, and Ching.

— During the period between 16 June and 14 July, floods struck Kansu (now Gansu province) in northwest *China* at Wu-tu.

— During the period between 15 July and 13 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang.

— During the period between 15 July and 13 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Ho-tsê.



In 1189 at Tien Lake in *China*, there was a great wind, when two dragons were seen fighting, and the decorations of a neighboring temple were blown away; in an instant the dragons whirled over the top of the temple, and were visible far and near. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

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**1190 A.D.** In *England*, hail with thunder and lightning.<sup>57, 72, 93</sup>

There was a hurricane at Laudun in southern *France*.<sup>72</sup>

In December at Messina in Sicily, *Italy*, there was terrible thunder and lightning.<sup>72</sup>

In 1190, a drought engulfed Szechwan (now Sichuan province) in southwest *China* at Chungking; Hupeh (now Hubei province) in central *China* at Ch'i-ch'un; and Anhwei (now Anhui province) in eastern *China* at Kuei-ch'ih. During the period between 5 February and 8 August, a drought engulfed several regions of *China*.<sup>153</sup>

In 1190 during the summer, there was a drought in Sze-ch'wan province in *China*.<sup>165</sup>

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**1191 A.D.** The year 1191 was a damp year. There were heavy rains in Savoy, *France* near the western Alps. A landslide blocked the Romanche River in southeastern *France*.<sup>173</sup>

In 1191, there was a famine in East Riding of Yorkshire in *England*.<sup>212</sup>

In 1191, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 25 May and 23 June, a drought struck Chahar province (now eastern *Inner Mongolia*) at Dolonor and Chang-pei.

— During the period between 8 August and 8 November, a drought struck Honan (now Henan province) in central *China* at Kaifeng and Hopei (now Hebei province) in northern *China* at Ta-ming. This drought caused a famine.

— During the period between 18 December 1191 and 16 January 1192, a drought engulfed Szechwan (now Sichuan province) in southwest *China* at Tzū-chung, Chien-yang, An-yüeh, Jung and Fu-shun; Kansu (now Gansu province) in northwest *China* at Wu-tu, Ch'êng and Hsi-ho; Shensi (now Shaanxi province) in central *China* at Fêng; and Kiangsu (now Jiangsu province) on the east coast of *China* in the area east of the Huai River.

In 1191 during the summer and autumn, there was a drought in Anhwei, Chihli, Hunan, Kiangsu, Shantung and Sze-ch'wan provinces in *China*.<sup>165</sup>

In 1191, floods struck many regions of *China* including:<sup>153</sup>

— Fukien (now Fujian province) on the southeast coast of *China* at Ch'ang-t'ing. And at Ku-t'ien and Foochow houses and fields were damaged by the floodwaters.

— During the period between 27 March and 24 April, floods struck Fukien province at Ning-hua. Houses and fields were damaged and over 20 persons drowned.

— During the period between 25 May and 23 June, floods struck in Fukien province at Foochow and Chien-ou; in Szechwan (now Sichuan province) in southwest *China* at Ch'ung-ch'ing, Pei-ch'uan, Kuang-yüan, San-t'ai, Nan-ch'ung, Mien-yang, and Kuang-han; in Shensi (now Shaanxi province) in central *China* at Ning-ch'iang and Liao-yang; in Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an; and in Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hai-k'ang.



— During the period between 23 July and 21 August, floods struck in Shensi province at Liao-yang. Several thousand families were flooded.

**1192 A.D.** In the Novgorod [*Russia*], the church of the Holy Apostles in Kholm was burned down; set afire by thunder.<sup>76</sup>

In 1192 during the period between 12 June and 10 July, a severe drought engulfed Szechwan (now Sichuan province) in southwest *China*. As a result, the land tax was remitted.<sup>153</sup>

In 1192, floods struck many regions of *China* including:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking and Chinkiang.
- Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng, Kuang-tê, and Kuei-ch'ih.
- Honan (now Henan province) in central *China* at Loyang.
- Hupeh (now Hubei province) in central *China* at Chiang-ling.
- Kansu (now Gansu province) in northwest *China* at Ching-ch'uan.
- Anhwei province at Ch'ing-yang. Houses and fields were damaged by the floodwaters and many people drowned.
- During the period between 12 June and 10 July, floods struck Hunan province in south-central *China* at Ch'ang-tê. Houses and fields were damaged.
- During the period between 12 June and 10 July, floods struck Szechwan (now Sichuan province) in southwest *China* at San-t'ai. Houses were damaged by the floodwaters. The land tax was remitted.
- During the period between 10 August and 8 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow.
- During the period between 7 December 1192 and 4 November 1193, floods struck Hupeh province at Hsiang-yang.

In 1192 during the spring, summer and autumn, there was a great drought in Sze-ch'wan provinces in *China*. As a result, the land tax was remitted.<sup>165</sup>

**1193 A.D.** In 1193 in *England* and *France*, there was a famine that brought on a pestilential fever.<sup>212</sup>

In 1193, floods struck many regions of *China* including:<sup>153</sup>

- During the period between 7 December 1192 and 4 November 1193, floods struck Hupeh (now Hubei province) in central *China* at Hsiang-yang.
- During the period 3-31 May, floods struck Kiangsi (now Jiangxi province) in southern *China* at Shang-kao. Over 200 families flooded.
- During the period between 6 May and 8 August, floods struck in Kiangsi province at Kiukiang and Kan and in Hupeh province at Chiang-ling.
- During the period 1-30 June, floods struck in Kiangsi province at Kao-an. Houses and fields were damaged by the floodwaters. And at Chin-hsien where over 120 families were flooded.
- During the period 1-30 June, floods struck in Anhwei (now Anhui province) in eastern *China* at Fêng-yang. And at Shou, houses and fields were damaged. And at Kuang-tê and Hsüan-ch'êng, crops were damaged by the floodwaters.
- During the period 1-30 June, floods struck in Chekiang (now Zhejiang province) on the east coast of *China* at Chu-chi and Hsiao-shan where crops were damaged. Floods also struck Shao-hsing.
- During the period 1-30 June, floods struck in Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang.
- During the period 1-29 July, floods struck in Honan (now Henan province) in central *China* at Chi; in Hopei (now Hebei province) in northern *China* at Ta-ming, Ch'ing and Ts'ang; in Hupeh province at Yang-hsin where houses were damaged; and in Kiangsi province at Ching-an where over 320 families were flooded.

— During the period between 30 July and 28 August, floods struck Kiangsi province at Fêng-ch'êng, Ch'ing-chiang and Chi-an. At Ch'ing-chiang over 2,300 families drowned.

— During the period between 29 August and 26 September, floods struck Kiangsi province at Nan-ch'ang. Over 1,270 families drowned.

In 1193, a severe drought engulfed several regions of *China* including:<sup>153</sup>

— Szechwan (now Sichuan province) in southwest *China* at Kuang-an, Tzū-chung, Chien-yang, An-yüeh, Ch'ü and Ho-ch'uan.

— During the period between 29 August and 26 September, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking, Soochow, Sung-chiang and T'ai-ts'ang; Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng, Fêng-yang and Kuang-tê; and Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hu-chou.

In 1193 during the summer and autumn, there was a drought in Chêhkiang, Kiangsu and Sze-ch'wan provinces in *China*. In Sze-ch'wan, this was a great drought.<sup>165</sup>

### **1193 A.D. – 1196 A.D. France, Belgium and England. Famine**

In *England* and *France* there was a famine that led to pestilential fever. This lasted from 1193 to 1195.<sup>90</sup>

From great rains in *England*, most of the corn [grain] perished and was lost.<sup>72</sup>

From 1193 to 1196 in *England* and *France*, there was a famine occasioned by incessant rains. “The common people perished everywhere for lack of food; and on the footsteps of famine, the fiercest pestilence followed, in the form of an acute fever.”<sup>57, 91</sup>

In 1194, there was a famine in *France*.<sup>72</sup>

In 1195 and 1196, there was a famine for 4 years, from rain and floods; years together.<sup>72</sup>

In March 1196, there was a sudden and great inundation, which carried away many places, towns, villages and inhabitants. This year there was a terrible dearth in *France*, Flanders [now *Belgium*], and *England* from excessive and unseasonable rains from some years past. Hence an epidemic and acute fever. Most of the vulgar died of the famine; then came the plague. This dearth began some years before, and continued four years together. Quickly after the Octaves of Pentecost, began this great mortality, which was ushered in by long wars and famine. This fever of burning ague raged six months and vanished this winter. There was so great a mortality, that there not being living healthy persons enough to bury the dead. Funerals were neglected. The dead were thrown on heaps into pits made on purpose.<sup>72</sup>

**1194 A.D.** A violent storm almost desolated a great part of *Denmark* and *Norway*.<sup>40, 41, 43</sup>

There was great thunder, lightning, hail and rain at Beluata, which broke down all fruit-trees, vines and corn [grain]. Many villages were burnt down [from the lightning]. Another tempest struck at Laudun in southern *France*. So great a heat and drought at Thuringii, that in many places of their river, people walked over dry footed. There was a famine in *France*.<sup>72</sup> [Thuringii possibly the Medieval Duchy of Thuringia located now in central *Germany*.]

The year 1194 was remembered as a very warm and dry summer [in *Germany*]. The mills would not work because of a lack of water.<sup>172</sup>

The year 1194 was the driest year “without history” [in *France*].<sup>173</sup>

In 1194, there was a great flood in *China*. The Yellow River cut a new course to the sea.<sup>142</sup>

In 1194, floods struck many regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at An-chi, Taichow, Wên-chou, and Chien-tê.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Chinkiang, Wu-chin, and Chiang-yin.

— Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng.

— Hunan province in south-central *China* at Ch'ang-tê. Houses and fields were damaged by the floodwaters.

— During the period between 22 May and 19 June, floods struck in Kiangsu province at T'ai; in Anhwei province at Shih-tai and Kuei-ch'ih where houses were damaged and many people drowned; and in Kansu (now Gansu province) in northwest *China* at Ching-ch'uan where houses were damaged and many people drowned.

— During the period between 20 July and 17 August, floods struck Chekiang province at Tz'ü-ch'i. Houses and crops were damaged by the floodwaters. Many people drowned.

— During the period between 20 July and 17 August, floods struck Chekiang province at Shao-hsing, Hsiao-shan, Yü-yao and Shang-yü. Dikes and crops were damaged.

— During the period between 18 August and 15 September, floods due to heavy and protracted rains struck Chekiang province at Hangchow, Hsin-têng, Yü-chien, Fu-yang, and Yü-hang. Houses and fields were damaged by the floodwaters and innumerable people drowned.

— During the period between 18 August and 15 September, floods struck Honan (now Henan province) in central *China* at Yang-wu and Fêng-ch'iu. The autumn land tax was remitted.

In 1194 during the period between 5 February and 8 November, a severe drought engulfed several areas of *China*. As a result the land tax was remitted. The areas affected included Kiangsu (now Jiangsu province) on the east coast of *China*; Chekiang (now Zhejiang province) on the east coast of *China*; Kiangsi (now Jiangxi province) in southern *China*; Kiangsu province at Yangchow and Nanking; Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng and Kuang-tê.<sup>153</sup>

In 1194 during the spring, summer and autumn, there was a very severe drought in Anhwei, Chêhkiang, Kiangsi and Kiangsu provinces in *China*.<sup>165</sup>

*Also refer to the section 1193 A.D. – 1196 A.D. for information on the famine in France, Belgium and England during that timeframe.*

**1195 A.D.** The heavy rains in the month of February 1195 in *France* made the rivers overflow and occasioned much damage.<sup>79</sup>

The summer of 1195 was very wet [in *France*]. This was the first year of three rotten years [1195-1197].<sup>173</sup>

During the fall of 1195, a plague of locust struck *Europe*, [from *France*] to *Hungary*.<sup>173</sup>

In June, there was a hurricane [in *England*].<sup>72</sup>

[In *England*] there was excessive rains and most corn [grain] was lost.<sup>72</sup>

In 1195 during the period between 9 July and 7 August, floods due to a typhoon and heavy rains struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow. Houses and fields were

damaged and many people drowned. Then during the period between 8 August and 5 September floods struck at Huang-yen and Hangchow.<sup>153</sup>

In 1195 during the 7<sup>th</sup> moon, in the vicinity of Shanghai, *China*, there was great wind. The tide seaward destroyed the crops.<sup>166</sup>

*Also refer to the section 1193 A.D. – 1196 A.D. for information on the famine in France, Belgium and England during that timeframe.*

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**1196 A.D.** In *England*, there were great floods in March from rains.<sup>47, 72, 92</sup>

In 1196 and from some years past [in *England*], there was constant rain, dearth and death.<sup>72</sup>

On the 3<sup>rd</sup> of the Nones of November there was a hurricane.<sup>72</sup>

There was almost incessant rain for two months in 1196. This produced a terrible flood of the Rhône and Saône rivers in *France*.<sup>79</sup>

The waters of the Rhône River in *France* overflowed its banks and spread into the coastal plains, flooding everything in their paths. Several towns and villages sitting on the banks of the river were partially submerged and destroyed.<sup>61</sup>

In March 1196, the Seine River in Paris, *France* flooded for 16 days. The summer was very wet and this caused a scarcity [famine].<sup>173</sup>

In 1196 during the period 1-29 April, a drought engulfed *China*. During the period between 31 May and 27 June, a drought struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow. Then during the period between 8 August and 8 November, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo, Shao-hsing, Taichow, Chin-hua, Chien-tê, Wên-chou, Ch'ü and Li-shui.<sup>153</sup>

In 1196 during the spring and summer, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

*Also refer to the section 1193 A.D. – 1196 A.D. for information on the famine in France, Belgium and England during that timeframe.*

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**1197 A.D.** In 1197, the famine [in *England* and *France*] was still calamitous.<sup>72</sup>

The summer of 1197 [in *France*] was very wet and this caused a scarcity [famine].<sup>173</sup>

[In *England*], it rained three days together without ceasing.<sup>72</sup>

In 1197 during the period between 19 April and 18 May, a drought engulfed *China*. Then during the period between 19 April and 10 November, a severe drought engulfed Szechwan (now Sichuan province) in southwest *China*. As a result of the hardship, the land tax was remitted. Then during the period between 13 October and 10 November, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-shing and Chin-hua. Crops were damaged.<sup>153</sup>

In 1197 during the spring, summer and autumn, there was a great drought in Sze-ch'wan province in *China*. As a result, the land tax was remitted.<sup>165</sup>

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**1198 A.D.** About the Feast of John the Baptist [June 24], dew fell in *France*, as sweet as honey. In July, there was a grievous tempest and great hailstones, which broke down houses, woods, [grape] vines and corn [grain]. [In *England*] on 13 August, there was a tempest.<sup>72</sup>

In 1198 a cruel storm with high winds and water caused great damage to the marshlands in *Germany*.<sup>172</sup>

At the beginning of October 1198, Philip of Swabia, [from Bavarian *Germany*] in his disputes with Otho, arriving on the banks of the Moselle River, and found the waters lower than they had been for centuries.<sup>79</sup>

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### **1199 A.D. – 1202 A.D. Egypt. Famine**

In 1200 in *Egypt*, there was a famine of great severity for deficient rise of the Nile River.<sup>57, 91</sup>

There was a great dearth in *Egypt* from 1199-1202.<sup>83</sup>

In 1201 and 1202, there was a great famine in *Egypt*.<sup>173</sup>

[The flooding of the Nile River was the life-giving inundation which yearly fertilized the crops in *Egypt*. This annual flood generally peaked in September near Cairo. During the growing season (after the inundation had receded) the Egyptians planted their crops - around October and November - and tended to the fields. The Egyptians watered their crops using an irrigation system of canals or by bringing water to the fields in basins or by using the shaduf, to raise water from the river to the bank of the Nile. By the time the Nile reached its lowest level, some time around March or April, the crops would be ready for the harvest.]

The highest point reached by the annual inundation, and very rarely reached, is a little above nineteen cubits. In this case, much cultivable land remains so long submerged that the sowing cannot take place; and it is as barren as a desert for that year, while in some spots which are ordinarily dry, yielded a rare harvest. But at this level, the inundation is accompanied by a great destruction of dwellings and of livestock. When the rise reaches eighteen cubits, there is great rejoicing, for the produce is then sufficient for two years' consumption, after the government dues are paid. When it reaches sixteen cubits, there is enough produce for the wants of the year; and this was called, "the Sultan's flood," because then the Sultan claimed his taxes. Below sixteen cubits, there is more or less scarcity. In these cases the south wind has prevailed, whereas during the good years, the north winds prevailed. The cubit at the Nilometer [A Nilometer was an ancient structure used to measure the level of the Nile river during floods] at Elephantine Island was equivalent to 19½ inches. There were 28 digits in a cubit.<sup>83</sup>

The Nile River inundation peaked on 9 September 1199. It stood no higher than twelve cubits, twenty-one digits; and it then began to decline. [The lowest Nile peak ever known seems to have been that of 966, when the waters rose only to twelve cubits, seventeen digits; and the next lowest was in 1199, when it rose only four digits higher.] At this point it became obvious that *Egypt* was at the verge of a great famine; a wrath that could annihilate all the resources of life and all the means of subsistence. The price of provisions began to rise. The inhabitants of the villages and country estates began to relocate to the great provincial towns. Many Egyptians in large numbers began to flee to Syria, to Maghreb [North Africa], to Hedjaz [coastal region of the western Arabian Peninsula bordering on the Red Sea], to Yemen, to Mosul and Baghdad [Iraq], to the countries of Greater Khorasan [Iran, Afghanistan, Turkmenistan, Uzbekistan and Tajikistan], to the Greek empire, and to other parts of Africa.<sup>83</sup>

During the next flood season, on 4 September 1200, the peak reached fifteen cubits, sixteen digits. But the floodwaters began to drop almost immediately. This flood was referred to as a phantom inundation, a ghost that would appear as if in a dream and then immediately vanish. Only the level lands profited by this inundation. Only the lower provinces were sufficiently watered. But the famine had already taken a

vicious toll and the villages by this time were entirely emptied of cultivators and laborers. In many cases these watered lands remained untilled because the proprietors could neither provide the seed nor pay the expenses of cultivation. Of the fields, which were sown, many were laid waste by vermin, which devoured the seeds.<sup>83</sup>

During January 1201, the waters of the Nile River sank considerably and continued to fall until men and horses could ford the river in several places. On 20 May 1201, a powerful earthquake struck *Egypt* adding to the devastation. [The epicenter of the earthquake was in Syria and caused approximately 30,000 deaths throughout very wide area, from Sicily to Iraq and Anatolia to *Upper Egypt*. It is believed this earthquake actually took place on 20 May 1202. Thus this entire stream of famine events in this account may be offset by a year.] During the next flood season, the peak occurred on 1 September 1201 reaching a height of one digit under sixteen cubits. After two days at this height, the waters began to decline slowly, and to flow away very gradually.<sup>83</sup>

As the famine first took hold in 1199, the infinite number of people who fled to Cairo and Al-Fustat, *Egypt* experienced a frightful famine and mortality. They ate carrion, corpses, dogs and the dung of animals. As the famine grew very severe, they went even further; devouring little children. The commandant of the city tried to halt the practice by sentencing all who committed this crime [cannibalism] as well as anyone who ate the meat to be burned alive. [But the hunger drove the people.] In the space of a few days, as many as thirty women were burned alive, every one of whom had confessed that they had eaten several children. [But shortly after their execution their bodies disappeared, because the bodies of these “already cooked” criminals were in turn stolen and eaten. Therefore the authorities found it very difficult to stamp out the practice. Instead cannibalism] extended over all *Egypt*. The horror that was first associated with this crime ceased to be felt and people became indifferent and viewed it as an ordinary thing. There was not a single inhabited spot where the practice of eating human flesh did not become extremely common. Syene [Aswan], Kous, the Faioum [Faiyum], Mahalleh [Mahalla], Alexandria, Damietta, and all other parts of *Egypt*, witnessed these scenes of horror.<sup>83</sup>

At Cairo and Al-Fustat, and in the neighboring places; wherever one went, there was not a spot in which one's feet or one's eyes did not encounter a corpse, or a man in the agonies of death. Day by day, from one hundred to five hundred dead bodies were taken from Cairo, to be carried to the place where they might have funeral rites. At Al-Fustat the number of dead was incalculable. They were not buried, but merely cast out of the town. At last, there were not enough living left to carry away the dead, and they remained in the open air, among the houses and shops, or even in the interior of dwellings. You might see a corpse falling to pieces in the very place where a cook or a baker, or other tradesman, was carrying on his business.<sup>83</sup>

A traveler often passed through a large village without seeing a single living inhabitant. He saw the houses standing open, and the corpses of those who had lived there stretched out opposite one another — some decayed, and some recently dead. Very often, there was a house full of furniture, without any one to take possession of it. One could travel for several days together, and in all directions, without meeting a single living creature, nothing but corpse. A great mortality and pestilence happened in Faioum [Faiyum], in the province of Garbiyyeh [Gharbiyah], and at Damietta and Alexandria.<sup>83</sup>

Nor in many cases, did those that fled *Egypt* fair better. According to the testimony of a great number of witnesses, the road between Egypt and Syria was like a vast field sown with human bodies. It had become as a banquet-hall for the birds and wild beasts, which gorged themselves on their flesh; and the very dogs that these refugees had taken with them, to share their exile, were the first to devour their bodies. The inhabitants of the Hauf, (a district to the east of the Nile, below Cairo,) when they fled to Syria to find pasturage, were the first who perished upon this road; long as it is, it was strewn with their corpses, like locusts which have been broiled.<sup>83</sup>



[The death toll in the end was horrendous.] At Al-Fustat of the nine hundred machines for weaving mats; now only fifteen remained [A loss of 98%]. We have only to apply the same proportion to the other trades, which are carried on in that town; to the shopkeepers, bakers, grocers, shoemakers, tailors and other artisans. The numbers employed in each of these were reduced in the same proportion or greater than the mat weavers.<sup>83</sup>

At Maks [Izab al Maksa?] there was a hill on which human remains had accumulated in great quantity. Abdallatif [or Abd-ul-Latif was a celebrated ancient physician and traveler] estimated that there were twenty thousand corpses. When from the height he looked down, upon the place called the Basin, and which is a considerable hollow, we saw skulls, some white, some black, and others of a deep brown: they were in layers, and heaped up in such a quantity that they covered up the other bones: one would have said that there were only heads without bodies: and one might suppose that one saw melons which had been gathered, and which were thrown into a pile, as we heap sheaves upon a granary floor. Days later he returned to the same spot. The sun had dried the flesh: the skulls had become white, and they appeared like ostriches' eggs piled together.<sup>83</sup>

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**1199 A.D.** In *England*, there were serious floods from rain.<sup>47, 72, 92</sup>

[In *England*], the rains were often, great and heavy and produced great floods.<sup>72</sup>

In 1199 at the rise of the Teutonic Order, strong North Winds blew in *Prussia* for 12 years together, which was the cause of very great tempests. There were several heavy rains and great floods in many parts of *England*, which carried down Berwick Bridge, etc. with many houses and much people. On October last, there was frightful thunder. On 4 November, there was terrible thunder.<sup>72</sup> [Old *Prussia* during this time period consisted of *Poland*, east of the Vistula and southwest *Lithuania*, and the historical ethnographic region of *Lithuania Minor*. The Berwick Bridge spans over the River Tweed in Northumberland, northeast *England*]

In 1199 during the period between 27 May and 24 June, a drought engulfed *China*.<sup>153</sup>

In 1199 during the summer, there was a drought in *China*.<sup>165</sup>

In 1199, floods struck many regions of *China* including:<sup>153</sup>

— Kiangsi (now Jiangxi province) in southern *China* at P'o-yang, Shang-jao, Kiukiang, Lin-ch'uan, and Yung-hsiu.

— Chekiang (now Zhejiang province) on the east coast of *China* at Chien-tê, Ch'ü, and Taichow.

— Hupeh (now Hubei province) in central *China* at Yang-hsin.

— Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton.

— During the period between 8 August and 8 November, floods struck Chekiang province at Wên-chou, Chin-hua, Ch'ü, and Taichow. Houses were damaged by the floodwaters and many people drowned.

*Also refer to the section 1199 A.D. – 1202 A.D. for information on the drought and famine in Egypt during that timeframe.*

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**1200 A.D.** [In *England*], the winter was excessively cold.<sup>72</sup>

In 1200, *Ireland* was struck by a famine. In *Ireland*, “a cold foodless year”.<sup>57, 91</sup>

In the year 1200, there was a vague mention of a famine in *India*. But little is known of this event.<sup>156</sup>



In 1200, floods struck many regions of *China* damaging houses and crops. Areas affected were: <sup>153</sup>  
 — Anhwei (now Anhui province) in eastern *China* at Hsi.  
 — Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou and Nan-p'ing.  
 — Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ü, Chien-tê and Chin-hua.  
 — Kiangsi (now Jiangxi province) in southern *China* at P'o-yang and Shang-jao.

In 1200, during the period between 15 April and 14 May, a drought engulfed *China*. During the period between 15 May and 12 July, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow; Kiangsu (now Jiangsu province) on the east coast of *China* at Chiang-yin, Nanking, Wu-chin, Chinking, Yangchow, Huai-an, T'ung and T'ai; and Anhwei (now Anhui province) in eastern *China* at Ho. <sup>153</sup>

In 1200 during the spring and summer, there was a drought in Chêhkiang, Hunan, Hupeh and Kiangsu provinces in *China*. In Chêhkiang, this was a great drought. <sup>165</sup>

*Also refer to the section 1199 A.D. – 1202 A.D. for information on the drought and famine in Egypt during that timeframe.*

**1201 A.D.** On April 15, the church of St. Nikola in Gorodishche, *Russia* [near Novgorod] was burnt down by thunder; and the whole summer stood with rain. <sup>76</sup>

[In *England*], the spring had glutting and continual rains and very great floods. On 25 June and 10 July, there were great tempests of thunder, lightning, hail as big as eggs, and prodigious rains. This destroyed the corn [grain], cattle, people, meadows etc. and burning towns [from lightning strikes]. The rains continued from the Feast of Pentecost to the Feast of the Nativity of the Blessed Virgin [September 8], which not only hindered corn and fruits from ripening, but also rendered them mostly useless and unprofitable. A great dearth of animals followed, but chiefly of sheep. <sup>72</sup>

[In *England*] during the years 1201-1204, the long rains caused famine, dearth and great mortality. <sup>72</sup>

In 1201 during the period 2-31 July, a drought engulfed *China*. Then during the period 1-29 August, a severe drought struck many regions of *China* and as a result the land tax was remitted. The regions affected included: <sup>153</sup>

- Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow along with other parts of the province.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking, Huai-yin and Yanchow along with other parts of the province.
- Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng and Kuang-tê.
- Hupeh (now Hubei province) in central *China* at I-ch'ang and Ch'ang-yang.

In 1201 during the summer, there was a great drought in Chêhkiang, Kiangsu and Sze-ch'wan provinces in *China*. <sup>165</sup>

*Also refer to the section 1199 A.D. – 1202 A.D. for information on the drought and famine in Egypt during that timeframe.*

**Winter of 1201 / 1202 A.D.** [In *England*], this winter was severe beyond any in the memory of man for extreme cold, and long continuance. Frozen ale was sold by weight. It snowed for many days and was very deep. <sup>72</sup>

**1202 A.D.** [In *England*], after the frosts followed the like of tempests of thunder, lightning, rain, and hail as big as hen's eggs. This destroyed corn [grain], fruits, young cattle and horses, etc. As a result of the rains of 1201, a bad crop, and the corn for seed marred, there came a dearth.<sup>72</sup>

In 1202 in London, *England*, there was a great storm of hail and rain. In 1202 there “fallen grete reynes, and hailstones as gret as an eg, medlyd with reyn; where thorough trees, vines, cornes, all manner frutes, were moche destroid: and the people were sore abaysshed, for there were seyn foules fleyng in the eyre berynge in their bills brennyng coles, which brenden many houses.” [Translation: In 1202 there fell great rains, and hailstones the size of an egg, mixed with rain; where all the trees, vines, grains and all manner of fruits, were much destroyed: and the people were mortified, for there were seen fowls flying in the air bearing in their bills burning coals, which burned down many houses.] Another account gave this event as occurring in the year 1203. In London “there fel [fell] great raines [rains], thundrings [thunder], and hailes [hail] (stones as big as eggs), whereby many trees and corne [grain] were destroyed; and birds were seen flying in the ayre [air] with fyre [fire] in their mouthes [mouths], and to set fyre [fire] in houses and burn them.<sup>212</sup> [possible description of a tornado and damage from lightning storms]

[In *England*] during the years 1201-1204, the long rains caused famine, dearth and great mortality.<sup>72</sup>

All summer 1202 was troubled by storms, which delayed many fleets leaving from the Flemish ports of *the Netherlands* bound for the Third Crusade.<sup>79</sup>

In 1202 during the period between 5 February and 18 August, several regions of *China* were engulfed by a drought including:<sup>153</sup>

- Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hu-chou.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, T'ai-ts'ang and Nanking.
- Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng and Kuang-tê.
- Hunan province in south-central *China* at Changsha.

In 1202 during the spring, summer, autumn and winter, there was a very severe drought in Chêhkiang, Hunan and Kiangsu provinces in *China*. There was no snowfall during the winter.<sup>165</sup>

In 1202, floods struck several regions of *China* including:<sup>153</sup>

- Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou, Foochow, Ch'ang-t'ing, Hsia-p'u, Ku-t'ien and Nan-p'ing. At Chie-ou houses were damaged and over 60 persons drowned. At Hsia-p'u over 280 families were flooded. At Ku-t'ien houses were damaged by the floodwaters and over 270 persons drowned. At Nan-p'ing over 250 families were flooded and many people drowned.
- Szechwan (now Sichuan province) in southwest *China* at Lu.
- During the period between 21 July and 18 August, floods struck Fukien province at Shang-hang. Houses, fields and crops were damaged by the floodwaters and many people drowned.

*Also refer to the section 1199 A.D. – 1202 A.D. for information on the drought and famine in Egypt during that timeframe.*

**Winter of 1202 / 1203 A.D.** During the period between 8 November 1202 and 5 February 1203, a drought engulfed *China*.<sup>153</sup>

**1203 A.D.** [In *England*], there was a very sore famine. Multitudes of poor died. There were bad seasons.<sup>72</sup>

In *England* in 1203, there was a great mort [death] and famine from long rains.<sup>57,91</sup>

[In *England*] during the years 1201-1204, the long rains caused famine, dearth and great mortality.<sup>72</sup>

In *Ireland* in 1203, there was a great famine “so that the priests ate flesh meat in Lent”. [Christians during this time era abstained from eating meat during the Lenten period as a sacred obligation.]<sup>57,91</sup>

In 1203 during the period between 14 April and 10 July, a drought of long duration engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow. During the period between 13 May and 10 June, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking. Crops were damaged.<sup>153</sup>

In 1203 during the spring and summer, there was a drought in *China*.<sup>165</sup>

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**Winter of 1203 / 1204 A.D.** From late January to May in 1204, there was a continuous drought and a burning heat in summer. This season was very destructive to the fruits of the earth, and as a result a very large famine and mortality occurred in *England, France, Spain and Italy*.<sup>62</sup>

In April 1204, a famine still prevailed in *the North and the East*.<sup>72</sup>

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**1204 A.D.** In 1204, there was mortality [death]. In *Ireland*, a prodigious number [of people] perished. There was a general plague throughout *Europe*. In London, *England* alone, 200 were buried daily in the Charterhouse yard.<sup>212</sup>

In 1204 in *Italy*, the summer was extremely dry and hot.<sup>62</sup>

From late January to May 1204 in *France*, the heat and drought were unusual.<sup>79</sup>

In 1204 from February to April [in *France*], it was very dry.<sup>173</sup>

It did not rain or rained very little during the months of February, March and April 1204 in *France*. Hot weather followed three months of drought.<sup>79</sup>

In 1204, Auge and the neighborhood of Caen in northern *France* were almost submerged [by floodwaters].<sup>79</sup>

[In *England*] during the years 1201-1204, the long rains caused famine, dearth and great mortality.<sup>72</sup>

In 1204, there was a terrible great flood of water [in *Germany*]; the greatest since the birth of Christ. All marshlands were inundated and many people and livestock drowned. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

In 1204 during the period 2-30 May, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng and Hopei (now Hebei province) in northern *China* at Ta-ming. During the same time period, floods struck Kiangsi (now Jiangxi province) in southern *China*. During the period between 31 May and 26 August, a drought struck Kiangsi and Chekiang provinces and Kiangsu province south of Chinkiang. As a result, the land tax was remitted.<sup>153</sup>

In 1204 during the summer and autumn, there was a drought in Chêhkiang, Chihli, Kiangsi and Shantung provinces in *China*.<sup>165</sup>

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**Winter of 1204 / 1205 A.D.** A cold spell hit *England* on 14 January 1205. The River Thames froze. There was frost until March 22.<sup>28, 40, 41, 42, 43</sup>

During the winter of 1205, there was a severe frost [in *England*]. It began on 14 January and lasted until 22 March. “Wheate was sold for a marke [mark was currency equivalent to 160 pence] the quarter [quarter ton], which before was at 12 pence.”<sup>212</sup>

In *England* in 1205, there was frost from the 14<sup>th</sup> of January to 22<sup>nd</sup> March. “Frozen ale and wine sold by weight.” “In the seventh year of King John began a great frost, which continued till the 22<sup>nd</sup> March, so that the ground could not be tilled, whereof it came to passe, that in the summer following a quarter of [a ton of] wheat was sold in many places in *England* for a mark, which for the more part of the days of Henry II, was sold for 12*d.*, and a quarter of [a ton of] beans and peas for a noble, and a quarter of [a ton of] oats for 3*s.* 4*d.*, which were wont to be sold for 4*d.*”<sup>47, 93</sup>  
[*d.* = pennies; *s.* = a shilling worth 12*d.*; a mark worth 20*s.*; a noble was a gold coin worth 6*s.* 8*d.*]

In 1205, there was the greatest frost in *England* from January 14 to March 22 with deep snows. Frozen ale and wine were sold by weight.<sup>72</sup>

In 1204 or 1205 on the Nones of December began a most violent rigorous frost, which continued to 12 April. So the ground could neither be plowed nor sown. Hence there came a dearth. But there was the fertility and plenty from the little corn that was sown with difficulty. The frost killed much sheep and cattle with their young.<sup>72</sup>

The winter of 1204-05 was very harsh in *France*, Flanders [now *Belgium*] and *England*. In *England*, the cold of Christmas lasted until the vernal equinox [around March 20 or 21]. On the Continent (*Europe*) a great mortality of the animals, especially sheep and birds occurred. A famine followed this severe weather.<sup>62</sup>

The cold of 1204 in northern *France* surpassed everything we had seen in living memory.<sup>79</sup>

The winter of 1205 was very cold in Brittany and Normandy, *France* during mid-January to mid-March.<sup>173</sup>

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**1205 A.D.** In *England*, hail the size of ducks' eggs with thunder and lightning.<sup>72</sup> Much of the grain in the fields were destroyed.<sup>57, 93</sup>

In *England*, there were many lives lost, houses overthrown, and the grain in the fields destroyed, by hail as large as hens' eggs.<sup>40, 41, 43, 56</sup>

In 1205, there was a year of terrible thunder and lightning storm [in *England*] and a hurricane.<sup>72</sup>

The summer of 1205 was very hot [in *France*].<sup>173</sup>

In 1205 during the period between 6 May and 8 August, a drought engulfed *China*. Then during the period between 18 July and 11 December, a drought struck Kiangsu (now Jiangsu province) on the east coast of *China*; Chekiang (now Zhejiang province) on the east coast of *China*; Fukien (now Fujian province) on the southeast coast of *China* at Foochow; Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Kuei-lin.<sup>153</sup>

In 1205 during the period between 14 October and 13 November, floods struck several regions of *China* damaging houses and crops. The areas affected were:<sup>153</sup>

— Hupeh (now Hubei province) in central *China* at Chiang-ling and Hsiang-yang.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an and the area east of the Huai River.

— Anhwei (now Anhui province) in eastern *China* at Hsü-i.

In 1205 during the summer, there was a great drought in Chêhkiang, Fuhkien, Kiangsi, Kwangsi, Kwangtung and Sze-ch'wan provinces in *China*.<sup>165</sup>

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**1206 A.D.** The summer of 1206 was very hot [in *France*]. Many individuals suffered heat stroke during the first week of August. The harvest crops were good and beautiful.<sup>173</sup>

In 1206 there was a great flood of water in *Germany*. The Main River rose to 32 Ellen [74 feet, 22 meters]. The Rhine River destroyed certain protective dams and drowned several thousand men, women and children.<sup>172</sup>

In 1206 during the period between 8 June and 7 July, a flood struck Chekiang (now Zhejiang province) on the east coast of *China* at Tung-yang. Fields were damaged and many people drowned. Then during the period between 6 August and 4 September, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Hsing-tzū; Hunan province in south-central *China* at Changsha; and Hupeh (now Hubei province) in central *China* at Chiang-ling. As a result, the land tax was remitted.<sup>153</sup>

In 1206 during the autumn, there was a drought in Chêhkiang, Hunan, Hupeh and Kiangsi provinces in *China*. The land tax was remitted.<sup>165</sup>

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**Winter of 1206 / 1207 A.D.** A terrible flood succeeded by lightning and thunder in December 1206, brought a tremendous disaster. We do not recall ever having seen a similar flood. The Seine River in Paris, *France* broke three arches of the bridge “Petit Pont”. And all the streets of Paris were so flooded that they could only be accessed by boat.<sup>79</sup>

On 5 December 1206 in *France*, lightning and thunder accompanied abundant rainfall. These rains brought excessive floods.<sup>79</sup>

In December 1206, the greatest flood ever seen took place in *France*.<sup>72</sup> [Various accounts of this greatest ever seen St. Nicolas flood in *France* are also described in years 1207, 1208 and the Winter of 1209/1210.]

In *France* in December 1206 on the eve of the Feast of St. Nicolas [December 6], there were violent burst of lightning and thunder. Winds and a raging storm accompanied the rains of spring and summer and the cold winter.<sup>79</sup>

During the winter of 1206, there was a major flood in Paris, *France*. People travelled throughout the city by boat.<sup>173</sup>

A blizzard struck *England* on 27 January 1207. Many houses fell in. The storm left deep snowdrifts. In *Germany*, many travelers froze to death on the roads.<sup>28</sup>

On January 17<sup>th</sup> 1206 or 1207, about the middle of the night, there suddenly rose such a tempest of wind, as blew down many houses. The area was buried in snow and drifts. Many flocks of sheep and cattle were destroyed.<sup>72</sup>

In 1207, the River Thames in *England* was frozen for eleven weeks.<sup>29</sup>

In 1207, the frost in *Britain* lasted fifteen weeks.<sup>41, 42, 43, 47, 93</sup>

**1207 A.D.** In 1207 during the period between 1 March and 26 June, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hu-chou; and Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang and T'ai-ts'ang.<sup>153</sup>

In 1207 during the summer, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

In 1207, floods struck several regions of *China* including Kiangsu (now Jiangsu province) on the east coast of *China*; Chekiang (now Zhejiang province) on the east coast of *China*; Anhwei (now Anhui province) in eastern *China*; and Hupeh (now Hubei province) in central *China* at Wuchang and Hanyang.<sup>153</sup>

In 1207 during the reign of King John, a storm struck [*England*] with hailstones as big as hens' eggs.<sup>194</sup>

In 1207 or 1209 on St. Nicolas's Eve, there was a tempest of thunder and lightning and a great flood.<sup>72</sup>

**1208 A.D.** The summer of 1208 [in *France*] was hot. The [grape] vines flowered in May.<sup>173</sup>

In December 1208 in *France*, there were terrible rains and great floods, destroying bridges, houses etc. "Greatest ever seen in *France*."<sup>47, 92</sup>

In 1208 there were such terrible rains, thunder and hail, which killed men, destroyed [grape] vines, trees and corn [grain]. In December was the greatest inundation in *France* that the oldest of that age had seen, overthrowing bridges and buildings.<sup>72</sup>

There was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

In 1208 during the period between 6 May and 14 June, a drought engulfed the east coast of *China* at Kiangsu (now Jiangsu province) in the area south of Chinkiang and at Chekiang (now Zhejiang province). As a result, the land tax was remitted.<sup>153</sup>

In 1208 during the summer, there was a drought in Chêhkiang province in *China*. The land tax was remitted.<sup>165</sup>

**1209 A.D.** In 1209 during the period between 6 May and 31 August, a drought engulfed several regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hu-chou. The drought was severe.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, T'ai-ts'ang and Nanking.

— Anhwei (now Anhui province) in eastern *China* at Fêng-yang, Tang-t'u, Hsüan-ch'êng and Kuang-tê.

— Hupeh (now Hubei province) in central *China* at Chiang-ling.

In 1209, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 4 June and 3 July, floods struck Szechwan (now Sichuan province) in southwest *China* at Lien-chou [uncertain name Yün-lien]. The city walls, houses and fields were damaged by the floodwaters.



- During the period between 4 July and 1 August, floods struck Szechwan province at Sui-ning, Lang-chung and Chao-hua. Houses were damaged by the floodwaters at Chao-hua.
- During the period between 4 July and 1 August, floods struck Liaoning province located in the southern part of *China's* northeast at I.
- During the period between 4 July and 1 August, floods struck Kansu (now Gansu province) in northwest *China* at Hsi-ho, Ch'êng and Li. Granaries were damaged at Li.
- During the period 2-31 August, floods caused by a typhoon and heavy rain struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow. Over 2,280 families were flooded and many people drowned.

In 1209 during the summer, there was a drought in Chêhkiang, Hupeh and Kiangsu provinces in *China*. In Chêhkiang, this was a great drought.<sup>165</sup>

In 1209 or 1211 [in *England*] there was a terrible summer of thunder, heavy rains, severe winter and after it a dearth.<sup>72</sup>

**Winter of 1209 / 1210 A.D.** In *England*, there were great floods on St. Nicholas Eve (December 5), “after a tempest of thunder and lightning.”<sup>47, 92</sup>

On Saint Nicholas Eve [5 December] 1209, thunder and lightning causing many houses to be burnt, followed by very high floods, which caused great damage. Wind blew down houses and trees.<sup>72</sup>

In *England*, in the year 1209, the winter was long and severe and followed by a dearth.<sup>47, 93</sup>

In the year 1209 or 1211, there was a severe long winter in *England* followed by a dearth.<sup>72</sup>

In 1210, the frost was the hardest in *England* from 1 January to 1 March and a dearth followed.<sup>72</sup>

In *England* in 1209, there was a famine from a rainy summer and severe winter.<sup>57, 91</sup>

In 1209 or 1211, there were terrible thunders this summer, severe heavy rains, a stormy and cold winter, hence a scarcity and famine.<sup>72</sup>

A severe winter struck *England* in January 1210 and lasted into February. There were great deposits of snow.<sup>28</sup>

In the year 1210 in the beginning of January, a very severe frost began in *France*, which lasted about two months and the winter crop was spoiled for the most part, and the little that they reaped in some places in wheat, barely gave back as much as they had sown. This winter was very disastrous for the cattle.<sup>62</sup>

In 1210 in northern *France*, we experienced a very sharp frost at the beginning of January, which continued nearly two months. It prevented the sowing of the winter crops and destroyed many seeds sown.<sup>79</sup>

The *French* historians cite great mortality of animals due to cold during 1210.<sup>58</sup>

**1210 A.D.** In 1210 or 1212, in Perth, *Scotland*, there was a great flood from an overflow of Tay and Anan rivers: many houses washed down and people drowned. The king lost his youngest son and nurse in it; and twelve of the court ladies were drowned. The king and his brother with great difficulty escaped in a boat.<sup>47, 92</sup>

In 1210 or 1212, there were great floods in the Rivers Tay and Anan in *Scotland*. The city of Perth was overflowed [flooded] and most houses broke down and many people were drowned. The King lost his youngest son and nurse in it and twelve more of the court ladies. The King and his brother with great difficulty escaped in a boat. There was a strong frost from January to March whereby the grain sown was killed and it yielded not as much a crop as sown. People were afflicted with sundry diseases and many died. This was a sickly time.<sup>72</sup>

In 1210, there was an inundation in *Scotland*. At Perth, about the time of the feast of St. Michael, the flood carried off much of the harvest crops from the field. The water of the River Tay and the River Almond so swelled that the large bridge of St. John was overthrown. “William the King, David Earl of Huntingdon, the King’s brother, Alexander, the King’s son, with some of the principal nobility, went into a boat, and sailed quickly out of the town, otherwise possibly they might have perished.”<sup>212</sup>

In 1210 or 2012 [in *England*], there was a famine caused by last summer’s rain and winter’s frost.<sup>72</sup>

In 1210, floods struck a several regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Shao-hsing, Chien-tê, and Ch’ü. As a result, the land tax was remitted.

— During the period between 25 May and 22 June, floods struck Chekiang province at Chin-hua, Fu-yang, Yü-hang, Hai-ning, Chu-chi, Ch’un-an, and Hsin-têng. Houses and fields were damaged by the floodwaters and many people drowned.

— During the period between 25 May and 22 June, floods struck Anhwei (now Anhui province) in eastern *China* at Hsi. Houses and fields were damaged by the floodwaters and many people drowned.

In 1210 during the period between 23 June and 22 July, a severe drought engulfed Honan (now Henan province) in central *China* at Kaifeng and Hopei (now Hebei province) in northern *China* at Ta-ming.<sup>153</sup>

In 1210 during the summer, there was a great drought in Chihli and Shantung provinces in *China*.<sup>165</sup>

**1211 A.D.** In 1211, a drought engulfed Szechwan (now Sichuan province) in southwest *China* at Tzū-chung, An-yüeh and Ho-ch’uan; Honan (now Henan province) in central *China* at Pi-yüan; Hopei (now Hebei province) in northern *China* at Ta-ming; and Shansi (now Shanxi province) in northern *China* at Yang-ch’ü. The drought was severe in Hopei and Shansi provinces.<sup>153</sup>

In 1211 during the summer, there was a drought in Chihli, Shantung and Sze-ch’wan provinces in *China*.<sup>165</sup>

In 1211 during the period between 10 August and 8 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Tz’ü-ch’i. Houses and fields were damaged by the floodwaters and many people drowned. During the period between 9 September and 8 October, floods struck Chekiang province at Shao-hsing. Dikes and fields were damaged.<sup>153</sup>

[In *England*], there was a tempest and hurricane.<sup>72</sup>

**1212 A.D.** Early frost destroyed the harvest in Novgorod, *Russia* in 1212 A.D. Children were sold as slaves for bread.<sup>28</sup>

In Sicily *Italy*, there was an inundation from the sea, “thousands of people swept away by it.”<sup>47, 72, 92</sup>

In 1212 in Cathinna in *Sicily*, some thousands of people were swept away by an inundation of the sea. In *Italy* fell a shower of hail, each stone as large as a goose egg.<sup>72</sup> [Another account places the hailstorm in the year 1213.] In 1213 in *Italy*, hail like goose eggs.<sup>57</sup>

The year 1212 was very dry in *France*.<sup>79</sup>

The summer of 1212 [in *France*] was very dry. Throughout the rest of the year, the weather was dry.<sup>173</sup>

In 1212 during the period between 4 April and 2 May, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Yang-ch'ü and Tatung; Shensi (now Shaanxi province) in central *China* at Sian; and Honan (now Henan province) in central *China* at Kaifeng. Then during the period between 1-29 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chien-tê, Taichow, Chu-chi and Shao-hsing. Houses and fields were damaged by the floodwaters.<sup>153</sup>

In 1212 during the spring, there was a great drought in Shansi, Shantung and Shensi provinces in *China*.<sup>165</sup>

**1213 A.D.** The winter of 1213 was so long and hard before and after Christmas, that in Vienna, *Austria*, the river froze three times and could be crossed on the ice.<sup>79</sup>

In 1213 during the period between 22 May and 19 June, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Yang-ch'ü and Shensi (now Shaanxi province) in central *China* at Sian. During the period between 22 May and 17 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Chiang-ling, Hanyang and An-lu.<sup>153</sup>

In 1213 during the summer and autumn, there was a drought in Hupeh and Shensi provinces in *China*.<sup>165</sup>

In 1213, floods struck *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Yü-hang, Yü-chien and An-chi.

— During the period between 20 June and 19 July, floods struck Chekiang province at Ch'un-an. Houses and fields were damaged by the floodwaters. 180 li (60 miles) were flooded. Innumerable people drowned.

— During the period between 20 June and 19 July, floods struck Chekiang province at Chu-chi. Houses and fields were damaged by the floodwaters. Many people drowned.

**1214 A.D.** [In Novgorod, *Russia*] on 1 February, on Quinquagesima Sunday, there was thunder after morning service, and all heard it; and then at the same time they saw a flying snake [or dragon].<sup>76</sup>

The River Thames in *England* was so low between the tower and the bridges; that men, women and children waded over it. The water was only four inches (10 centimeters) deep.<sup>1</sup>

The River Thames in *England* was so low between the Tower and the bridge that women and children waded over it; owing to so great an ebb in the ocean that laid the sands bare several miles from the shore, which continued a whole day.<sup>5, 40</sup>

In London, *England*, the level of the water was so low in the River Thames that individuals waded through it at the Tower. The sea withdrew for several miles.<sup>28</sup>

In 1214 during the period between 9 July and 7 August, a drought engulfed many regions of *China*. During the same time period, floods struck Hopei (now Hebei province) in northern *China* at Mi-yün.<sup>153</sup>

In 1214 during the summer, there was a drought in *China*.<sup>165</sup>

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**1215 A.D.** In the English Channel there was a great hurricane off the coast of Calais, *France*. A number of the Norman nobility on their way to assist King John against the barons were wrecked.<sup>57</sup>

A powerful storm struck in 1215 on the coast of Calais, *France*. Hugh de Beauvais and several thousand foreigners, on their voyage to assist King John against the barons perished.<sup>90</sup>

In the Novgorod Republic [now part of *Russia*] during autumn, much harm was done; frost killed the corn [grain] crops throughout the district, but at Torzhok all remained whole. The Knyaz [prince] seized all the corn in Torzhok and would not let one cartload into the city [Novgorod]. And in Novgorod it was very bad. They bought one barrel [11½ pecks] of rye for ten grivnas [grivna is a circular ingot of silver], one of oats for three grivnas, a load of turnips for two grivnas. People ate pine bark and lime tree leaves and moss. Oh brothers, then was the trouble; they gave their children into slavery. They dug a public grave and filled it full. Oh, there was trouble! Corpses in the marketplace, corpses in the street, corpses in the fields; the dogs could not eat up the men!<sup>76</sup>

In 1215 during the period between 5 February and 24 September, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China*, Chekiang (now Zhejiang province) on the east coast of *China*, Anhwei (now Anhui province) in eastern *China*, and Fukien (now Fujian province) on the southeast coast of *China*. The drought was accompanied by a plague of locust. The drought was so severe that many springs dried up.<sup>153</sup>

In 1215 during the spring and summer, there was a drought in Anhwei, Chêhkiang, Fuhkien, Kiangsi and Kiangsu provinces in *China*.<sup>165</sup>

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**1216 A.D.** The winter in *Italy* was similar to the year 1133 A.D.<sup>1</sup>

The River Po in *Italy* was frozen to the depth of sixteen feet (4.9 meters).<sup>30</sup>

In 1216, the Po River in *Italy* froze.<sup>58, 80</sup>

In 1216, the Rhône River in *France* froze.<sup>58, 80</sup> - froze to a great depth.<sup>61</sup>

The Rhône River in southern *France* froze in 1216.<sup>79</sup>

In 1216, the Po River in *Italy* and the Rhône River in *France* froze to a great depth.<sup>60, 62</sup>

In the year 1216, the winter was very severe in *Italy*. The Po River froze to a depth of 15 Ellen (~ 34.5 feet or 10.5 meters). The wine in barrels in the cellars burst from freezing.<sup>62</sup> [The Elle is an old unit of German measurement. It is based on the length of the arm bone, which is generally 60-80 centimeters long. The length varied. In the North, the Elle was generally around 2 feet. In Prussia, it was generally 2 1/8 feet. In the South, it was 2 ½ feet.]

In 1216, there was a great flood that collapsed countries, swallowed up 10,000 people along with livestock and buildings. Prior to the flood of 1030, Helgeland, *Norway* had 9 parishes, but now only 2 remained.<sup>172</sup>

The great flood of February 1216 began the separation of the islands that exists today from the mainland. Even as early as the year 1000, there were on the *North Frisian* coast no islands. Only with recurrent

massive storm surges the islands were created. In 1216 Sylt and Fohr were separated. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

In 1216 during the period between 18 May and 16 June, floods struck several areas of *China*. Houses, fields and crops were damaged by the floodwaters. As a result, the land tax was remitted. The following regions were affected:

- Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Shao-hsing, Chien-tê, Chin-hua, Taichow, and Ch’ü.
- Kiangsi (now Jiangxi province) in southern *China* at Shang-jao and P’o-yang.
- Fukien (now Fujian province) on the southeast coast of *China* at Foochow, Lung-ch’i, Chin-chiang, and P’u-t’ien.

Then during the period between 17 July and 14 August, a drought engulfed *China*.<sup>153</sup>

In 1216 during the autumn, there was a drought in *China*.<sup>165</sup>

**1217 A.D.** The summer of 1217 [in *France*] was very hot.<sup>173</sup>

In 1217, floods struck Szechwan (now Sichuan province) in southwest *China* at Kuang-han and Ch’ung-ch’ing. During the period between 6 July and 3 August, floods struck Yunnan province in southwest *China* at Hui-tsê. During the period between 4 August and 2 September, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow. Then during the period 1-30 November, floods struck Chekiang province where houses were damaged by the floodwaters and many people drowned.<sup>153</sup>

In 1217 during the autumn, there was a drought in *China*.<sup>165</sup>

**1218 A.D.** In *England*, there was a great flood in the night in winter.<sup>47, 72, 92</sup>

On 17 November 1218 there was a terrible abnormal flood that inundated *North Friesland* houses and villages. One surmises that at that time the north shore at Lundenberger Harder [Lundenbergsand] was separated. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

In 1218, floods struck in Chekiang (now Zhejiang province) on the east coast of *China* at Wu-k’ang and in Kiangsi (now Jiangxi province) in southern *China* at Chi-an. Houses and crops were damaged by the floodwaters. People and cattle drowned. During the period between 25 June and 23 July, floods struck Chekiang province at Hu-chou. During the same time period, a drought engulfed many regions of *China*. During the period between 8 August 1218 and 5 February 1219, a drought engulfed Anhwei (now Anhui province) in eastern *China*; Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin, Chinkiang and Chiang-yin; Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou; and Anhwei province at Kuang-tê.<sup>153</sup>

In 1218 during the summer and autumn, there was a drought in Kiangsu province in *China*.<sup>165</sup>

**Winter of 1218 / 1219 A.D.** In the year 1218, a very severe frost began on 27 September 1218, which was very destructive. Seven days later another frost took the grapes, which had been harvested for the most part. On 27 October, it began to freeze, and the cold lasted, with intermittent snowfalls up to St. Nicholas (December 6). It continued so violent, that everything was frozen, the earth, the lakes, the rivers, and especially the Seine and Loire rivers in *France*. After a decline caused by the west wind brought us the cold north wind then suddenly there was very rough weather including snow and frost, which lasted until mid-March. Icy winds blew even after the thaw. Therefore, the fields in May, one

could only see an isolated grain on the stalks or weak shoots on the vines. In many places the land was worked over again and replanted.<sup>62</sup>

On 29 September 1218 in *France*, a heavy frost accompanied by snow, reigned for seven days and destroyed, at the time of harvest, most of the grapes. New snow and cruel freezing temperatures struck after the 30<sup>th</sup> of October, and persisted relentlessly until 6 December. People crossed the ice on our larger lakes and the largest rivers, including the Loire and the Seine rivers. The cold dampened somewhat with the arrival of winds from the south, but this did not last long with the sudden return of northerly winds. Then the frost and snow was continuous until the middle of March. Unbearable cold winds finally followed the killing frost, so that in the middle of May, the bare fields had barely a few ears, and the vines a few buds. In many places, the frost was so fatal that it forced them to plow and sow the fields twice.<sup>79</sup>

In 1218, large rivers in *France*, particularly the Seine and Loire Rivers were frozen and were crossed on the ice.<sup>62</sup>

During the winter of 1219, the Loire, Seine and Vienne rivers in *France* froze three times. Then the Seine River in Paris flooded. "The water was up to the second floor."<sup>173</sup>

In 1218 at the siege of Damyata [now Dumyat] in *Egypt* in winter, the east wind blowing, the Nile River swelled and did great damage to the besiegers.<sup>72</sup>

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**1219 A.D.** In October 1219 in Nordland, "The St. Lawrence Lake broke out and drowned 36,000 people besides cattle."<sup>47, 72, 92</sup> [Nordland likely refers to Noord-Holland, a province situated on the North Sea in the northwest part of the *Netherlands*. St. Lawrence Lake might refer to Lauwerszee.]

On St. Luke's [October 18], there was a tempest and hurricane out of the northwest that struck [*England*].<sup>72</sup>

[In *England*], the winter was terrible with thunder and continual rains and hurricanes.<sup>72</sup>

In 1219 in Nordland, 36,000 men perished by a sudden flood. St. Laurence's Lake surprisingly broke out emptying itself into the Ilora and Rhodon, through Gratianople, destroying many thousands of people, and marring much land. In *England* all winter there were frequent thunders, continual rains, violent hurricanes.<sup>72</sup> [Nordland likely refers to Noord-Holland, a province situated on the North Sea in the northwest part of the *Netherlands*. St. Lawrence Lake might refer to Lauwerszee.]

A storm on 16 January 1219 produced a large drowning primarily to the Dutch coast (*Friesland*), but also on the west coast of Schleswig-Holstein where some 10,000 people were drowned. The Saxon Chronicle speaks of a total of 36,000 deaths from this storm. The storm increased the depth of Jade Bay. Hail and storm surge accompanied the full moon, when there was virtually no tide. There was enormous damage to the existing dikes (at the time, there was still not a closed dam line of the coast).<sup>172</sup>

In 1219 in *France*, an impetuous west wind blew hard during the first months of March and April. In April, although it did not rain, the [river] waters swelled beyond measure, and ravaged for a month and half the surrounding countryside. In Paris, the Seine River invades a great number of houses where it was impossible to enter without boats. The unexpected flood even covered the Petit-Pont Bridge. It was still impassable during the first fortnight of May. Soon the rainy season began. The rains began on June 24 and continued without interruption until the following August. This unusual weather therefore delayed the grain harvest and the grape harvest. Then early frosts accompanied by large snowstorms brought about the ruin of the harvest of wine. Then the rains resumed again and continued, still tirelessly, along



with terrible floods, until February 1220. The floods submerged almost the entire city of Grenoble in southeastern *France*.<sup>79</sup>

In 1219 in *France*, westerly winds blew incessantly during the months of March and April. These were succeeded by long rains that lasted until the Feast of Saint John's. In mid-August, the weather produced extraordinary burst of lightning and thunder. During the last Monday of August, a hard frost withered [grape] vines. At the end of September, the weather produced cruel frosts, which lasted three weeks along with copious amounts of snow that stayed on the ground for several days. Sustained rainfall ended this year.<sup>79</sup>

In the year 1219, the wine had to endure the harshest adversity. When the grapes were flowering, it rained constantly. In the last days of August to the end of September, the usual harvest time came a frost that destroyed the grapevines. It was very cold for three weeks and the grapes could not ripen. A thick snow covered the ground for several days. As a result, almost all the wine was lost in the Kingdom of *France*.<sup>62</sup>

In 1219, floods struck in Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning and in Anhwei (now Anhui province) in eastern *China* at Ho-fei. Fields were damaged by the floodwaters.<sup>153</sup>

In 1219 during the period between 6 May and 8 August, a drought engulfed *China*.<sup>153</sup>

In 1219 during the summer, there was a drought in *China*.<sup>165</sup>

**1220 A.D.** In *Poland*, there were floods caused by constant rains.<sup>92</sup> In Friesland *the Netherlands*, there was an inundation in October.<sup>47</sup>

In 1220, there was a considerable inundation in Friesland.<sup>43</sup>

In 1220 or 1221 there were continual great rains all the summer in *Poland*. Hence there were so great floods. Many villages were swept away. The winter corn [grain] was lost and there was no sowing in the spring. A sharp horrid cold winter followed. Then came three years of famine and plague wherein myriads of people and cattle died. There was so great a mortality in foreign countries. The number of individuals that were well were not enough to take care of the sick and bury the dead. In cities, towns and villages the mortality was so great that sometime only three or four survived, yet these had multitudes of dead to bury.<sup>72</sup>

In 1220 during the period 2-30 July, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping. During the period between 30 August and 27 September, floods struck Honan (now Henan province) in central *China* at Pi-yüan and Têng. As a result, the land tax was remitted. Then during the period between 27 November and 26 December, floods struck Honan province at Loyang.<sup>153</sup>

In 1220 during the summer, there was a drought in Chihli province in *China*.<sup>165</sup>

**1221 A.D.** In *England*, the frost was severe.<sup>47, 93</sup>

In 1221, *England* experienced a rainy summer and a severe winter.<sup>72</sup>

In 1221 [in *England*], "during a violent tempest fiery dragons and flying spirits were seen careering through the air." [possible description of a tornado]

Beginning in 1221 and lasting 3 years until 1224 [in *England*], there was the sorest famine after incessant summer rains of 1221 and the severe frost.<sup>72</sup>

In 1221, a drought engulfed several regions of *China* including Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo, Shao-hsing, Taichow, Chin-hua, Ch'u, Chien-tê, Wên-chou and Li-shui; Kiangsi (now Jiangxi province) in southern *China*; and Fukien (now Fujian province) on the southeast coast of *China*. During the period between 26 March and 23 April, a drought engulfed *China*.<sup>153</sup>

In 1221 during the spring, there was a very severe drought in Chêhkiang, Fuhkien, Kiangsi and Kwangtung provinces in *China*.<sup>165</sup>

In 1221, floods struck in Shensi (now Shaanxi province) in central *China* at Liao-yang; in Kansu (now Gansu province) in northwest *China* at Ch'êng and Wu-tu; in Szechwan (now Sichuan province) in southwest *China* at Kuang-yüan; and in Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

**1222 A.D.** In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.<sup>1</sup>

Violent rain occurred in London, *England*. The storm threw down several churches.<sup>2</sup>

From 14 September to 10 February, there were terrible tempests of thunder, lightning, rain and dearth [in *England*].<sup>72</sup>

Lightning and thunder, so dreadful, as to throw down several churches in February 1222.<sup>43, 56</sup>

A violent rain occurred in London, *England*.<sup>40, 41 56</sup>

In *England* in the year 1222, high tides and continuous rainstorms did great damage.<sup>72, 92</sup> In the “seventh yeare of Henry III, on Holy Rood Day [September 14], was a great thunder and lightning tempest throughout all *England*, and such great floods of water followed with great winds and tempests, which continued till Candlemas [February 2], that the year following wheat was sold for 12 shillings, the quarter.”<sup>47</sup>

[In *England*] in April 1222, there was a prodigious snow, which broke down many trees. The frost that followed killed far more, so that in many places no leaves appeared on them that summer. There were no apples in most places. After this there was so great a drought that most late sown seeds died. On Holy Rood Day [September 14], there was a terrible and destructive thunder and lightning with profound rains, long and deluging floods. On November 30<sup>th</sup>, there was a tempest of thunder and lightning producing great damage to *England*. At the same time a great hurricane overthrew houses, trees. This storminess continued until Candlemas [February 2]. On 8 February at Grantham in Lincolnshire there was such thunder and lightning, as filled the church with a most offensive smell, that the people fled out of it. On the Day of the Exaltation of the Cross [September 14], there was thunder throughout all of *England*. There was a most shocking winter for thunder, lightning and hurricanes, which demolished many buildings as houses, churches, steeples, etc. These misfortunes caused a dearth of corn [grain] in 1223. On Saint Lucia Eve [12 December], there was a most destructive tempest of wind. The sea also rose with higher tides and springs than ordinary. Thunder killed many people chiefly in Warwickshire.<sup>72</sup>

The summer of 1222 was very hot [in *France*].<sup>173</sup>

In 1222 during the period between 11 June and 10 July, a drought engulfed Hunan province in south-central *China* at Yüeh-yang and Kiangsi (now Jiangxi province) in southern *China*. During the period between 9 August and 6 September, floods struck a couple regions of *China*. Houses, fields and crops were damaged by the floodwaters. The regions affected were: Chekiang (now Zhejiang province) on the east coast of *China* at Hsiao-shan, Ch'ü, Chin-hua, and Chien-tê and Anhwei (now Anhui province) in eastern *China* at Hsi. During the period between 7 September and 6 October, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping.<sup>153</sup>

In 1222 during the summer and autumn, there was a drought in Chihli and Hunan provinces in *China*.<sup>165</sup>

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**1223 A.D.** There was a succession of thunderstorms in *England*, which continued fifteen days with violent winds and terrific lightning; which did great damage.<sup>1</sup>

When a cloud burst at Islebia [now Eisleben in central *Germany*], the falling rain was so thick that many people were choked with its water.<sup>72</sup>

In 1223, a violent cattle plague struck *England, Austria, Italy* and *Germany*.

In 1223 during 1-29 June, floods struck several regions of *China*. Houses and crops were damaged by the floodwaters and many people drowned. The regions affected were:

- Hupeh (now Hubei province) in central *China* at Chiang-ling and Wuchang.
- Szechwan (now Sichuan province) in southwest *China* at Ch'ung-ch'ing.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Huai-an and Wu-chin.
- Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Chia-hsing.
- Anhwei (now Anhui province) in eastern *China* at Kuei-ch'ih, Tang-t'u and Kuang-tê.

Then during the period between 8 August and 8 November, floods struck Chekiang province at Yü-hang and Hangchow and Fukien (now Fujian province) on the southeast coast of *China* at Foochow, Lung-ch'i, Chin-chiang and P'u-t'ien. Crops were damaged.<sup>153</sup>

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**1224 A.D.** In the Novgorod Republic [now part of *Russia*], there was terrible thunder on May 20, the Day of St. Falalei; the Church of the Holy Trinity was burnt down, and two men fell dead.<sup>76</sup>

The rains that fell in April, May, June and July 1224, completely destroyed the nuts and grains in *France*.<sup>79</sup>

In 1224 in *France*, there was so much rain mixed with winds and clouds, from April to August, that the wheat and nuts died penniless. The harvest in turn was reduced to almost nothing by the frosts of autumn. Then came a winter with so rough and violent a wind that it threw down the towers of churches in many locations.<sup>79</sup>

[In *Western Europe*] in 1224, the heat of the summer was so strong that the grain dried up. Violent winds prevailed during the entire month of August, completed the devastation of the fields.<sup>62</sup>

In *England* in 1224, there was a very dry winter and bad time for seeds; whence followed a great famine.<sup>57, 91</sup>

In *England*, there was a great drought.<sup>47</sup>

On 18 October 1224 in London, *England*, there was a great windstorm (hurricane/tornado) that caused significant damage. In "1224, in this yere, upon Seynt Luke's day [October 18] there blew a gret wynd out of the north, whiche caste downe manye houses, steples, and torrettes of chirches, and turned up so

downe trees in wodes and in orchardes; at which tyme fyry dragons, and wykkes spirytes, grete noumbre, were seyn openly fleying in the eyre.” [In 1224 in this year, upon Saint Luke’s day [October 18], there blew a great wind out of the north, which cast down many houses, steeples, and turrets of churches, and turned upside down trees in the woods and in orchards; at which time fiery dragons, and (weak?) spirits, in great number, were seen openly flying in the air.]<sup>212</sup> [In early times, when events happened that defied logical explanation, they were sometimes attributed to mythical creatures. It was common in China to describe tornadoes as dragons. The roar of a tornado became the roar of a great dragon. The debris picked up through the tornado’s funnel cloud and thrown miles away became spirits flying through the air. Only a great dragon could swoop down from the top of a cloud and instantly cause great devastation by uprooting or breaking massive oak trees in two or utterly destroying homes and buildings and then as quickly as they appeared, they disappear.]

In November 1224, there was a terrible thunder and lightning storm [in *England*] that lasted for 15 straight days.<sup>72</sup>

There were several great rains and thunders, hailstones as big as eggs. These destroyed trees, [grape] vines, corn [grain] etc. In *England*, there were terrible hurricanes. There were great tempest, destruction of corns, trees and buildings and shipping. Yet there was so great a drought in winter, as hindered sowing of corn; hence a scarcity.<sup>72</sup>

In 1224 during the period between 20 May and 18 June, floods struck a couple regions of *China* including:<sup>153</sup>

— Fukien (now Fujian province) on the southeast coast of *China* at Foochow. Several hundred families were flooded and many people drowned. It also struck Chien-ou and Nan-p’ing.

— Szechwan (now Sichuan province) in southwest *China* at Hsi-ch’ang. Houses and crops were damaged.

**Winter of 1224 / 1225 A.D.** The winter stretched from St. Denis (9 October) until the feast of St. Mark’s (25 April) and was very severe. "A violent wind struck down the harvest and also tore down church steeples in several places in *France* and *Normandy*. A very strong famine prevailed in the whole continent (*Europe*) but particularly in Flanders [now *Belgium*], but we have, thank God, not heard that any man had died because of it."<sup>62</sup>

At the extreme of coldness of 1224 in northern *France*, joined a violent wind, which uprooted the crops in several places and overthrew the towers of churches.<sup>79</sup>

The winter of 1225 was very cold and unusually long [in *France*]. The frost lasted from 9 October until 25 April. The storms in *Normandy* were so fierce that church towers fell.<sup>173</sup>

There was a long and severe winter in 1225, followed by an unparalleled famine, fatal to many. A great death of sheep in *England*.<sup>72</sup>

In 1223 or 1225 [in *England*], there was a great and deep snow. It snowed many days and began on 14 January.<sup>72</sup>

**1225 A.D.** In 1225 [in *England*], there was a famine and dearth from last year’s summer rain and winter drought, that prevented sowing.<sup>72</sup>

In 1225 during the period between 8 June and 6 July, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping. During the period between 6 August and 3 September, floods struck Anhwei (now Anhui province) in eastern *China* at Ch’u.<sup>153</sup>

In 1225 during the summer, there was a drought in Chihli province in *China*.<sup>165</sup>

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**1226 A.D.** The Rhône River in *France* overflowed its banks and combined with the effects of war caused great destruction to the fortified city and the people of Avignon in southeastern *France*. This unfortunate city had, like the Count of Toulouse embraced the cause of the Albigenses. Louis VIII came with a considerable army to besiege Avignon in the beginning of the year 1226. This siege lasted three months until the city capitulated. Louis VIII forced the Avignonais to raze the walls that protected their city against foreign enemies. The flooding began a few months after this siege. The Rhône River overflowed its banks on September 17<sup>th</sup>. The floodwaters found no obstacle (city walls) to block it from entering the city, spread with strength to the lower parts of the city. It caused great damage and added to the misery of the people.<sup>61</sup>

The extreme drought in the year 1226 brought about the ruin of almost all the summer crops. The fall of 1226 also proved hot and dry. Across *France*, this dry heat produced a prodigious quantity of wine.<sup>79</sup>

The summer of 1226 [in *France*] was hot and dry causing a drought. The wines were wonderful. The autumn was also dry.<sup>173</sup>

In 1226, snow fell in *Syria*. In *England*, there was a terrible hurricane with a north wind.<sup>72</sup>

In 1226 during the period between 28 April and 27 May, a drought engulfed Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 1226 during the spring, there was a drought in Shensi province in *China*.<sup>165</sup>

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**Winter of 1226 / 1227 A.D.** The frost in *England* in 1226 was severe and snow.<sup>47, 93</sup> Severest frost and snow.<sup>72</sup>

In January 1227, thick sea ice on the *Baltic Sea* allowed a German Army of Monks (Livonian Brothers of the Sword) to march from the mainland of *Estonia* to the islands of Muhu and Saaremaa and to capture these islands.<sup>34</sup>

In *France*, a very heavy frost and dry clear weather, preceded by a warm, dry autumn reigned continuously from 1 November 1226 to 5 February 1227 and killed the olive trees.<sup>79</sup>

The winter of 1227 was very dry and cold and lasted till February [in *France*].<sup>173</sup>

The winter of 1226-27 was dry and very cold in *France*. The drought lasted until February 1227.<sup>79</sup>

The frost lasted from 1226 in northern *France*, in clear weather and dry, since the first days of November until 5 or 6 February.<sup>79</sup>

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**1227 A.D.** In *Ireland* in 1227, there was a great famine throughout the country.<sup>57, 91</sup>

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**1228 A.D.** In Friesland [*the Netherland*], an irruption of the sea caused 100,000 people to drown.<sup>47, 92</sup>

In 1228 in Friesland [*the Netherlands*], the sea overflowed its banks, demolished towns, churches, castles innumerable, and drowned over 100,000 people. In *England* there were terrible thunder and lightning all summer, ruining houses, killing man and beast. The summer was so hot that the harvest was fully ended by midsummer. During the harvest there were excessive rains.<sup>72</sup>

[In *Europe*], the summer of 1228 was very hot. The harvest was all finished by the Feast of Saint John (24 June). In *England*, lightning killed many people and animals.<sup>62</sup>

The summer of 1228 was hot [in *France*].<sup>173</sup>

In 1228, there was a very mild winter and spring [in *Germany*]. In April the grape vines bloomed. The grape harvest was over before the feast of John [the Baptist]. In late July, the grapes were ripe.<sup>172</sup>

There was a terrible thunder and lightning storms along with meteors all summer [in *England*].<sup>72</sup>

In 1228 [in *England*] after a rainy harvest followed by a frost, the heavens had fiery flames all winter.<sup>72</sup>

In 1228 [in *England*], all summer was terrible with thunder and lightning, killing man and beast; in harvest there was incessant rains; and in winter a hard frost.<sup>72</sup>

In 1228 [in *England*], there was great and deep snowfalls that lay on the ground for a long time.<sup>72</sup>

In the Novgorod Republic [now part of *Russia*] during autumn, great rains came down day and night. From our Lady's Day [the Assumption – 15 August] until St. Nicholas Day [19 December] we saw not the light of day. People could not get the hay nor do the fields. Also there was great flood in the Volkhov. Around the lake and along the Volkhov River, [the flood waters] carried away the hay. Then the lake froze and the ice stood for three days, a south wind drove it up and having broken [the ice] carried it into the Volkhov River, tore away nine stays of the great bridge, and carried down eight by night to the Pitba stream on St. Nicholas Day, and the ninth [stay] was carried away on 8 December, St. Potapi Day.<sup>76</sup>

In 1228 during the period between 31 August and 29 September, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping.<sup>153</sup>

In 1228 during the summer, there was a drought in Chihli province in *China*.<sup>165</sup>

**1229 A.D.** In 1229 the winter was severe. The frost was so severe and hard, that horses, draughts and carriages went on the ice. After that there was a great snow, which covered the ground many days.<sup>72</sup>

In 1229 during the period between 19 September and 18 October, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow.<sup>153</sup>

**1230 A.D.** A great famine consumed *Russia*. For what is there to say, or what to speak of the punishment that came to us from God? Of the bitter and sad memory of that spring! How that some of the common people killed the living and ate them; others cutting up dead flesh and corpses ate them; others ate horseflesh, dogs and cats. Those found who committed such acts were punished — some they burned with fire, others they cut to pieces, and others they hanged. Some fed on moss, snails, pine-bark, lime-bark, lime and elm-tree leaves, and whatever each could think of. And again other wicked men began to burn the good people's houses, where they suspected that there was rye; and so they plundered their property. Instead of repentance for our wickedness, we became more prone to wickedness than before, though seeing before our eyes the wrath of God: the dead in the streets and in the market-place, and on the great bridge, being devoured by dogs, so that they could not bury them. They put another pit outside at the end of Chudinets Street, and that became full, and there is no counting [the number of bodies in it]. And they put a third at Koleno beyond the Church of the Holy Nativity, and that likewise became full, there was no counting the bodies. And seeing all this before our eyes we should have



become better; but we became worse. Brother had no sympathy with brother, nor father with son, nor mother with daughter, nor would neighbour break bread with neighbour. There was no kindness among us, but misery and unhappiness; in the streets unkindness one to another, at home anguish, seeing children crying for bread and others dying. And we were buying a loaf for a grivna [a circular ingot of silver] and more, and a fourth of a barrel of rye for one silver grivna. Fathers and mothers gave away their children into servitude to merchants for bread. This distress was not in our land alone, but over the whole *Russia* province except Kiev alone. And so has God rewarded us according to our deeds.<sup>76</sup>

In the Novgorod Republic [now part of *Russia*], on the Day of the Exaltation of the Honourable Cross (September 26), a frost killed the crops throughout our district and from that there arose great misery. We began to buy bread at eight kunas, a barrel of rye at twenty grivnas [a grivna is a circular ingot of silver], or at twenty-five in the courts, wheat at forty grivnas, millet at eight, and oats at thirteen grivnas; our town and our country went asunder and other towns and countries became full of our own brothers and sisters; and the rest began to die. And who would not weep at this, seeing the dead lying in the streets, and the little ones devoured by dogs? Vladyka Spiridon put a common grave by the Church of the Holy Apostles in Prussian Street and engaged a good and gentle man by name Stanila to carry the dead on horses wherever he went about the town and so continuously he dragged them every day; and filled it up to the top; there were 3,030 corpses in it.<sup>76</sup>

In 1230 (the 2<sup>nd</sup> year of Kwanki) there were universally poor crops in the country of *Japan*. Starved corpses lay uncared for along the roads. Poor people, hard pressed for a living, sold their wives and children. In extreme instances, not a few men sold themselves as slaves. Whereupon, with the idea of meeting the extraordinary situation with an extraordinary method, the sale of the human body was publicly permitted. That it was permitted to those who saved starving men and women to make them their slaves was noted in the order of the Shogunate Government, dated April 17<sup>th</sup>, 1228 (1<sup>st</sup> year of Sho-o) as recorded in a compilation of Government orders.<sup>85</sup>

On 25 June 1230 after dark, there was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

In *Italy*, there was a great overflow of the Tiber River, which overflowed the low city; and floods in *France*.<sup>47, 72, 92</sup>

In 1230 in Rome, *Italy*, there was a famine after a deluge of the Tiber River.<sup>57, 72, 91</sup>

In *Italy* in 1230, the Tiber River overflowed, so that it reached to the stairs of Saint Peter's Church. The lower city was drowned. Then followed such a famine that scarce one in sixteen persons survived. In July and August it was so burning hot that men roasted eggs in the sand.<sup>72</sup>

**1231 A.D.** On 25 January 1231, suddenly there fell a very great darkness over London, *England* and with it came a tempest of thunder and lightning that filled St. Paul's [Church] with a stink [offensive odor].<sup>72</sup>

In 1231, floods struck *China*.<sup>153</sup>

**1232 A.D.** The summer of 1232 was hot. In the east of *France* during July and August, one could "cook eggs in the sand".<sup>173</sup>

In *Austria*, there was a general overflow of the Danube River.<sup>47, 92</sup>

In 1232, the Danube overflowed its banks, did much damage. It drowned people, cattle, towns, corn and woods. Hence there was scarcity and famine.<sup>72</sup>

**1233 A.D.** In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.<sup>1</sup>

The rain was violent in London, *England*. It thundered 15 days together, with rain and floods that destroyed the fruits of the earth.<sup>2, 43, 56</sup>

In 1233, it thundered for fifteen days together in *England*. The next year began with terrible tempest of thunder, rain and floods, which spoiled the fruits of the earth.<sup>39</sup>

In 1233 in *England*, there was a great tempest of wind, with rain and it thundered for fifteen consecutive days.<sup>57, 90</sup>

In 1233 in *England*, there were thunderstorms for fifteen consecutive days, with great rains and gales.<sup>212</sup>

[Some accounts place this event in 1231 or 1232.] In 1231, there was a great thunderstorm in *England* that lasted 15 days. It began the day after the feast of St. Martin. “Which lasted 15 daies, beginning th’ morrow after St. Martin’s day.”<sup>212</sup> In *England*, there was a rainy spring with many floods. But on the morrow of Saint Martin’s Day in 1232 was great thunder and lightning, which continued 19 days together.<sup>72</sup>

In November 1233, there was a tempest with terrible thunder and lightning [in *England*].<sup>72</sup>

In *England*, it thundered for 15 days together, with terrible tempest of thunder and rain.<sup>40</sup>

In *England* in March 1233, there was thunder, lightning and rain for 15 days together. It was rainy all summer. A flood in July did significant damage.<sup>72</sup>

In 1233, a drought engulfed *China*.<sup>153</sup>

In 1233 during the summer, there was a great drought in *China*.<sup>165</sup>

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**Winter of 1233 / 1234 A.D.** In the winter, the sea between *Norway* and *Denmark*, and from *Sweden* to [the island of] *Gothland*, and the Rhine River and *Baltic Sea* were all frozen and snow fell to a frightful depth. The winter in *Italy* was similar to the year 1133 A.D.<sup>1</sup>

It was so cold in Venice, *Italy*, that the *Adriatic Sea* froze in 1235. [Misprint for year 1234 A.D.] The ice was so thick that it bore the weight of wagons.<sup>28</sup>

In 1234, loaded carts and wagons crossed the ice on the frozen *Adriatic Sea* in front of Venice, *Italy*.<sup>38, 58, 80</sup>

In 1234, the Po River in *Italy* froze.<sup>58, 80</sup>

In 1234, the Rhône River in *France* froze.<sup>58, 80</sup>

During the winter of 1234, Lake Zurich, the Rhône River and the Bay of Venice were made of ice.<sup>173</sup>

The winter of 1233-34 in *France* was as long as rigorous. The cold froze the Rhône River and all plants of the South to the roots.<sup>79</sup>

The *Mediterranean Sea* was frozen over and the merchants passed with their merchandise in

carts.<sup>2, 41, 42, 43, 47, 93</sup>

The *Mediterranean* was again frozen over in 1234 A.D.; and a whole pine forest was killed by the cold.<sup>30</sup>

In 1234, the Po River in *Italy* and the Rhône River in *France* froze again; loaded carts crossed the *Adriatic Sea* on the ice in front of the city of Venice.<sup>60, 62</sup>

So great a frost in 1233 in Gallia Cisalpina, *Italy* that the Venetians walked on the ice of the Po River and travelled with coaches and wagons over it as in a land journey. Wine was frozen in bottles and was thawed to melt it. Vines and other trees died. Many people froze to death in bed.<sup>72</sup>

In 1233, in *England*, the frost “lasted till Candlemas.”<sup>47, 72, 93</sup>

During the 18<sup>th</sup> year of Henry III reign (1234) in *England*, “was a great frost at Christmas, which destroyed the corne in the ground, and the roots and hearbs in the gardens, continuing till Candlemasse without any snow, so that no man could plough the ground; and all the yeare after was unseasonable weather, so that barrenesse of all things ensued, and many poor folkes died for the want of victualls, the rich being so bewitched with avarice that they could yield them no reliefe.”<sup>47, 93</sup>

In the year 1234, a remarkable winter raged throughout *France, England* and *Italy*. On the night of Feast of the Circumcision of Christ (1 January) joined a very severe and persistent frost. The extreme cold froze the seeds for the most part with the root. In this sad time for the unfortunate people, except the pain of the cold, weighed the torments of hunger. In *Germany*, the ice of the rivers destroyed bridges, houses, walls and trees.<sup>62</sup>

[In *England*], the frost continued till Candlemas. There was no snow. Corn [grain] was lost. Herbs and roots of trees died.<sup>72</sup>

In 1234 in *England*, the frost was the hardest and strongest but there was no snow.<sup>72</sup>

**1234 A.D.** Famine and plague followed. So great was the famine in *France*, that men ate grass like oxen, especially in Aquitania. The plague was so terrible in Pictavia, *Scotland* that Saint Maxentius’s Church was filled with dead corpse.<sup>72</sup>

In 1234 [in *England*], there was the greatest famine when people ate horseflesh, bark of trees, grass. A plague followed.<sup>72</sup>

In Novgorod [*Russia*], the Church of St. Luke in the Lyudin quarter was burned down from thunder in the evening of June 10.<sup>76</sup>

**1235 A.D.** The water rose so high in the River Thames in *England* as to extend round Westminster Hall, to such a depth, that the judges and lawyers were taken from the Hall in boats.<sup>1, 40, 212</sup>

[Another account places this event in 1236.] In *England* in 1236, there were great tempest of rain, which soaked the earth with water and caused monstrous floods. This rain continued all January, February, and part of March. On 10 February, the River Thames rose with such a high tide, as filled Westminster Hall. On 25 December, there was great thunder and lightning.<sup>72</sup>

The rest of 1234 had exceedingly bad weather, wholly unseasonable. Hence [in 1235] came barrenness, scarcity, dearth and pestilence. Many people died. The famine was so great that people were forced to eat grass, horseflesh, and bark of trees in *France* and *England*. In London alone, 20,000 people

starved.<sup>57, 72</sup>

In 1235 in *England*, famine and plague; 20,000 persons died in London; people ate horseflesh, bark of trees, grass, etc.<sup>91</sup>

While backward weather seasons were contributing factors of the great famine of 1235 in *England* during Henry III's reign, much of the responsibility is laid at the door of the government itself. Twenty thousand people are said to have died in London alone from the famine.<sup>84</sup>

The summer of 1235 was hot [in *France*].<sup>173</sup>

In 1235, there was flooding in Paris, *France*.<sup>173</sup>

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**1236 A.D.** The Danube River is frozen in its full depth for a considerable time.<sup>60</sup>

The Loire River in *France* was frozen solid. The Danube was frozen over across its entire width and remained frozen for a considerable time.<sup>62</sup>

During the winter of 1236 in northern *France*, the rivers froze.<sup>79</sup>

The winter of 1236 was cold in Winchester, *England*. Rivers froze. [The ice] collapsed and destroyed bridges in Tours and Saumur, *France*.<sup>173</sup>

There was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

In the year 1236, in *France* and to the banks of the Danube River, the winter was very hard. The Loire River was first struck with disastrous flooding, and the severe cold and frost came later. The Bridges at Saumur and Tours, *France* were destroyed by the ice conditions. As a result of these scourges, a famine spread throughout *Europe*.<sup>62</sup>

The summer of 1236 was very hot. Crops failed in Normandy, *France* because of the drought.<sup>173</sup>

In 1236, floods struck several regions of *China* including:<sup>153</sup>

— Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ying-tê and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh.

— During the period between 8 April and 6 May, floods due to heavy and protracted rain struck Hupeh (now Hubei province) in central *China* at Ch'i-ch'un. Houses were flooded.

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**1237 A.D.** [In *England*] in December 1236 and January, February and March of 1237, it was all rainy and great floods.<sup>72</sup>

The summer was an excessive drought for five months. However the earlier rains brought on an epidemic of Ague. This was a rainy, stormy, troublesome and sickly year. Agues were epidemic beyond compare. Wines this year were 16 times as dear as last year.<sup>72</sup>

The summer of 1237 was very hot [in *France*].<sup>173</sup>

In 1237, floods struck Kiangsi (now Jiangxi province) in southern *China* at P'o-yang and Shang-jao. During the period between 24 June and 23 July, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

In 1237 during the summer, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

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**1238 A.D.** The summer of 1238 was hot [in *France*].<sup>173</sup>

In 1238, floods struck Chekiang (now Zhejiang province) on the east coast of *China*.<sup>153</sup>

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**1239 A.D.** In 1239 in *England*, there was the greatest famine “people eat their children.”<sup>57, 72, 91</sup>

A plague and such a famine that delicate mothers ate their tender children.<sup>72</sup>

In 1239 during the period between 5 May and 3 June, a drought engulfed *China*.<sup>153</sup>

In 1239 during the summer, there was a drought in *China*.<sup>165</sup>

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**1240 A.D.** In *England*, the River Thames greatly flooded from rain.<sup>72, 92</sup> Extended above 6 miles at Lambeth.<sup>47</sup>

[In *France*] the summer of 1240 was dry and burning hot. The wines produced this year were so strong that they could not be drunk without drinking water.<sup>62</sup>

In 1240, there was flooding in Paris, *France*.<sup>173</sup>

[In *England*], in the year 1240 or 1241 for about four months together, it scarcely ever ceased raining. But about Easter, it began to turn clear and fair. Then there was three months of drought. Great famine followed. Wheat rose to 40 shillings. On 7 May, there was a dreadful hurricane.<sup>72</sup>

In 1240 during the period between 22 June and 20 July, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China*; Chekiang (now Zhejiang province) on the east coast of *China*; and Fukien (now Fujian province) on the southeast coast of *China* at Foochow. The drought was accompanied by a plague of locust.<sup>153</sup>

In 1240 during the summer, there was a great drought in Chêhkiang, Fuhkien and Kiangsi provinces in *China*. The drought was accompanied by a plague of locusts.<sup>165</sup>

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**1241 A.D.** In *England*, there was deep snow with great frost after. On St. Mark’s night (April 25) there was frost and snow fatal to fruit trees.<sup>47, 93</sup>

[In *England*] on Saint Lucius’s Day fell a prodigious snow with great winds, deep drifts. Many people and cattle were lost. A long and severe frost followed.<sup>72</sup>

In 1241 in *England*, there was a deep snow followed by a great frost.<sup>72</sup>

The summer of 1241 was very hot [in *France*]. There was a drought from 6 January to 20 September. The wine was famous but there was a poor harvest [of grain] crops due to the drought.<sup>173</sup>

In 1241 during the period between 9 August and 6 September, a drought engulfed *China*.<sup>153</sup>

In 1241 during the autumn, there was a drought in *China*.<sup>165</sup>

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**1242 A.D.** [In *England*] on the Feast of Saint Edmund in 1242, there was a great terrible tempest of thunder and lightning followed by such excessive rains for many days together. The rivers swelled to prodigious heights. The River Thames by land floods overflowed all its banks, drowned the country for six miles about Lambeth. None could go into Westminster Hall but on horseback.<sup>72</sup>

In 1242, there was an inundation of the Thames for above six miles at Lambeth.<sup>43</sup>

In 1242, the Seine River in Paris, *France* flooded.<sup>173</sup>

In 1242 during the period between 30 June and 28 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing, Li-shui and Chin-hua. Then during the period between 29 July and 27 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin, Chinkiang and Nanking.<sup>153</sup>

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**1243 A.D.** [In *England*] in 1243 and 1244, there were great droughts followed by a most fatal plague.<sup>72</sup>

[In *Hungary*, there was a famine not caused by abnormal weather. A most direful famine in *Hungary*, the Tartars having ravaged the country for three years, that there was neither sowing nor reaping.<sup>72</sup> In 1243 in *Hungary*, there was a great famine from Tartar invasion.<sup>91</sup>]

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**1244 A.D.** In the middle of November 1244, there was great thunder and lightning with a very intemperate season for 15 days together in *England*.<sup>72</sup>

The summer of 1244 [in *France*] was hot.<sup>173</sup>

In 1244 during the period between 9 May and 6 June, a drought engulfed *China*.<sup>153</sup>

In 1244 during the summer, there was a drought in *China*.<sup>165</sup>

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**1245 A.D.** A drought that began in 1242 [in *England*] finally came to an end in 1245 after the rains took up.<sup>72</sup>

A winter storm on 6 December 1245 was so cold in *Ireland* that many people lost toes due to frostbite. The snow was referred to as “poisonous snow”.<sup>28</sup>

In 1245 during the period between 26 June and 23 August, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang and Wu-chin.<sup>153</sup>

In 1245 during the summer and autumn, there was a very severe drought in Kiangsu province in *China*.<sup>165</sup>

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**1246 A.D.** [This entry shows a date out of chronological order and is most likely 1246] In 1249 [in *England*] on Feast of Saint Marks [25 April] was a great frost and snow, so hurtful to birds and blossoms of trees and herbs, that most of them died.<sup>72</sup>

In 1246 in *England*, there was frost on Saint Mark’s Night and snow fatal to fruit and trees.<sup>72</sup>

In 1246 during the period between 16 July and 12 August, a drought engulfed *China*.<sup>153</sup>

In 1246 during the summer, there was a drought in *China*.<sup>165</sup>

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**1247 A.D.** In *England*, from 1247 to 1250, there were several inundations of the sea: great losses.<sup>47, 92</sup>



In 1247 in *England*, there were no tides for three months together.<sup>72</sup>

[In *England*], from St. Valentine's Day to St. Bennet's, not one fair day, then came the plague.<sup>72</sup>

In *England*, there was such rainy weather that scarce there was one day without rain until the Feast of Saint Bennet. Over the past few years, the great drought brought great and fatal epidemic diseases on all of *England*. But this year in September, the plague raged sore. Thunder and lightning killed several people and broke down trees. The sea overflowed its banks.<sup>72</sup>

In 1247 during the period between 7 April and 2 August, a drought engulfed *China*.<sup>153</sup>

In 1247 during the spring and summer, there was a drought in *China*.<sup>165</sup>

In 1247, flood struck Fukien (now Fujian province) on the southeast coast of *China* at Foochow.<sup>153</sup>

**1248 A.D.** In *Germany*, there was a famine.<sup>57, 72, 91</sup>

There was a great famine in *Germany*. There was an eclipse of the sun and an inundation of the sea.<sup>72</sup>

The winter of 1248 was cold in Winchester, *England*.<sup>173</sup>

The summer of 1248 [in *France*] was hot.<sup>173</sup>

On 1 November 1248, a storm with a huge high storm surge struck *Friesland*.<sup>172</sup>

In *England*, from 1247 to 1250, there were several inundations of the sea: great losses.<sup>47</sup>

**1249 A.D.** Last winter [in *England*] there was so pleasant, sweet and warm, that people fancied the season was changed. There was no frost or snow the whole winter. Folks threw off their cloaks and went in the thinnest lightest summer dress. But from the end of March to the middle of May came as great a cold. In June fell abundance of rain about Abington, *England* that the willow trees, mills and houses near the waterside were borne down and overturned. Corn in the fields was beaten down, and bread made from it when ripe was like bran. In July, Posson [today Poznań located in west-central *Poland*] was burnt by lightning and 300 men who came to the horse races were killed on the course. In Friffingen [Frisingen or Frisange is a commune and town in southern *Luxembourg*] was such a plague of mice, which ate up corn, hay and all greens. The year 1249 was a rainy year.<sup>72</sup>

In *England*, from 1247 to 1250, there were several inundations of the sea: great losses.<sup>47</sup>

In 1249, a sea flood struck with such voracity that it caused great damage [in *Germany*]. [This entry was listed under the category "storm surge", which might include an inundation of the sea.]<sup>172</sup>

**1250 A.D.** In *England*, the frost was very severe.<sup>47, 93</sup> Very great.<sup>72</sup>

In *England*, from 1247 to 1250, there were several inundations of the sea: great losses.<sup>47</sup>

[In *England*] on 1 October 1250, there was so great and mighty a hurricane both by sea and land that the likes of it had not been known nor heard of. The sea, contrary to its natural course flowed twice without ebbing, sending into the midland to a great distance a frightful hideous noise. In the night it seemed all in a flame; and the waves to fight one against another. Mariners could not save their vessels. Around

Winchelsea in east Sussex on the coast, 300 houses and some churches were carried down by the flood. Besides damage done to churches, steeples, mills, etc. In other parts, inestimable damage was done in Holland, the Lincolnshire Fens, and other low places. There was a most rigorous and long winter, very great snows. At the thaw was a prodigious flood, which did much harm.<sup>72</sup> [Holland may refer to an area of southeastern Lincolnshire, *England*. The Lincolnshire Fens are a vast, extremely flat plain between Cambridge and Lincoln in east *England*.]

On 1 October 1250, a most dreadful inundation of the sea did great damage to Holland beyond sea [*the Netherlands*], Holland in Lincolnshire [in *England*], and the marsh-ground in Flanders [now *Belgium*], and drowned Winchelsea [in *England*]. The inundation was accompanied by an unheard of tempest of wind.<sup>225</sup>

[In *England*], there was an irregular tide when the sea flowed twice without an ebb. It swelled, roared, slammed, etc.<sup>72</sup>

In 1250 during the period between 29 August and 27 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow. Then during the period between 28 September and 26 October, floods struck Chekiang province at Chien-tê where the land tax was remitted.<sup>153</sup>

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**1251 A.D.** In *England*, tides rise 6 feet higher than usual.<sup>47, 72, 92</sup>

In *Ireland* on the 29<sup>th</sup> of June, there was a great inundation of the River Shannon.<sup>47, 92</sup>

There was a famine in *England* in 1251.<sup>90, 212</sup>

In *England*, a storm caused the chimney of the chamber where the queen of King Henry III, and her children lay, to be blown down, and their whole apartments at Windsor Castle shaken, many oaks in the park were rent asunder, and turned up by the roots, accompanied with such thunder and lightning as had not been known in the memory of man.<sup>40, 41, 56</sup> [Windsor Castle is located in Berkshire in southern *England*. Norwich is located in Norfolk in eastern *England*.]

On Christmas Day at night there was great thunder and lightning in the diocese of Norwich, *England*. On the Feast of Saint Dunstan [19 May] the air being darkened from all corners, happened such a terrible tempest of thunder and lightning, as none living had ever seen. It began first at a great distance, but soon burst out in most terrible shocking claps, shaking and demolishing houses, rendering oaks, etc. At the same time, the sea on the coasts of *England* rose with higher tides than ordinary, by 6 feet. The summer was excessive and intolerably hot. So great mortality followed that in many parishes, a hundred died in a month. The harvest was very early and good.<sup>72</sup>

On December 25 at Norrage [Norwich, *England*], there was a tempest of thunder and lightning.<sup>72</sup>

In 1251 in the Ardèche region of southern *France*, a great flood of the Doux River destroys and carried away the superb masonry bridge called the "Great Bridge" between Tournon and Saint-Jean-de-Muzols. The bridge was not rebuilt until 1382.<sup>61</sup>

[In *Germany*], the summer of 1251 was exceptionally and intolerably hot. As a result there was so great a mortality that they buried in some parishes a hundred people in one month. There was a wine shortage in *France*.<sup>62</sup>

In the Novgorod Republic [now part of *Russia*], heavy rains came and took away all the ploughed fields and crops and hay; and the flood carried away the large bridge over the Volkhov River, and in the autumn a frost struck the crops, but a remnant was preserved.<sup>76</sup>

In 1251, a drought engulfed Fukien (now Fujian province) on the southeast coast of *China* at Foochow; Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Nan-hai; and Kiangsi (now Jiangxi province) in southern *China* at P'o-yang.<sup>153</sup>

In 1251, there was a drought in Fuhkien and Kwangtung provinces in *China*.<sup>165</sup>

In 1251, floods struck Kiangsi (now Jiangxi province) in southern *China* at P'o-yang; Chekiang (now Zhejiang province) on the east coast of *China*; and Kiangsu (now Jiangsu province) on the east coast of *China*. During the period between 19 August and 16 September, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Ch'ang-t'ing. During the period between 17 September and 16 October, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling.<sup>153</sup>

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**1252 A.D.** In *England* in 1252, no rain from Whitsuntide [the week following Pentecost] to Autumn. No grass; hence arose a severe famine. There was great mortality of man and cattle; dearth of grain and scarcity of fruit.<sup>57, 91</sup>

[In *England*] in 1252, there was a long drought from Easter to the harvest. There was no rain or dew. This condition combined with the morning frosts and northerly winds did great harm both to the fruits and corn [grain]. As the season wore on and the heat and drought increased, the remainder of the fruit withered away so that only a tenth part [10%] was scarce left. The grass was so burnt up that one might rub it to powder between their hands. Cattle were ready to starve. The exceedingly hot nights brought a vermin of fleas and gnats that were very troublesome. Many diseases followed, such as agues, sweats, etc. At harvest time there was a great death of cattle, especially in the Fens, Norfolk and the south. The infection was such that dogs and ravens feeding on the carrion, swelled and died, so that people did not dare eat the dead cattle. Heifers and bullocks followed the milk cows and sucked on them as if they had been calves. All apple trees and pear trees after they yielded their first ripe fruits blossomed again as when they did in April. The death of cattle came about in this way. After so great a drought that lasted until the end of July, there came a period of rainfall which produced an abundance of greenery. The starved cattle feed so greedily on this new grass, that they quickly became bloated. This condition led to their death. At Michaelmas [29 September], the plague began in London and spread over the whole nation and reigned till August 1253.<sup>72</sup>

In 1252, there was a gale [in *England*]. There was a great tempest upon the sea, and fearful.<sup>212</sup>

In 1252, there was an inundation of the sea in *England*. "An inundation of the [River] Humber at Cottyngam [Cottingham] destroyed both man [around 35 people perished] and beast, especially at Owythfleet, Saltage Myrton, Tharlesthorpe, Sutton, and Drypool, where nearly all the buildings were lost. After which Owythfleet, Tharlesthorpe, and Saltage were gradually but totally swallowed up by the Humber."<sup>212</sup>

The summer of 1252 [in *France*] was very hot. "The eggs were cooked in the sand."<sup>173</sup>

In 1252 during the period between 8 July and 6 August, floods struck several regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua, Taichow, Li-shui, Chien-tê, and Ch'ü.

— Kiangsi (now Jiangxi province) in southern *China* at Shang-jao.

— Fukien (now Fujian province) on the southeast coast of *China* at Chien-ou, Nan-p'ing and Shao-wu.

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**1253 A.D.** [In *England*], a great drought occurred during the spring and summer. At harvest there fell such great rains, which caused deluging floods. The rivers broke down and overflowed their banks, drowning an abundance of land, destroying many people, many villages and houses in sundry places, such as Holderness and other low countries. After Michaelmas [29 September], returned such a drought that people could have no corn ground [who lived] within a day's journey of a [grain] mill. On Saint Lucius' Day, there fell a great snow. There was significant thunder during winter and a great hurricane.<sup>72</sup> [Holderness is located in Yorkshire, on the east coast of *England*.]

In *England*, there was the greatest drought all spring and summer. In harvest time there were great rains. Then in October and long afterwards drought reappeared.<sup>72</sup> [Another account places this event in 1252.<sup>47</sup>]

In 1253 during the period between 28 June and 26 July, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Kiukiang; Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou; Fukien (now Fujian province) on the southeast coast of *China* at Foochow; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Nan-hai. Then during the period between 27 July and 25 August, floods struck in Chekiang province at Wên-chou, Taichow and Li-shui and in Kiangsi province at Shang-jao and P'o-yang.<sup>153</sup>

In 1253 during the summer, there was a drought in Fuhkien, Hunan, Hupeh, Kiangsi, Kwangsi and Kwangtung provinces in *China*.<sup>165</sup>

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**1254 A.D.** In *England*, the frost was severe between the 1<sup>st</sup> of January to the 14<sup>th</sup> of March.<sup>47, 93</sup> Severe cold.<sup>72</sup>

In *England*, there was a severe cold winter until the Feast of Saint Gregory in March. There was so great a murrain and death of sheep, that in many places above half had died. The winds came from the north for about three months continuous. They did great harm to the flowers and fruits. On 1 July, there fell such a storm of hail and rain as had not been known in *England*. The force of the rain and hailstones broke tiles covering the houses, and the boughs of the trees. This storm was incessant downpour for an hour. In *England* and *France*, there was a great plague on horses called "the evil of the tongue".<sup>72</sup>

In 1254 during the period between 13 October and 1 November, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing, Hsiao-shan and Chu-chi. As a result, the land tax was remitted.<sup>153</sup>

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**1255 A.D.** [In *England*], the rivers were in vast floods from the severe and long rains; many high buildings were destroyed by the force of the tempest.<sup>72</sup>

In 1255 during the period between 6 June and 5 July, floods struck on the east coast of *China* in Chekiang (now Zhejiang province) at Hangchow, Chia-hsing and Hu-chou and in Kiangsu (now Jiangsu province) at Soochow, Sung-chiang and T'ai-ts'ang.<sup>153</sup>

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**1256 A.D.** [In *England*] on 7 November and 17 December, there were terrible tempest of wind, rain, hail and thunder, which did great damage to water-mill wheels, arches of bridges, stacks of hay and corn, houses, children in cradles. These were borne down in torrents of water.<sup>72</sup>

In 1256, there was a great thunder and lightning storms that occurred often during the year [in *England*]. There were several great rains, thunder, lightning, winds and tempests.<sup>72</sup>

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**1257 A.D. – 1259 A.D. England. Famine**

While backward weather seasons were contributing factors of the great famine of 1257-59 in *England* during Henry III's reign, much of the responsibility is laid at the door of the government itself. The whole kingdom had been drained of its coinage by the taxes, which the king had levied to pay German troops and to buy electoral votes for his brother, the Earl of Cornwall, who was a candidate for the imperial crown of the Holy Roman Empire.<sup>84</sup>

It was during this famine that *England* for the first time imported from Germany and Holland grain to alleviate the suffering of her poorer classes. The Earl of Cornwall himself sent sixty shiploads of food, which was sold for his account to the starving. In the following year, 1258, there was a bountiful harvest but destructive rains caused the heavy crops to rot in the fields, and even the grain, which was gathered, became mouldy.<sup>84</sup>

In *England* in July 1257, there were great floods from rains.<sup>47, 72, 92</sup>

In July 1257, there were excessive rains and floods. Low lands drowned. All the marshes were like a flooded desert. There was great scarcity of horses and cattle in *England*.<sup>72</sup>

In *England* in 1257, the inundations of autumn destroyed the grain and fruits and pestilence followed.<sup>57, 91</sup>

In 1258 in *England*, north winds in spring destroyed vegetation and food failed. The preceding harvest was small and innumerable multitudes of poor people died. Fifty shiploads of wheat, barley, and bread were procured from Germany; but citizens of London were forbidden by proclamation against dealing in same.<sup>91</sup> "A great dearth followed this wet year pest, for a quarter of [a ton of] wheat was sold for 15 to 20 shillings. But the worst was in the end; there could be none found for money when – though many poor people were constrained to eat barks of trees and horseflesh; but many starved for want of food – 20,000 in London."<sup>57</sup>

In 1258, all summer and harvest there were the greatest floods. Corn [grain] all rotten. Famine.<sup>72</sup>

The previous year's excessive and long rains caused a dearth in 1258 over all of *England* because of a scarcity of corn [grain]. A Quarter of wheat [1/4 ton], which previously sold for 2 shillings now sold for 24 shillings. Wheat had become very scarce. Great stores of grain were shipped in from *Alamain*. The crop also failed in *France* and *Normandy* as well as *England*. The King of *Alamain* procured 50 great ships laden from *Dutch lands* with wheat, barley, meal and bread, which greatly relieved the poor. But the Londoners bought it up, either to hoard it, or to sell it for a marked up price, or to send it off to other ports. Many lived on herbs and roots and not a few of the poor were starved to death. Because the winds were keeping north several months; the fruits, flowers and produce from the earth were so hindered that they served no purpose until June was nearly over. There was all summer and during the harvest excessive rains and inundations. Yet a double crop of corn [grain] and grass was on the ground but unfortunately, it was all rotten. Thus were the expectations of the farmers lost. Famine and death went hand-in-hand triumphantly together. People died so fast, they dug great pits in churchyards and filled them with heaps of dead carcasses. But towards the end of the harvest, the weather picked up and so much of this rotten crop was harvested very late. This did much good and lowered the price of corn [grain] half and half. On 1 December at night a terrible tempest of thunder, lightning, wind and rain. This year horseflesh was a delicate dish. There was great mortality.<sup>72</sup>

In 1258, terrible winter of thunder, lightning and rain.<sup>72</sup>

In 1259 in *England*, a great mortality reigned till summer then there was drought and plenty.<sup>72</sup>

**1257 A.D.** In the year 1257, the winter in Holland [now *the Netherlands*] was severe. The French chronicles recorded “In the Kingdom of *France*, the winter was too hard.”<sup>62</sup>

[In *Europe*] in the summer of 1257, it was excessively hot and the heat did not let up until Candlemas (2 February).<sup>62</sup>

In 1257 during the period between 16 May and 9 September, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui.<sup>153</sup>

In 1257 during the summer and autumn, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

*Also refer to the section 1257 A.D. – 1259 A.D. for information on the famine in England during that timeframe.*

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**1258 A.D.** [In *Europe*], this winter the weather was so mild and pleasant, that it only froze on two days. In January, violets and flowering plants of strawberry, and apple trees were all white with blossoms. It was warm weather until the Feast of Candlemas [2 February].<sup>62</sup>

The large amount of rainfall in 1258 in *France* made the wheat in the fields and barns sprout. It also prevented the grapes from reaching full maturity.<sup>79</sup>

The summer of 1258 was humid [in *France*].<sup>173</sup>

In 1258 during the period between 6 April and 3 June, a drought of long duration engulfed *China*.<sup>153</sup>

In 1258 during the spring and summer, there was a drought of long duration in *China*.<sup>165</sup>

On 1 December 1258, there was a terrible tempest of thunder, lightning, wind and rain [in *England*].<sup>72</sup>

*Also refer to the section 1257 A.D. – 1259 A.D. for information on the famine in England during that timeframe.*

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**1259 A.D.** In *England*, there was a drought in summer, and great plenty.<sup>72</sup>

In *England*, a great mortality reigned till summer then there was drought and plenty. A hurricane struck on 28 December.<sup>72</sup>

In 1259, floods struck Anhwei (now Anhui province) in eastern *China* at Ch’u and Chekiang (now Zhejiang province) on the east coast of *China* at Chien-tê. During the period between 24 May and 21 June, floods struck in Chekiang province at Chin-hua. Houses were flooded.<sup>153</sup>

*Also refer to the section 1257 A.D. – 1259 A.D. for information on the famine in England during that timeframe.*

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**1260 A.D.** In *England*, there was “no rain all the year to August; then moderate showers only; oats and barley lost.”<sup>47, 72</sup>

In *England*, there was drought during the summer that was so long, great and severe; that oats and barley sown in due time came not up till near harvest. Then moderate rains fell, they sprang up, grew and shot up. But now it was Michaelmas [29 September] and without any sun to ripen them, they were cut down and dried for cattle fodder. There was a shocking inundation on the Rhine River [in *Germany*], fatal to many people and cattle.<sup>72</sup>

In *Germany*, there were great floods on the Rhine River.<sup>47, 72, 92</sup>



In 1260, a drought engulfed Shansi (now Shanxi province) in northern *China* at Chin-ch'êng and Ch'ang-chih. During the period between 11 June and 9 July, a drought engulfed *China*.<sup>153</sup>

In 1260, there was a drought in Shansi province in *China*.<sup>165</sup>

**1261 A.D.** It was a sore rainy year in *England*. But a great plenty of corn and wine abroad.<sup>72</sup>

In 1261, there was a great plenty of all grains and grapes. Well got.<sup>72</sup>

[In *England*] in harvest rains began.<sup>72</sup>

In 1261, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo, Taichow, Shao-hsing, Chin-hua, Ch'ü, Chien-tê, Wên-chou and Li-shui. During the period between 29 June and 28 July, floods struck Chekiang province at Hangchow and An-chi.<sup>153</sup>

**1262 A.D.** In *Ireland*, there was a great destruction of people from plague and hunger.<sup>57, 91</sup>

There was a great scarcity and famine in *Scotland* and *England* from last year's rainy harvest.<sup>72</sup>

[In *England*] it was rainy.<sup>72</sup>

The summer of 1262 [in *France*] was hot.<sup>173</sup>

In 1262 during the period between 20 February and 21 March, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, An-chi and Chia-hsing. Many people drowned. Then during the period between 20 May and 17 June, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Pin and Hui-min.<sup>153</sup>

In 1262 during the summer, there was a drought in *China*.<sup>165</sup>

**1263 A.D.** In *England*, "on St. Nicholas we began a month's hard frost."<sup>47, 72, 93</sup>

In *England*, on St. Nicholas' Eve began a very severe frost, which lasted over a month. Horses and people went over the River Thames on ice.<sup>72</sup>

On 1 December and 13 December, there were terrible thunder and lightning storms [in *England*].<sup>72</sup>

The summer of 1263 produced a drought in Holland [now *the Netherlands*].<sup>173</sup>

In 1263 during the period between 7 July and 5 August, a drought engulfed *China*. During the period between 4 September and 3 October, a drought engulfed Honan (now Henan province) in central *China* at An-yang and Hopei (now Hebei province) in northern *China* at Yung-nien, Tz'ü, and Chêng-ting.<sup>153</sup>

In 1263 during the summer and autumn, there was a drought in Chihli and Honan provinces in *China*.<sup>165</sup>

**1264 A.D.** [In *England* in 1264, there were shortages that were more related to pirates than to the weather.] In *England* on 16 June there were terrible thunder and lightning, and another on the 8<sup>th</sup> of the Ides of September. There was a great plague of cattle and sheep. Pirates continually coasting all the shores of *England*; seized all shipping coming in or going out and murdering whole crews. Merchants were robbed and spoiled of their goods and many of them were necessitated to beg for their bread. So

great was the scarcity of everything, that wine rose from 40*s.* to 10 Merk or 7*l.* Wax rose to 8 or 9 Merks. Pepper from 6*d.* rose to 3*s.* Salt, iron, steel, cloth and all merchant goods were drained away and lost.<sup>72</sup>

On 16 June and in September, there were terrible thunder and lightning storms [in *England*].<sup>72</sup>

A severe famine struck *Egypt* in 1264. But much of the hardship was averted by the strong leadership of Bibars. Bibars was a native of Kipchak [Gypjak], located between the Ural Mountains and the Caspian Sea. Years before he was sold into slavery and fetched very little on the auction block because of a cataract in one of his eyes. Later he founded the Mameluke Empire. He met the famine promptly and vigorously by regulating the sale of grain wisely and compelling his officers and emirs to support the destitute for three months.<sup>84</sup>

In 1264, floods struck two provinces of *China*:<sup>153</sup>

— Hopei (now Hebei province) in northern *China* at Chêng-ting, Peiping, Yung-nien, Tz'ü, Hsing-t'ai, Ta-ming, and Ho-chien.

— Shantung (now Shandong province) on the east coast of *China* at Ho-tsê, P'u, T'ai-an, Kao-t'ang, Pin, Chi-ning, Liao-ch'êng, Tê, Tsinan, Hui-min, Tz'ü-ch'uan, Yeh, and Tung-p'ing.

In 1264 during the period between 28 April and 26 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing and Shansi (now Shanxi province) in northern *China* at Taiyuan and Lin-fên. During the period between 26 June and 24 July, a drought engulfed *China*.<sup>153</sup>

In 1264 during the summer, there was a drought in Shansi and Shantung provinces in *China*.<sup>165</sup>

**1265 A.D.** In 1265, a drought engulfed many regions of *China* including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Loyang.

— Jehol (formally Rehe province) at Lin-hsi. Rehe is located north of the Great Wall, west of *Manchuria*, and east of *Mongolia*. In 1955, the area was divided between Hebei province, Liaoning province and *Inner Mongolia*.

— Shantung (now Shandong province) on the east coast of *China* at I-tu and Tung-p'ing.

— Hopei (now Hebei province) in northern *China* at Chêng-ting, Hsing-t'ai, and Ho-chien.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow and P'ei. [P'ei is located at longitude 118.03° East and latitude 34.30° North].

— Anhwei (now Anhui province) in eastern *China* at Su.

In 1265 during the summer, there was a drought in Chihli, Kiangsu, Shansi and Shantung provinces in *China*.<sup>165</sup>

**Winter of 1265 / 1266 A.D.** On the night after St. Marcellus feast [one of which was December 29<sup>th</sup>], a storm struck *Friesland* and flooded far and wide and did great damage. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

**1266 A.D.** In *Scotland*, there were great inundations of the River Tay and the River Forth from the sea.<sup>47, 92</sup> These were most fatal.<sup>72</sup>

Swarms of palmer-worms [caterpillars] ate up all fruits, herbs, grass and greens in *Scotland*. There were very great floods from the sea and the River Tay and the River Forth, which destroyed many villages, people and cattle.<sup>72</sup>

The summer of 1266 [in *France*] was hot.<sup>173</sup>

In 1266, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping and Shensi (now Shaanxi province) in central *China* at Fêng-hsiang. During the period 3-31 August, a drought engulfed *China*.<sup>153</sup>

In 1266, there was a drought in Shensi province in *China*.<sup>165</sup>

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**1267 A.D.** On 14 February 1267, a flood took *Friesland*. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

The summer of 1267 [in *France*] was hot.<sup>173</sup>

In 1267, floods struck Shansi (now Shanxi province) in northern *China* at Ying and a drought engulfed Hopei (now Hebei province) in northern *China* at Shu-lu. During the period between 8 August and 19 September, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China* at Shao-wu. As a result the land tax was remitted.<sup>153</sup>

In 1267 during the autumn, there was a great drought in Chihli and Fuhkien provinces in *China*. As a result, the land tax was remitted.<sup>165</sup>

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**1268 A.D.** In *England* in April for fifteen days, there was a very great tempest of thunder, rain and floods. Another occurred on the day before the Ides of January. On 19 February, there was a hurricane. There was a famine in Vienna, *Austria*. There was barrenness and scarcity in *Sicily* and the Apulia region of southern *Italy*.<sup>72</sup>

In 1268, there was a terrible famine in *Sicily, Italy* and Vienna, *Austria*.<sup>57, 72, 91</sup>

The summer of 1268 was hot. In Colmar in northeastern *France*, the temperatures were very high. For 12 weeks beginning on 14 May there was no rain. There was so much fruit on the trees that the branches broke.<sup>173</sup>

In 1268, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping and Chêng-ting.<sup>153</sup>

In 1268, there was a drought in Chihli province in *China*.<sup>165</sup>

In 1268 during the period between 9 September and 7 October, floods struck Anhwei (now Anhui province) in eastern *China* at Po. During the period between 8 October and 5 November, floods struck Hopei (now Hebei province) in northern *China* at Peiping where the land tax was remitted.<sup>153</sup>

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**Winter of 1268 / 1269 A.D.** A severe winter struck *Europe* beginning on 30 November 1268. The winter lasted until 25 May 1269. The *Baltic Sea* froze.<sup>28</sup>

In the year 1269, the winter was severe in *Northern Europe*.<sup>62</sup>

During the winter of 1269 the rivers in northern *France* froze.<sup>79</sup>

In 1269, the Kattegat was frozen between *Sweden* and Jutland, *Denmark*.<sup>62</sup>

During the winter of 1269, the frost was so intense in *Scotland* that the ground bound up.<sup>212</sup>

In *England*, the frost lasted from 30<sup>th</sup> of November to 2<sup>nd</sup> of February.<sup>47, 93</sup> Hardest frost.<sup>72</sup>

In *England* in February of 1269, there were great floods from the winter thaw.<sup>47, 72, 92</sup>

In *England*, there was a continuous frost from the Feast of Saint Andrew [30 November] to Candlemas [2 February]. The River Thames was frozen over. Horses, draughts and people passed over [the river on the ice]. Merchant goods came to London by land. Ships could not come up the river. On 6 February, there fell such a profound rain, as raised the greatest flood in the memory of man. The River Thames filled the cellars and vaults in London with water, to a great loss of merchandise.<sup>72</sup>

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**1269 A.D.** In 1269 during the period between 4 January and 2 February, floods struck several regions of *China*. As a result the land tax was remitted. The regions affected included:

- Hopei (now Hebei province) in northern *China* at Chêng-ting, Peiping, Hsing-t'ai, and Ho-chien.
- Shantung (now Shandong province) on the east coast of *China* at Kao-t'ang, Chi-ning, Tzū-ch'uan, Yeh, Tsinan, I-tu, Ên, and Tung-p'ing.
- Honan (now Henan province) in central *China* at Kaifeng.
- Chahar province (now eastern *Inner Mongolia*) at Lin-hsi.

During the period between 3 February and 4 March, floods struck Shantung province at I-tu, Tzū-ch'uan and Yeh.

Then during the period between 6 May and 8 November, a drought engulfed Hopei province at Chêng-ting and Yung-nien and also Suiyuan province (now part of *Inner Mongolia*) at Tokto, the Mongolian Urad Banner and the Mongolian Mowmingan Banner.

Then during the period between 25 December 1269 and 22 January 1270, floods struck in Hopei province at Hsien, Jên-ch'iu, Ch'ing and Ts'ang; Shansi (now Shanxi province) in northern *China* at Hun-yüan; and Suiyuan province at Tokto.<sup>153</sup>

In 1269 during the summer, there was a drought in Chihli province in *China*. The land tax was remitted.<sup>165</sup>

[In *England*] it was rainy the whole summer.<sup>72</sup>

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**1270 A.D.** In 1270 it rained every day for so hard during harvest time that the grain rotted in the fields [in *Germany*]. As a result a famine emerged. The conditions lasted 5 years.<sup>172</sup>

The summer of 1270 was very poor and very wet in *Austria*, *Switzerland*, Bohemia [now western *Czech Republic*], *Netherlands*, *Germany* (Lower Saxony), and *France* (Carcassonne). This produced poor harvests.<sup>173</sup>

In 1270, a drought engulfed several regions of *China* including:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking. This drought was severe.
- During the period between 23 March and 21 April, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at I-tu, P'êng-lai and Yeh. As a result, the land tax was remitted.
- During the period between 20 July and 17 August, a drought engulfed Shantung province.
- During the period between 17 October and 14 November, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng and Loyang.

In 1270 during the period between 17 September and 16 October, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at An-chi. During the period between 14 December 1270 and 12 January 1271, floods struck Chekiang province at Chia-hsing and Kiangsu (now Jiangsu province) on the east coast of *China* at Sung-chiang.<sup>153</sup>

In 1270 during the spring and summer, there was a great drought in Anhwei, Honan, Kiangsi, Kiangsu

and Shantung provinces in *China*. As a result, the land tax was remitted in Kiangsu, Honan and Shantung.<sup>165</sup>

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**1271 A.D.** In *England*, on the 4<sup>th</sup> of the Nones of July, there was a terrible wind and rain rotting and breaking trees, overthrowing houses etc. A great famine over all *England* followed. On 14 October, there was a great inundation of rain at Canterbury with thunder, lightning and tempests, as their forefathers never saw nor heard. During the whole day and night, thunder never ceased, but roared continually, like one single clap. A very great flood followed, which overthrew trees, vines etc. Men could neither go nor ride. Many were in eminent danger from the force of the water in the streets and houses of the city. The flood carried down many people and buildings.<sup>72</sup>

In *England* in 1271, there was a violent tempest and inundation; followed by a severe famine in the entire district of Canterbury.<sup>57, 91</sup>

In October, there was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

In 1271 in *England*, there was a famine from rotting rains.<sup>72</sup>

In 1271, there was pestilence and famine in the whole of *Ireland*.<sup>57, 91</sup>

In 1271 during the period between 11 February and 12 March, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing and Chu-chi. The fields were damaged. Then during the period between 9 June and 8 July, flood struck Chekiang province at Chu-chi. The houses were damaged by the floodwaters. Then during the period between 7 August and 5 September, floods struck Szechwan (now Sichuan province) in southwest *China* at Yüeh-shan and Chungking. The city walls were damaged by the floodwaters.<sup>153</sup>

In 1271 during the period between 11 May and 8 June, a drought engulfed Chahar province (now eastern *Inner Mongolia*) at Yü and Shansi (now Shanxi province) in northern *China* at Kuang-ling.<sup>153</sup>

In 1271 during the summer, there was a drought in Chihli province in *China*.<sup>165</sup>

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**Winter of 1271 / 1272 A.D.** The Friday, which preceded Christmas, brought great cold, few people remembered experiencing such extreme cold [in *Western Europe*].<sup>62</sup>

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**1272 A.D.** In *England*, from the Feast of Saint Egidius [23 April] to the Feast of Saint Cicilius [Saint Cecilia – 22 November] were terrible rains, and great floods. There was the most dreadful tempest of hurricanes, hail and fire [caused by lightning] in *Scotland* that is on record; the whole kingdom was almost ruined by them.<sup>72</sup>

The winter of 1272 was very wet and there were floods [in *France*].<sup>173</sup>

The summer of 1272 [in *France*] was hot.<sup>173</sup>

In 1272 during the period between 27 June and 26 July, a drought engulfed *Korea*.<sup>153</sup>

In 1272 during the summer, there was a famine in *Corea* [*Korea*].<sup>165</sup>

In 1272 during the period between 25 August and 23 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing, Yü-yao, Shang-yü, Chu-chi, Hsiao-shan and Hangchow. The land tax was remitted at Hangchow. Then during the period between 24 September and

23 October, floods struck several regions of *China*. Houses fields and crops were damaged by the floodwaters. The regions affected included:<sup>153</sup>

- Honan (now Henan province) in central *China* at Nan-yang, Ch'in-yang, Mêng and Chi.
- Hopei (now Hebei province) in northern *China* at Peiping, Yung-nien and Tz'ü.
- Shantung (now Shandong province) on the east coast of *China* at T'ai-an.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Nan-t'ung.

**1273 A.D.** In *England*, there were terrible rains and floods all March, then prodigious winds both day and night, doing inexpressible damage. In March, there was also a hard and long frost. In Tuscany, *Italy*, this was a year of great plenty (14 eggs sold for 1d., a hen for 2d., 8 herrings for 1d.)<sup>72</sup>

In 1273, floods struck Honan (now Henan province) in central *China* at Loyang. As a result, the land tax was remitted. During the period between 6 May and 8 November, a drought engulfed *China*.<sup>153</sup>

In 1273 during the summer and autumn, there was a drought in *China*.<sup>165</sup>

**1274 A.D.** In 1274 during the period between 9 April and 7 May, floods struck Anhwei (now Anhui province) in eastern *China* at Ho-fei. During the period between 8 May and 5 June, floods caused by heavy and protracted rains struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing. Innumerable people drowned. Then during the period between 2 September and 1 October, floods struck Chekiang province at An-chi, Yü-hang, Hangchow and Wu-k'ang.<sup>153</sup>

In 1274, a severe drought engulfed Anhwei (now Anhui province) in eastern *China* at Ho-fei; Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Wu-hua; and Fukien (now Fujian province) on the southeast coast of *China* at Fu-ch'ing.<sup>153</sup>

In 1274, there was a great drought in Anhwei province in *China*.<sup>165</sup>

[In *England*] there was thunder lightning and rains.<sup>72</sup>

**1275 A.D.** In 1275, a drought engulfed Honan (now Henan province) in central *China* at Chi and Shansi (now Shanxi province) in northern *China* at Taiyuan.<sup>153</sup>

In 1275, there was a drought in *China* along with great floods in Chihli, Honan and Shansi provinces.<sup>165</sup>

**Winter of 1275 / 1276 A.D.** The winter of 1275-76 in *Italy* was very long and harsh. Heavy snow fell and covered the earth near Parma in northern *Italy* on 29 November and the snow cover remained until early April. You could sow this year no vegetables and cereal grain that were planted almost entirely failed. The herds in the Diocese of Parma died out almost completely.<sup>62</sup>

During the winter of 1276 in Parma in northern *Italy*, there was snow on the ground from December to April.<sup>173</sup>

**1276 A.D.** In *England*, there were great floods from the sea and from the rains.<sup>47, 72, 92</sup>

In *England* from long and excessive rains came desolating inundations in many places, so that corn [grains] and grass came not to maturity. There was a great inundation from the sea at Venice, *Italy* followed by a great earthquake [tsunami].<sup>72</sup>

In 1276 and 1277, there was a drought in *England*. It was so hot and dry in the summer that scarcely any fodder [dried hay or feed for cattle] was available.<sup>212</sup>



In Bagdad, *Iraq*, the city was inundated after the appearance of red flame.<sup>47, 92</sup>

In 1276, floods struck Shantung (now Shandong province) on the east coast of *China* at Chü-yeh; *Korea*; and Liaoning province located in the southern part of *China*'s northeast at Mukden. As a result, the land tax was remitted. During the same year, a drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-fên.<sup>153</sup>

In 1276, there was a drought in Shansi province in *China*. The land tax was remitted.<sup>165</sup>

**1277 A.D.** In Holland [now *the Netherlands*], there were great inundations at Friesland, forming the Dollert Sea.<sup>47</sup> [The Zuyder-zee is a great gulf, which penetrates far inland between North Holland, and Friesland, Overyssel and Gelderland on the east. The southern portion was originally a large lake, the barrier between which and the sea was broken through by an inundation in 1225. It is much encumbered with sand banks, and subject to violent storms. The Dollert, a similar inlet between Groningen and Hanover, was formed likewise by an irruption of the sea in 1277.]

In 1277, there was an inundation at *Friesland*, since named the Dollet [Dollert] Sea.<sup>43</sup>

[In *Western Europe*] the summer of 1277 was hot. There was an exceptional drought. The largest rivers, the fountains, the sources of water were completely dry. As a consequence, there was a large loss of life. The lightning struck during the months of August and September, in many places.<sup>62</sup>

In 1276 and 1277, there was a drought in *England*. It was so hot and dry in the summer that scarcely any fodder [dried hay or feed for cattle] was available.<sup>212</sup>

The summer of 1277 [in *France*] was hot.<sup>173</sup>

In 1277, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 3 June and 2 July, floods struck Honan (now Henan province) in central *China* at Loyang and Shantung (now Shandong province) on the east coast of *China*. [There appears to be a conflict here because another account reads: In 1277 during the period between 3 June and 5 July, a drought engulfed Honan (now Henan province) in central *China* at Loyang and Shantung (now Shandong province) on the east coast of *China*.]

— During the period 3-31 July, floods struck Shantung province at Chü-yeh, Ho-tsê, Ting-t'ao, P'u, and T'ang-i. Crops were damaged.

— During the period 3-31 July, floods struck Hopei (now Hebei province) in northern *China* at Wu-ch'ing. Crops were damaged.

— During the period between 26 December 1277 and 24 January 1278, floods struck Shantung province at Kuan and Hopei province at Yung-nien. As a result, the land tax was remitted.

In 1277 during the summer, there was a drought in Honan and Shantung provinces in *China*.<sup>165</sup>

**1278 A.D.** In *Italy*, there was a great overflowing of the Tiber River.<sup>47, 72, 92</sup>

There was a great inundation of the Tiber River [in *Italy*], four feet above the altar of Maria Rotunda [the Pantheon in Rome has been used as a Roman Catholic church dedicated to "St. Mary and the Martyrs" but informally known as "Santa Maria Rotonda."].<sup>72</sup>

In 1278, there was a drought in *England* and *France*.<sup>212</sup>

In 1278, floods struck Honan (now Henan province) in central *China* at An-yang and Loyang and in Chahar province (now eastern *Inner Mongolia*) at Cho-lu. The floods led to a famine.<sup>153</sup>

In 1278 during the period between 24 April and 22 May, a drought engulfed *China*.<sup>153</sup>

In 1278 during the summer, there was a drought in Honan and Shansi provinces in *China*.<sup>165</sup>

**1279 A.D.** In *England* in May, there was a terrible thunderstorm. Trees were plucked up by the roots in many places by a tempest, and removed to others, men were wrapped up in the air, lakes were dried [tornado].<sup>72</sup>

In the year 1279, wares became very inexpensive in *Germany*. A bushel [of grain] cost 22 Pf [Pfennig – an old German coin, penny]. A hen cost 2 Pf. A number of eggs cost 1 Pf. Eight pieces of herrings cost 1 Pf.<sup>172</sup>

In 1279, floods struck Hopei (now Hebei province) in northern *China* at Pao-ting. During the period between 9 August and 7 September, floods struck Hopei province at Chao. As a result the land tax was remitted. [There appears to be a conflict here because another account reads: In 1279, a drought engulfed Hopei province at Pao-ting. During the period between 9 August and 7 September, a drought engulfed Hopei province at Chao.]<sup>153</sup>

In 1279 during the autumn, there was a drought in Chihli province in *China*.<sup>165</sup>

**1280 A.D.** In *England*, there were great floods all the summer; especially on 2 August.<sup>47, 72, 92</sup>

In *England* on 2 August, there was a prodigious inundation, which carried off many people, cattle, mills, bridges, houses, trees, hay, grass, etc. On 11 November, there was a terrible thunderstorm, which broke down houses and trees. So great a flood was there in the Sequan that it broke down the bridges at Lyons in east-central *France*.<sup>72</sup>

In 1280, more than 300 houses overwhelmed at Winchelsea in *England* by an inundation of the sea.<sup>90, 212</sup>

At Winchelsea, *England*, above 300 houses were overthrown by the sea.<sup>40, 41, 43</sup>

During the famine in *Bohemia* [now western *Czech Republic*] in 1280-82, individuals resorted to cannibalism.<sup>155</sup>

In 1280 during the period between 2 February and 2 March, floods struck Hopei (now Hebei province) in northern *China* at Tz'ü and Lu-lung. Then during the period between 27 August and 25 September, floods struck several regions of *China* including:<sup>153</sup>

- Shantung (now Shandong province) on the east coast of *China* at P'u, Chü-yeh and Tung-p'ing.
- Hopei province at Tz'ü, Peiping and Pao-ting.
- Honan (now Henan province) in central *China* at Ch'in-yang and Mêng.
- Chahar province (now eastern *Inner Mongolia*) at Lin-hsi.

In 1280 during the period between 27 August and 25 September, a drought engulfed several regions of *China* including:<sup>153</sup>

- Hopei (now Hebei province) in northern *China* at Peiping and Pao-ting
- Honan (now Henan province) in central *China* at Ch'in-yang, Mêng, Kaifeng and Hsü-ch'ang.
- Shansi (now Shanxi province) in northern *China* at Lin-fên.

— Jehol (formally Rehe province) at Lin-hsi. Rehe is located north of the Great Wall, west of Manchuria, and east of Mongolia. In 1955, the area was divided between Hebei province, Liaoning province and *Inner Mongolia*.

In 1280 during the autumn, there was a drought in Chihli and Shansi provinces in *China*.<sup>165</sup>

**Winter of 1280 / 1281 A.D.** In *England* on 22 January began a very severe 50-day frost.<sup>72</sup>

In *England* in 1280, the frost began on St. Vincent's Day (27 September) and lasted fifty days and was severe.<sup>47, 72, 93</sup>

**1281 A.D.** There was a grievous famine in *Poland*, great multitudes moved to *Russia* and *Hungary*.<sup>72</sup>

There was a famine in *Poland*.<sup>57, 72, 91</sup>

During the famine in *Bohemia* [now western *Czech Republic*] in 1280-82, individuals resorted to cannibalism.<sup>155</sup>

In 1281 in *Bavaria*, there was a snowfall in mid-June. Crop failure caused great famines.<sup>172</sup>

In 1281, there were very great floods in Paris, *France*.<sup>173</sup>

In 1281, there was a drought in *England*. The drought was so great that men passed over the River Thames dry-shod [without wetting the feet] between Westminster and Lambeth, and over the River Medway between Stroud and Rochester.<sup>212</sup>

In 1281, a powerful cyclone struck Hakata Bay, *Japan* causing 65,000 deaths.<sup>98</sup> [Hakata Bay is located in northwestern Fukuoka city, on the island of Kyūshū, *Japan*]

In 1281 during the period between 20 February and 20 March, floods struck Liaoning province located in the southern part of *China's* northeast at Liao-yang, Hei-shan and Ka-p'ing.<sup>153</sup>

In 1281, a drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-fên and Jehol (formally Rehe province) at P'ing-ch'üan. Rehe is located north of the Great Wall, west of Manchuria, and east of Mongolia. In 1955, the area was divided between Hebei province, Liaoning province and *Inner Mongolia*. During the period between 20 February and 20 March, a drought engulfed Liaoning province located in the southern part of *China's* northeast at Pei-chên and Jehol province at Lin-hsi and Karach'in (Right Wing). As a result, the land tax was remitted.<sup>153</sup>

In 1281 during the spring, there was a drought in Chihli and Shansi provinces in *China*. The land tax was remitted.<sup>165</sup>

In 1281, there was a widespread famine in the vicinity of Shanghai, *China*.<sup>166</sup>

**Winter of 1281 / 1282 A.D.** In the winter, the houses in *Austria* were completely buried in snow, and many people perished due to the cold and hunger.<sup>1</sup>

In 1281, the snow fell in great abundance in *Austria* and many houses were entirely buried in the open countryside.<sup>58, 80</sup>

A great snowstorm struck *Austria* in December 1281. *Europe* experienced a cold winter. London Bridge in *England* wrecked by ice. The spring thaw flooded Paris, *France*.<sup>28</sup>

During this winter of 1281-82, the heavy snowfall in *Austria* was in such abundance that a large number of houses in the country were completely buried. In Bohemia [now western *Czech Republic*], the freeze lasted until 25 March and then the thaw and melting of the snow produced a terrible inundation and great need. The melting snow and ice in the Seine River in Paris, *France* also produced a very severe inundation.<sup>62</sup>

In *England* from Christmas [25 December] to Lady Day [perhaps the Annunciation on 25 March], such a frost and snow as none then living had seen the like. Fish in ponds and wildfowl died for lack of food. The thaw carried down many bridges.<sup>72</sup>

In 1282 there was a most terrible frost, the like of which had never been known. The pressure of ice heaped up against [London] Bridge in *England*, and unable to pass through from the narrowness of the arches of the bridge, carried away five arches of it, and rendered it, of course, impassable for the time until they were rebuilt.<sup>29</sup>

During the winter of 1281-82, there was great snowstorm at Christmas in *England*. The River Thames was frozen over. The London Bridge was partially destroyed; five arches were carried away. Rochester and other bridges were wholly destroyed.<sup>212</sup>

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**1282 A.D.** During the famine in *Bohemia* [now western *Czech Republic*] in 1280-82, individuals resorted to cannibalism.<sup>155</sup>

In 1282, there was a great flood and gale at Boston, *England*. “The Monasterie [Monastery] of Spalding and many churches destroyed. At Yarmouth [Great Yarmouth], Donwich [the coastal town of Dunwich], and Ipswich [Ipswich], an intolerable multitude of men, women, and children overwhelmed by the water [and drowned], especially at Bostone [Boston].<sup>212</sup>

On 29 December 1282, there was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

The summer of 1282 [in *France*] was hot.<sup>173</sup>

In 1282 during the period between 11 January and 9 February, floods struck Hopei (now Hebei province) in northern *China* at Pao-ting. As a result, the land tax was remitted. Then during the period between 3 September and 2 October, floods struck Kiangsu (now Jiangsu province) on the east coast of *China*, Anhwei (now Anhui province) in eastern *China*, and Kiangsi (now Jiangxi province) in southern *China*. These later floods led to famine.<sup>153</sup>

In 1282, a drought engulfed Shantung (now Shandong province) on the east coast of *China*, Hopei (now Hebei province) in northern *China*, and an unknown location called Yen-nan [possibly located 230 kilometers north of Xian]. During the period between 3 September and 2 October, a drought engulfed Hopei province at Chêng-ting.<sup>153</sup>

In 1282 during the autumn, there was a drought in Chihli and Shantung provinces in *China*.<sup>165</sup>

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**1283 A.D.** In 1283, floods struck several regions of *China* including:<sup>153</sup>  
— Honan (now Henan province) in central *China* at Nan-yang, Pi-yüan, Têng, Fang-ch'êng, Sung and Chi. Crops were damaged.

— During the period between 26 June and 25 July, floods struck Shansi (now Shanxi province) in northern *China* at Taiyuan and Honan province at Ch'in-yang, Mêng and Loyang. Fields were damaged.  
 — During the period between 22 October and 20 November, floods struck Hopei (now Hebei province) in northern *China* at Cho.

In 1283, there was a drought in Chihli and Shantung provinces in *China*.<sup>165</sup>

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**1284 A.D.** In *England* on 26 December, there was great thunder and lightning. On 9 April about sunrise, the sky darkened as though it was night, suddenly followed a terrible tempest, first of hail and rain, then much snow covering all the earth to a considerable depth, lastly there was fearful thunder and lightning. This was the warmest winter known.<sup>72</sup>

The summer of 1284 [in *France*] was so hot that it felt like being in a boiler.<sup>173</sup>

In northern *France*, fierce winds tore up the walnut [trees] and destroyed [church] steeples on November 24, 1284.<sup>79</sup>

In 1284 during the period between 14 July and 12 August, floods struck in Hopei (now Hebei province) in northern *China* at Pao-ting and Ho-chien, and in Shantung (now Shandong province) on the east coast of *China* at Pin and Hui-min.<sup>153</sup>

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**1285 A.D.** In *England*, there was a great storm, “with violent lightning.”<sup>57</sup>

In 1285, there was a great thunderstorm in London, *England*.<sup>212</sup>

In *England*, as King Edward I and his queen were talking together in their bedchamber, a flash of lightning struck in at the window, passed by them, killed two of their servants who waited upon them, but did their majesties no hurt.<sup>40, 41, 43, 56, 90</sup>

In *England*, there was a sudden great darkness, and then such drought and heat as killed most grain.<sup>47, 72</sup>

In *England*, there was a sudden great darkness of the sky followed by a most parching drought and heat. Almost all greens died. Then came great and long rains; hence began a famine in *England*, which continued twenty-three years.<sup>72</sup>

The summer of 1285 [in *France*] was hot.<sup>173</sup>

The winter was very mild and rainy in *Italy*.<sup>62</sup>

In 1285, a drought engulfed several regions of *China*. As a result of the hardship, the land tax was remitted. These regions included:<sup>153</sup>

- Honan (now Henan province) in central *China* at Ch'in-yang, Mêng, Kaifeng, Lin-ju, An-yang and Chi.
- Shantung (now Shandong province) on the east coast of *China* at P'u and Liao-ch'êng.
- Hopei (now Hebei province) in northern *China* at Yung-nien.
- Shansi (now Shanxi province) in northern *China* at Lin-fên.

In 1285 during the summer, there was a drought in Chihli, Honan, Shansi and Shantung provinces in *China*.<sup>165</sup>

In 1285, floods struck several regions of *China* including:<sup>153</sup>

— Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu and Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo. Houses were damaged by the floodwaters and 795 families were flooded.

— During the period between 8 August and 8 November, floods struck Honan (now Henan province) in central *China* at Kaifeng and An-yang. Fields were damaged.

— During the period between 8 August and 8 November, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming, Ho-chien and Hsing-t'ai. Fields were damaged.

— During the period between 8 August and 8 November, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan. Fields were damaged.

**1286 A.D.** In 1286 in *England*, during the night of the Feast of Saint Margaret [Saint Margaret of Scotland – 10 June] fell a great tempest of rain, thunder, and lightning, so great that it drowned all the sown corn [grains]. All grains had been cheap. Wheat was 18 shillings a Quarter [quarter ton], but now began a dearth, which continued more or less for 40 years. On 6 July, a dismal tempest of hail, thunder and lightning at Magdeburg in central *Germany*.<sup>72</sup>

[In *England*] the rains which came too late in 1285 lasted too long in 1286, hence a dearth.<sup>72</sup>

There was a 23-year long famine in *England* that began in 1286.<sup>91</sup>

Beginning in 1286, there was a famine in *England* caused by excessive rains that lasted 23 years, or 40 by times.<sup>72</sup>

In 1286, floods struck many regions of *China* including:<sup>153</sup>

— Shensi (now Shaanxi province) in central *China* at Sian, Hua and Hua-yin.

— Hopei (now Hebei province) in northern *China* at Peiping, Cho, Mi-yün, Shun-i, T'ung and Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]

— Honan (now Henan province) in central *China* at Kaifeng, Nan-yang and Shang-ch'iu.

— Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow. Fields were damaged.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow. Fields were damaged.

— During the period between 26 March and 24 April, floods struck Hopei province at Hsiung, Pa and Pao-ting.

— During the period between 19 October and 16 November, floods struck Honan province at Kaifeng, Ch'i, T'ai-k'ang, Hsü-ch'ang, Yen-ling, Fu-kou, Yü-shih, Yen-ching, Chung-mou and Yüan-wu.

— During the period between 19 October and 16 November, floods struck Hopei province at T'ung.

— During the period between 19 October and 16 November, floods struck Chekiang province at Chien-tê.

In 1286 during the period between 25 May and 22 June, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng and Lin-ju, and Hopei (now Hebei province) in northern *China* at Peiping.<sup>153</sup>

In 1286 during the summer, there was a drought in Chihli, Honan and Shansi provinces in *China*. The land tax was remitted.<sup>165</sup>

**1287 A.D.** In Winchelsea, *England* in 1287, there was a great inundation of the sea; more than 300 houses swept away. "Charter granted for erection of new port."<sup>47, 92</sup>

In *England*, the winter was excessively rainy producing great floods. 1<sup>st</sup> June. Sea broke in from the Humber to Yarmouth, forced by the winds. In December on Suffolk and Norfolk coasts. Plague all the year.<sup>47, 92</sup> [The Humber is a large tidal estuary on the east coast of northern *England*. Yarmouth or Great Yarmouth is a coastal town in Norfolk in eastern *England*.]



In *Selandria*, fifteen islands submerged by the sea, 15,000 people drowned.<sup>47, 92</sup> [Selandia may be a variant of Zeeland in *the Netherlands*. 'Selandia' is the Latin name for the Danish island of Sjælland.]

Fifteen islands in *Selandia* were drowned by an inundation of the sea and with them 15,000 people. From the excessive rains that fell this winter in *England*; there were very great floods. On 1 January, the sea from the Humber to Yarmouth broke into the land, overflowing for three or four leagues [9-12 miles, 14.5-19.3 kilometers] in breadth, overthrowing buildings, drowning people and cattle. It came so suddenly that there was no avoiding it. It laid the whole Fens of Lincolnshire, *England* under water. In December, it broke out likewise in Norfolk and Suffolk, and did great damage.<sup>72</sup>

“15 Iflands [Islands] in Zealand, 10 drowned by the Sea, and 15000 people; all Winter [in *England*] exceffive [excessive] rainy, great Floods. June 1. the Sea was forced in by Winds from Humber to Yarmouth, and in Dec. from Norfolk to Suffolk; yet a plentiful Year.”<sup>72</sup>

In Holland [now *the Netherlands*], there was a dreadful storm, laid the whole country on both sides of the Zuyderzee under water. To such a height did the water rise that Count Florence took advantage of the circumstance to subdue the inland towns by armed vessels called “cogs”.<sup>47, 92</sup>

On 14 December 1287, a great storm struck. The chronicle of the monastery Rastede speaks of flooded dikes in *Friesland* and *Stedingen* [now tidal marsh of Lower Saxony, *Germany*] and thousands of deaths. The water rose "five feet higher" than ever before causing whole villages to be destroyed. People fled before the advancing North Sea, and thereby establish new villages as Osteel, Marienhaf or Upgant-Schott. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

It did not rain all summer in 1287 in *France*. Wells and springs dried up.<sup>79</sup>

The summer of 1287 [in *France*] produced a drought. It was a summer “without any rain”.<sup>173</sup>

In 1287, floods struck many regions of *China* including:<sup>153</sup>

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang and T'ai-ts'ang. As a result, 20% of the land tax was remitted.

— Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hu-chou. As a result, 20% of the land tax was remitted.

— During the period between 14 April and 13 May, floods struck Honan (now Henan province) in central *China* at Kaifeng and Nan-yang.

— During the period between 12 July and 10 August, floods struck Hopei (now Hebei province) in northern *China* at Pa.

— During the period between 9 October and 6 November, floods struck Liaoning province located in the southern part of *China*'s northeast at Liao-yang and Fêng-ch'êng. Fields were damaged.

— During the period between 9 October and 6 November, floods struck Yunnan province in southwest *China* at Chên-yüan. Fields were damaged.

In 1287 during the period between 5 February and 6 May, a drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-fên.<sup>153</sup>

In 1287 during the spring, there was a drought in Shansi province in *China*.<sup>165</sup>

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**1288 A.D.** In *England* during the winter, there was great frost and snow.<sup>47, 72, 93</sup>

In the month of March, the Rhine River froze below Basel (city situated at the border between *Switzerland, France and Germany*).<sup>62</sup>

The frosts of 1288 in northern *France* killed the buds of the vines, all woods and orchards.<sup>79</sup>

The summer of 1288 [in *France*] was hot.<sup>173</sup>

In *England* during the summer, there was heat and drought so intense as killed many. There were great deaths. There was plenty.<sup>47, 72</sup>

In *England* during the summer of 1288, it was so exceedingly hot, that in some places men died of the heat. This year and last brought such a plentiful increase that wheat sold for 16*d.* to 20*d.* per Quarter [quarter ton]. All provisions were very good and cheap. This drought was followed by a great mortality of people because of a severe cold frosty winter and much snow.<sup>72</sup>

In *England* in 1288, it was a good year for great wine, hay and acorns. But in August, there was such great heat that the birds died in the fields. In some places people died of suffocation from the heat.<sup>62</sup>

In 1288, floods struck many regions of *China* including:<sup>153</sup>

— During the period 2-31 May, floods struck on the east coast of *China* in Chekiang (now Zhejiang province) at Hangchow, Chia-hsing and Hu-chou, and in Kiangsu (now Jiangsu province) at Soochow.

— During the period 1-29 June, floods struck Honan (now Henan province) in central *China* at Nan-yang, Kaifeng, T'ai-k'ang, Hsü-ch'ang, Ch'i, and Huai-yang. During the same time period, floods also struck Hopei (now Hebei province) in northern *China* at T'ung and Anhwei (now Anhui province) in eastern *China* at Fou-yang.

— During the period between 30 June and 29 July, floods struck Honan province at Shang-ch'iu. Crops were damaged by the floodwaters and the land tax was remitted. During the same time period, floods also struck Honan province at K'ao-ch'êng, Kaifeng, Hsü-ch'ang, Ch'i, T'ai-k'ang. Fields were damaged by the floodwaters and the land tax was remitted. During the same time period, floods also struck Hopei province at T'ung. Fields were damaged by the floodwaters and the land tax was remitted.

— During the period between 30 July and 27 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Chiao. The floods led to a famine.

— During the period between 25 December 1288 and 22 January 1289, floods struck Shansi (now Shanxi province) in northern *China* at Taiyuan and Honan province at Kaifeng and Nan-yang. The crops were damaged.

In 1288, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing and Shensi (now Shaanxi province) in central *China* at Shang, Yao, Ch'ien and Hua.<sup>153</sup>

In 1288 during the spring, summer and autumn, there was a drought in Shantung and Shensi provinces in *China*.<sup>165</sup>

**1289 A.D.** In *England*, there was a great hailstorm, followed by heavy rains, greatly affecting the next year's harvest.<sup>47</sup>

In 1289 in *England*, during the 17<sup>th</sup> year of King Edward I reign, there was a great hailstorm, followed by heavy rains. As a result, the next year there was a great scarcity of grain.<sup>93</sup>

In 1289 in *England*, there was a famine caused by great rains.<sup>72</sup>

On 9 July 1289, there fell the greatest tempest of hail in *England* than could ever be remembered. This hailstorm was followed by continual rains. So that all corn [grain] turned very dear [scarce]. This dearth continued and increased even to the death of King Richard II.<sup>72</sup>

In *England* in 1289, a tempest destroyed the seed, and corn [grain] rose to a great price.<sup>57, 91</sup>

During the winter the temperature was so mild that in Cologne, *Germany*, the young girls wore wreaths of violets, cornflowers and primroses on Christmas [25 December] and the Epiphany [6 January].<sup>62</sup>

In 1289, there was a great flood in *China*. The Yellow River cut a new course to the sea.<sup>142</sup>

In 1289 during the period between 22 February and 22 March, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing. As a result, the land tax was remitted. During the period between 21 May and 18 June, floods struck Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng. Houses were damaged by the floodwaters. During the period between 19 July and 16 August, floods struck Hopei (now Hebei province) in northern *China* at Ho-chien. Crops were damaged by the floodwaters. During the period between 17 August and 15 September, floods struck Hopei province at Pa resulting in a famine.<sup>153</sup>

In 1289, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Hsin-chiang.<sup>153</sup>

In 1289 during the summer, there was a great drought in Shansi province in *China*. This led to an insurrection in Hunan.<sup>165</sup>

**1290 A.D.** [In *England*], there was a great dearth. Wheat sold for 12s. to 13s. 8d. per Quarter [quarter ton]. In winter, there was much snow but little frost.<sup>72</sup>

[In *England*] in 1290, there was a very severe famine.<sup>72</sup>

In 1290, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 13 January and 10 February, floods struck Hopei (now Hebei province) in northern *China* at Lu-lung and Luan. Crops were damaged by the floodwaters and the land tax was remitted.

— During the period between 11 February and 12 March, floods struck Anhwei (now Anhui province) in eastern *China* at Wu-wei. As a result, the land tax was remitted. During the same period of time, floods also struck Kansu (now Gansu province) in northwest *China* at Chang-yeh.

— During the period between 9 June and 7 July, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Chiang-yin. As a result, the land tax was remitted.

— During the period between 8 July and 6 August, floods struck Honan (now Henan province) in central *China* at T'ai-k'ang, Ch'in-yang, Mêng, Wu-chin, Kaifeng and Nan-yang. The land tax was remitted. Also during the same time period, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Chin-chiang. The land tax was remitted.

— During the period between 7 August and 4 September, floods struck Hupeh (now Hubei province) in central *China* at Wuchang and Hopei province at Ta-ming. Crops were damaged by the floodwaters and the land tax was remitted.

— During the period between 5 September and 4 October, floods struck Shantung (now Shandong province) on the east coast of *China* at Kao-t'ang. The fields were damaged. During the same time period, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton and Ch'ing-yüan. The land tax was remitted.

— During the period between 4 November and 2 December, floods struck Kiangsu province at Chiang-yin and Anhwei province at Hsüan-ch'êng. These floods led to a famine.

— During the period between 3 December 1290 and 1 January 1291, floods struck in Honan province at Kaifeng, T'ai-k'ang, Hsü-ch'ang and Huai-yang; in Anhwei province at Fou-yang; in Hopei province at T'ung. During the same time period, floods struck in Honan province at Hsin-an and in Hopei province at Hsiung and Jên-ch'iu where the floodwaters damaged the fields and houses.

In 1290 during the period between 10 May and 8 September, a drought engulfed Hopei (now Hebei province) in northern *China* at P'ing-shan, Chêng-ting and Tsao-ch'iang. As a result, the land tax was remitted. During the period between 7 August and 4 September, a drought engulfed Hopei province at Ts'ang and Shantung (now Shandong province) on the east coast of *China* at Yüeh-ling.<sup>153</sup>

In 1290 during the summer and autumn, there was a drought in Chihli province in *China*. The land tax was remitted.<sup>165</sup>

**1291 A.D.** In the spring, the Volkhov River flooded. The horses all died in Novgorod [*Russia*], and but few were left. The same year a frost attacked the crops throughout the whole of the Novgorod district.<sup>76</sup>

In *England*, there was a drought all summer.<sup>47, 72</sup>

[In *England*], there was a great famine.<sup>72</sup>

In *England* in 1291, there was a most droughty summer, an excessively rainy harvest and a frosty winter. This resulted in an extraordinary scarcity of hay, grass and corn [grains].<sup>72</sup>

In *India*, there was a great drought.<sup>47</sup>

In *India* in 1291, no rain fell in the provinces about Delhi and there was in consequence a most terrible famine.<sup>57</sup>

In 1291 A.D., during the reign of Firok Shah, there was a famine in Delhi and its neighborhood in *India*.<sup>179</sup> “The Hindus of that country, came into Delhi with their families, twenty of thirty of them together, and in the extremity of hunger drowned themselves in the Jumna [river].”<sup>181</sup>

In 1291 in Damascus, *Syria*, there was inundated caused by overflowing of streams.<sup>47, 92</sup>

In 1291 during the period 1-29 April, floods struck Hunan province in south-central *China* at Ch'ang-tê. During the period between 24 August and 23 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua. During the period between 24 September and 23 October, floods struck Hopei (now Hebei province) in northern *China* at Pao-ting, Ho-chien, Lu-lung and Luan.<sup>153</sup>

**Winter of 1291 / 1292 A.D.** In 1291 in *England*, the frost was severe all winter.<sup>47, 72, 93</sup>

In 1292, “the Rhine was frozen over,” and the snow is represented as being of an “enormous depth”.<sup>30</sup>

The winter of 1292 in *England* was very harsh. In February, one would walk across the [frozen] Rhine River in Western *Europe* with dry feet.<sup>173</sup>

In 1292, loaded carts crossed the Rhine River at Breisach in southwestern *Germany*, on the ice. The Caltégat Sea (Kattegat Sea) was frozen over completely with ice.<sup>60, 62</sup> [The Kattegat Sea is the strait between north *Denmark* and *Sweden*.]

In 1292, the winter in *Germany* and *Northern Europe* was very severe.<sup>62</sup>

The winter of 1292 in northern *France* was very severe.<sup>79</sup>

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**1292 A.D.** In 1292 during the period between 5 February and 19 March, a drought engulfed Honan (now Henan province) in central *China* at Hsin-yang and Shantung (now Shandong province) on the east coast of *China* at Hui-min. Then during the period between 16 June and 15 July, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ien-an.<sup>153</sup>

In 1292 during the spring and summer, there was a drought in Kwangtung and Shantung provinces in *China*. There were also floods.<sup>165</sup>

In 1292, floods struck many regions of *China* including:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Wu-chin, Chinkiang and Sung-chiang.
- Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou, Chia-hsing and Shao-hsing.
- During the period between 18 May and 15 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang, Hsin-chien and Chin-hsien.
- During the period between 16 June and 15 July, floods struck in Chekiang province at Hu-chou and Chia-hsing; in Kiangsu at Soochow, Chinkiang and Yangchow; and in Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng and Tang-t'u.
- During the period between 16 July and 13 August, floods struck in Hunan province in south-central *China* at Hua-jung and in Hopei (now Hebei province) in northern *China* at Wu-ch'ing.
- During the period between 12 October and 9 November, floods struck Hopei province at Lu-lung and Luan.
- During the period between 10 December 1292 and 8 January 1293, floods struck Hunan province at Yüeh-yang and Hua-jung.

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**1293 A.D.** On 14 May 1293 fell a great snow and with it a terrible wind. The storm did great damage in *England*.<sup>72</sup>

In the Novgorod Republic [now part of *Russia*], in the sixth week of Lent, a thaw set in; water covered all the land; round the town was flooded, and there was no fodder for the horses.<sup>76</sup>

The summer of 1293 [in *France*] was hot.<sup>173</sup>

In 1293 & 1294, there was a drought [in *England*]. The summers were excessively hot.<sup>212</sup>

In 1293, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Chêng-ting and Chin, and Kansu (now Gansu province) in northwest *China* at Ning [some uncertainty exist in location].<sup>153</sup>

In 1293, there was a very severe drought in Chihli province in *China*.<sup>165</sup>

In 1293, floods struck many regions of *China* including:<sup>153</sup>

- Hopei (now Hebei province) in northern *China* at Chêng-ting and Chin, and in Honan (now Henan province) in central *China* at Ning.
- During the period between 6 June and 4 July, floods struck in Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang and T'ai-ts'ang; in Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hu-chou; and in Hopei province at Chêng-ting and Shen.

— During the period 1-30 October, floods struck Shantung (now Shandong province) on the east coast of *China* at P'êng-lai.

— During the period between 31 October and 28 November, floods struck Hopei province at Lu-lung and Luan.

**1294 A.D.** In the winter, the sea between *Norway* and *Denmark*, and from *Sweden* to *Gothland*, and the Rhine River and *Baltic Sea* were all frozen and snow fell to a frightful depth.<sup>1</sup>

In 1294, the Cattegat, or sea between *Norway* and *Denmark*, was frozen, and that from Oslo in *Norway*, traders travelled on the ice to Jutland.<sup>2, 41, 42, 43, 47, 93</sup>

In 1294, the Cattegat was covered with ice seven feet thick. Batteries of artillery were moved to and from the strait.<sup>63</sup>

In 1294, The Cattegat entirely frozen.<sup>90</sup>

The drought of 1294 dried up all the wells and all sources [of water – springs, creeks, small rivers and lakes] in Provence, *France*. The Huveaune River dried up completely. The water on the Rhône River declined to such an extent that it was no longer navigable, even at its mouth. It was impossible to grind wheat with windmills.<sup>79</sup>

In *England*, there was a very great drought.<sup>47, 72</sup>

In *England*, there was a grievous famine. Wheat sold from 16s. to 20s. per Quarter (quarter ton). As a result, thousands of poor died. There was so great a drought that springs and rivers were dry. Grass was burnt up. Cattle were kept alive on straw. Corn [grain] was harvest before Saint John's Mass [23 June] and grapes at the Nativity of the Virgin [8 September].<sup>72</sup>

In *England* in 1294, there was a severe famine. Many of thousands of the poor died.<sup>57, 91</sup>

In *England*, there was a very sore famine with a desolating mortality.<sup>72</sup>

In 1293 & 1294, there was a drought [in *England*]. The summers were excessively hot.<sup>212</sup>

In 1294, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 26 May and 24 June, floods struck Hupeh (now Hubei province) in central *China* at I-ch'ang.

— During the period between 23 August and 20 September, floods struck Hopei (now Hebei province) in northern *China* at Lu-lung, Luan and Ch'ien-an.

— During the period between 21 September and 19 October, floods struck in Hopei province at Chao and Chin and in Kansu (now Gansu province) in northwest *China* at Ning [some uncertainty exist in location].

— During the period between 20 October and 18 November, floods struck Liaoning province located in the southern part of *China's* northeast at Liao-yang.

**1295 A.D.** On 19 and 20 January, day and night, a hurricane with violent showers and storms consumed the winter seeds in marshy places. There were great floods in *England*. There was a great intemperature of the elements this year. On the 3<sup>rd</sup> of the Nones of April, there was a deep snow. Hail spoiled the corn [grain]. Famine oppressed those of Bourbon [*France*].<sup>72</sup>

[In *England*] on 19 and 20 January, there was a hurricane, rain, storm, floods all winter and as a result seeds lost; hence dearth.<sup>72</sup>



In 1295 in *England*, there were no grain or fruits, “so the poor died of hunger.”<sup>57, 91</sup>

In *England*, there was a famine from hailstorms and a great concussion of the elements.<sup>57, 72, 91</sup>

In *Ireland*, there was a great dearth from 1294-96.<sup>57, 91</sup>

In 1295, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 14 June and 13 July, floods struck in Kiangsi (now Jiangxi province) in southern *China* at P’o-yang; in Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang, Wu-chin, Soochow and Nanking; in Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou; in Anhwei (now Anhui province) in eastern *China* at Tang-t’u; and in Hunan province in south-central *China* at Ch’ang-tê and Li.

— During the period between 14 July and 11 August, floods struck Shantung (now Shandong province) on the east coast of *China* at T’ai-an, Ho-tsê, Chü-yeh and Tsinan.

— During the period between 12 August and 10 September, floods struck Kiangsi province damaging crops. During the same time period, floods struck in Chekiang province at Hu-chou; in Liaoning province located in the southern part of *China*’s northeast at Liao-yang; in Shantung province at Tung-p’ing; and in Hunan province at Ch’ang-tê.

— During the period between 11 September and 9 October, floods struck in Kiangsu province at Soochow; in Anhwei province at Ho-fei and Shou; and in Chahar province (now eastern *Inner Mongolia*) at Hsüan-hua.

In 1295 during the 6<sup>th</sup> moon, there was an extensive "water calamity" [flood damage] in the vicinity of Shanghai, *China*.<sup>166</sup>

In 1295, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 14 July and 11 August, a drought engulfed Kansu (now Gansu province) in northwest *China* at Lung-hsi, Huan and Ch’ing-yang; Shensi (now Shaanxi province) in central *China* at Fu-shih; and Liaoning province located in the southern part of *China*’s northeast at Chin-chou.

— During the period between 12 August and 10 September, a drought engulfed Shansi (now Shanxi province) in northern *China* at Taiyuan and Lin-fên; Anhwei (now Anhui province) in eastern *China* at Shou; and Hopei (now Hebei province) in northern *China* at Ho-chien.

— During the period between 11 September and 10 October, a drought engulfed Honan (now Henan province) in central *China* at Kaifeng and Lin-ju; Shantung (now Shandong province) on the east coast of *China* at Tung-p’ing; and Hopei province at Chêng-ting.

— During the period between 10 October and 7 November, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu; Anhwei province at Ssü; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ho.

In 1295 during the summer and autumn, there was a drought in Chihli, Kansuh, Shansi and Shensi provinces in *China*.<sup>165</sup>

**1296 A.D.** In the winter, the sea between *Norway* and *Denmark*, and from *Sweden* to *Gothland*, and the Rhine River and *Baltic Sea* were all frozen and snow fell to a frightful depth.<sup>1</sup>

The sea between *Norway* and the promontory of Scagernit frozen over and from *Sweden* to *Gothland*.<sup>2, 40, 41, 42, 43</sup> [Scagernit or the Skagerrak is a strait running between *Norway* and the southwestern coast of Sweden and the Jutland peninsula of *Denmark*, connecting the North Sea and the Kattegat sea area, which leads to the Baltic Sea. Gothland is the Gotland Island, *Sweden* in the Baltic Sea.]

The *Baltic Sea* was covered with ice from *Sweden* to *Gothland*.<sup>47, 93</sup>

Never in living memory, has anyone seen a winter so cruel in *France* as that of 1296.<sup>79</sup>

The summer of 1296 [in *France*] was hot.<sup>173</sup>

In 1296, droughts engulfed several regions of *China* including:<sup>153</sup>

— During the period between 5 March and 3 April, a drought engulfed Hopei (now Hebei province) in northern *China* at Ta-ming, P'u-yang [some uncertainty on location K'ai-chou], Ho-chien, and Su-ning; and Honan (now Henan province) in central *China* at Ch'in-yang, Mêng and Wu-chih. As a result, the land tax was remitted.

— During the period between 29 September and 27 October, a drought engulfed Hopei province at Hsien and Jên-ch'iu.

— During the period between 28 October and 26 November, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hua.

In 1296 during the autumn, there was a drought in Chihli, Honan and Shansi provinces in *China*. There was a drought in the city of Moukden [now Shenyang]. The land tax was remitted.<sup>165</sup>

In 1296, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 2 June and 1 July, floods struck in Shansi (now Shanxi province) in northern *China* at Taiyuan; in Hopei (now Hebei province) in northern *China* at Chiao-ho, Jên-ch'iu and Hsien; and in Hunan province in south-central *China* at Li-ling.

— During the period 2-31 July, floods struck in Hopei province at Peiping, Pa and Pao-ting where crops were damaged. During the same time period, floods struck in Hopei province at Chêng-ting, Fou-ch'êng, Huo-lu, Kao-ch'êng, Pao-ting, An-hsin, Hsiung and Shu-lu; in Honan (now Henan province) in central *China* at Ju-nan; in Anhwei (now Anhui province) in eastern *China* at Fou-yang, Ho-fei and Tang-t'u, in Shantung (now Shandong province) on the east coast of *China* at Chü-yeh; in Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow, Nanking, Chinkiang, Wu-chin and P'ei [P'ei is located at longitude 117.00° East and latitude 34.47° North.]; in Hupeh (now Hubei province) in central *China* at Yüeh-yang; in Hunan province at Li; and in Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing.

— During the period 1-29 August, floods struck in Honan province at An-yang; in Hopei province at Chêng-ting; and in Shantung province at Ho-tsê and Pin.

— During the period between 30 August and 28 September, floods struck in Shantung province at Hui-min and Ho-tsê; and in Hopei province at Ta-ming

— During the period between 29 September and 27 October, floods struck in Hunan province at Yüan-chiang; and in Honan province at Ch'i, Fêng-ch'iu, Kaifeng, Ning-ling and Sui.

— During the period between 28 October and 26 November, floods struck in Shantung province at Wên-têng, and in Honan province at Kaifeng.

**Winter of 1296 / 1297 A.D.** The Seine River in Paris, *France* flooded from 20 December 1296 to 1 January 1297. There was water in all the streets of Paris.<sup>173</sup>

During the period between 26 December 1296 and 23 January 1297, floods struck several regions of *China* including:

— Hupeh (now Hubei province) in central *China* at Chiang-ling, Ch'ien-chiang and Mien-yang.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an, Tung-hai and Yen-ch'êng.

— Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning.

— Hopei (now Hebei province) in northern *China* at Peiping and Pao-ting.

— Honan (now Henan province) in central *China* at Kaifeng and Nan-yang.

During the same period of time, a drought engulfed Liaoning province located in the southern part of *China's* northeast at Liao-yang and K'ai-yüan [some uncertainty on location].<sup>153</sup>

**1297 A.D.** In *Scotland*, there was a sore affliction of famine and plague.<sup>72</sup>

In *Scotland* in 1297, calamitous famine and pestilence.<sup>57, 72, 91</sup>

The summer of 1297 [in *France*] was hot.<sup>173</sup>

In 1297, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 24 January and 22 February, floods struck Honan (now Henan province) in central *China* at Kaifeng, Shang-ch'iu and Nan-yang.

— During the period between 24 March and 22 April, floods struck Honan province at Lu-i, Kaifeng, Shang-ch'iu, Loyang, Hsü-ch'ang, Lin-ying, Yan-ch'êng, Sui, T'ai-k'ang, Fu-kou, Ch'i, and Nan-yang. Houses and fields were damaged by the floodwaters. During the same period of time, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow, P'ei, Sui-ning and Su-ch'ien. [P'ei is located at longitude 118.03° East and latitude 34.30° North.] Houses and fields were damaged.

— During the period between 22 May and 20 June, floods struck in Honan province at Nan-yang and Kaifeng; in Kiangsi (now Jiangxi province) in southern *China* at P'o-yang, Nan-ch'ang and Hsing-tzũ; in Shansi (now Shanxi province) in northern *China* at Hsi-yang; in Hunan province in south-central *China* at Li; and in Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Nan-hsiung.

— During the period between 21 June and 20 July, floods struck Anhwei (now Anhui province) in eastern *China* at Ho. Houses were damaged by the floodwaters.

— During the period between 21 July and 18 August, floods struck in Honan at Ch'i; in Hopei (now Hebei province) in northern *China* at Tientsin; in Shantung (now Shandong province) on the east coast of *China* at Lai-yang; and in Hunan province at Ling. Over 300 persons drowned at these locations. During the same time period, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou; and in Shansi province at Lin-fên. Over 6,800 persons drowned at these locations.

— During the period between 19 August and 16 September, floods struck in Anhwei province at Kuei-ch'ih, Hsüan-ch'êng and Tang-t'u; and in Kiangsi province at Hsing-tzũ.

— During the period between 18 September and 16 October, floods struck in Hunan province at Li and Ch'ang-tê; in Kiangsi province at P'o-yang and Ch'ing-chiang; in Shansi province at Lin-fên; and in Chekiang province at Wên-chou.

— During the period between 17 October and 15 November, floods struck in Anhwei province at Ho-fei and Wu-wei. Houses were damaged by the floodwaters. During the same time period, floods struck in Chekiang province at Chien-tê and Wên-chou; and in Kwangtung province at Nan-hsiung.

— During the period between 16 November and 15 December, floods struck Hunan province at Ch'ang-tê.

In 1297, a severe drought engulfed many regions of *China* including:<sup>153</sup>

— Shantung (now Shandong province) on the east coast of *China* at Tsinan; Shensi (now Shaanxi province) in central *China* at An-k'ang; Hopei (now Hebei province) in northern *China* at Hsing-t'ai, Ho-chien and Ta-ming; and Shansi (now Shanxi province) in northern *China* at Lin-fên.

— During the period between 24 March and 22 April, a severe drought engulfed Hunan province in south-central *China* at Tao.

— During the period between 21 June and 20 July, a severe drought engulfed Hopei province at Ho-chien and Ta-ming.

— During the period between 21 July and 18 August, a severe drought engulfed Honan (now Henan province) in central *China* at Ch'in-yang and Wu-chih.

— During the period between 19 August and 17 September, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and Huai-an; Chekiang (now Zhejiang province) on the east coast of *China* at Ning-hai; and Hopei province at Chêng-ting, Hsing-t'ai and Ho-chien.

— During the period between 18 September and 16 October, a severe drought engulfed Honan province at Chi and Kiangsu province at Tan-yang and Chin-t'an.

— During the period between 17 October and 15 November, a severe drought engulfed Anhwei (now Anhui province) in eastern *China* at Ho, Ho-fei, Mêng-ch'êng and Huo-ch'iu.

— During the period between 16 November and 15 December, a severe drought engulfed Kiangsu province at Wu-chin and I-hsing.

In 1297 during the spring, summer and autumn, there was a great drought in Chihli, Honan, Hunan, Kiangsu and Shansi provinces in *China*.<sup>165</sup>

**1298 A.D.** In 1298 during the 26<sup>th</sup> year of King Edward I reign, “A great famine in *England*, chiefly want of wine, so that the same could scarcely be had to minister the communion in the churches.”<sup>57</sup> [King Edward I reigned from 16 November 1272 – 7 July 1307]

[Another account places this event in 1296] In 1296 [in *England*], there was a famine and great scarcity of wine, even for sacred uses.<sup>72</sup>

In 1298, floods struck many regions of *China* including:<sup>153</sup>

— Kiangsi (now Jiangxi province) in southern *China*, Kiangsu (now Jiangsu province) on the east coast of *China* and Chekiang (now Zhejiang province) on the east coast of *China*.

— During the period between 14 January and 11 February, floods struck in Hopei (now Hebei province) in northern *China* at Mi-yün and Shun-i; and in Liaoning province located in the southern part of *China*'s northeast at Liao-yang and Pei-chên.

— During the period between 14 March and 11 April, floods struck Hupeh (now Hubei province) in central *China* at Hanyang and Han-ch'uan.

— During the period between 10 July and 7 August, floods struck in Hopei province at Tientsin, Lu-lung, Luan and Ta-ming; in Honan (now Henan province) in central *China* at Nan-yang, Shang-ch'iu and Kaifeng; and in Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng.

— During the period between 8 August and 6 September, floods struck Honan province at Kaifeng and Nan-yang. The dikes were damaged. Also during the same time period, floods struck Honan province at Shang-ch'iu. Crops and houses were damaged by the floodwaters.

In 1298 during the period between 14 March and 11 April, drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing; Kiangsu (now Jiangsu province) on the east coast of *China* at Chiang-yin, Nanking and Li-yang; and Anhwei (now Anhui province) in eastern *China* at Kuei-ch'ih. In Kiangsu, a plague of locust accompanied the drought. Then during the period between 10 June and 9 July, drought engulfed Hopei (now Hebei province) in northern *China* at Lu-lung, Luan and Hsing-t'ai; and Honan (now Henan province) in central *China* at Chi.<sup>153</sup>

In 1298 during the spring and summer, there was a drought in Chêhkiang, Chihli, Honan and Kiangsu provinces in *China*. There was a plague of locusts at Kiangsu.<sup>165</sup>

**1299 A.D.** In *England* in November, there was an inundation from the sea in the River Thames. “In December, great calm, heat, and clearness.”<sup>47, 72</sup>

In December [in *England*], there was a hurricane. Then great calm, clear and hot. After that great floods.<sup>72</sup>

In *Persia*, they were ravaged by famine and pestilence.<sup>57,91</sup>

In 1299, drought engulfed many regions of *China*. Due to the hardship, the land tax was remitted in these regions. The regions affected included:<sup>153</sup>

— During the period between 4 January and 1 February, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and Huai-an.

— During the period between 31 May and 28 June, a drought engulfed Hupeh (now Hubei province) in central *China* at Wuchang, Hanyang, Chiang-ling and Yang-hsin.

— During the period between 31 May and 28 June, a drought engulfed Kiangsu province at Wu-chin

— During the period between 31 May and 28 June, a drought engulfed Hunan province in south-central *China* at Changsha, Yüan-ling, Shao-yang, Kuei-yang, Yüeh-yang, Hêng-yang, Chih-chiang, Ch'ang-tê, Li and Ch'a-ling.

— During the period between 26 September and 24 October, a drought engulfed Kiangsu province at Yangchow and Huai-an.

— During the period between 25 October and 23 November, a drought engulfed Kiangsu province at Yangchow and Huai-an; Anhwei (now Anhui province) in eastern *China* at Ho-fei; and Hupeh province at Chiang-ling, Mien-yang, Sui and Huang-kang.

In 1299 during the summer, there was a drought in Hunan, Hupeh, Kansuh and Kiangsu provinces in *China*. The land tax was remitted.<sup>165</sup>

In 1299 during the period between 27 August and 25 September, floods struck in Honan (now Henan province) in central *China* at Kaifeng and Nan-yang; and in Hopei (now Hebei province) in northern *China* at Peiping and Ho-chien.<sup>153</sup>

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**Winter of 1299 / 1300 A.D.** During the period between 24 December 1299 and 22 January 1300, a drought engulfed Ningsia (now Ningxia province) in northwest *China* on the Loess Plateau at Etzina, the former Torgut Banner. As a result, the land tax was remitted.<sup>153</sup>

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**1300 A.D.** On 6 January 1300, the lakes collected such an unusual amount of water from streams so that they were 4 Ellen [9 feet, 3 meters] [above normal] on the highest lakes. This flood devoured towns and villages with people and livestock. At Rungholt [a city in Nordfriesland, northern *Germany*], the water devoured 7 parish churches along with 7,600 people and innumerable amount of livestock. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

In 1300, drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 22 March and 19 April, a drought engulfed Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng and Tang-t'u.

— During the period between 19 May and 17 June, a drought engulfed Anhwei (now Anhui province) in eastern *China* at Fêng-yang and Shou; Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and Suchow; Honan (now Henan province) in central *China* at Nan-yang and Shang-ch'iu; Hopei (now Hebei province) in northern *China* at Hsing-t'ai; and Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng and Chü-yeh.

— During the period between 15 August and 13 September, a drought engulfed Honan province at Hua.

In 1300 during the spring, summer and autumn, there was a drought in Anhwei, Chihli, Honan, Kiangsu and Shantung provinces in *China*.<sup>165</sup>

In 1300 during the period between 19 May and 17 June, floods struck Hopei (now Hebei province) in northern *China* at Chêng-ting, Pao-ting, Peiping, T'ung and Chi. [Chi is located at longitude 117.24° East



and latitude 40.03° North]. During the period between 18 June and 16 July, floods struck Honan (now Henan province) in central *China* at Shang-ch'iu and Sui.<sup>153</sup>

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**Winter of 1300 / 1301 A.D.** During the period between 12 December 1300 and 10 January 1301, a drought engulfed Hopei (now Hebei province) in northern *China* at Chao.<sup>153</sup>

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**1301 A.D.** This winter was warm in *Italy*. In early December, a hurricane destroyed homes and other buildings in *Germany*; it calmed down and the air cleared, and there was such unusual warmth; that in January young branches sprouted on the trees. Later the rivers overflowed their banks.<sup>62</sup>

In 1301 was a pitiful time, a time when nothing but hunger and grief could be found. Hunger was so great that in Erfurt, *Germany* alone 8,000 people perished.<sup>172</sup>

In 1301, a drought engulfed several regions of *China*. As a result, the land tax was remitted. The regions affected included:<sup>153</sup>

— Honan (now Henan province) in central *China* at Fêng-ch'iu, Lan-fêng, Chung-mou, Yen-ching, Loyang and Mien-ch'ih.

— Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Jung. [Jung is located at longitude 109.10° East and latitude 25.02° North.]

— Hupeh (now Hubei province) in central *China* at Ch'i-ch'un, Kuang-chi and Ch'i-shui.

— During the period between 7 July and 4 August, a drought engulfed Honan province at Kaifeng, Chi and Lin-ju; Hopei (now Hebei province) in northern *China* at Ta-ming; and Shantung (now Shandong province) on the east coast of *China* at P'u.

— During the period 3-31 October, a drought engulfed Hupeh province at Chiang-ling and Hunan province in south-central *China* at Ch'ang-tê and Li.

In 1301 during the summer and autumn, there was a drought in Chihli, Honan, Hunan and Kiangsu provinces in *China*. There were also floods. The land tax was remitted.<sup>165</sup>

In 1301 during the period between 7 June and 6 July, floods struck *China* at:<sup>153</sup>

— Hopei (now Hebei province) in northern *China* at Ta-ming, Pao-ting, Ho-chien and Chêng-ting.

— Chahar province (now eastern *Inner Mongolia*) at Hsüan-hua and Cho-lu.

— Honan (now Henan province) in central *China* at Shang-ch'iu.

— Shantung (now Shandong province) on the east coast of *China* at Mou-p'ing, Chü-yeh, Lin-ch'ü, P'êng-lai, Yeh, I-tu, Wei, Po-hsing, Tung-p'ing, Tsinan, and Pin.

— Szechwan (now Sichuan province) in southwest *China* at Wu-ch'i [uncertain name].

In 1301 during the period between 5 August and 2 September, floods struck *China* at:

— Hopei province at Peiping, Pao-ting, Ho-chien and Ta-ming.

— Shantung province at Chü-yeh.

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**1302 A.D.** There was a famine in *England, Scotland and Ireland*.<sup>57, 91</sup>

In 1302 during the period between 30 January and 27 February, a drought engulfed Shensi (now Shaanxi province) in central *China* at Sian. As a result, the land tax was remitted. During the period between 30 March and 28 April, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping, Lu-lung and Luan. As a result, the land tax was remitted.<sup>153</sup>

In 1302 during the spring, there was a drought in Kiangsu and Shensi provinces in *China*. The land tax was remitted.<sup>165</sup>

In 1302, floods struck several regions of *China* including:<sup>153</sup>



— During the period between 29 April and 27 May, floods struck Chahar province (now eastern *Inner Mongolia*) at Dolonor.

— During the period between 28 May and 25 June, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan; Honan (now Henan province) in central *China* at Shang-ch'iu; Hopei (now Hebei province) in northern *China* at An-tz'ü; and Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow, P'ei and Sui-ning. [P'ei is located at longitude 118.03° East and latitude 34.30° North.]

— During the period between 26 June and 25 July, floods struck Hopei province at Yung-nien.

— During the period between 26 July and 23 August, floods struck Hopei province at Hsing-t'ai.

**Winter of 1302 / 1303 A.D.** In 1302, the Rhône River in *France* froze.<sup>58, 60, 62, 80</sup>

During the winter of 1302-03, the Rhône River in *France* was frozen over completely.<sup>61</sup>

The winter of 1302 in *France* was bitterly cold. The Rhône River froze and the olive trees died.<sup>79</sup>

In 1302 in *Provence*, the year produced a severe winter.<sup>62</sup>

**1303 A.D.** In 1303, floods struck many regions of *China* including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Hsiu-wu, Mêng, Hsin-yeh, and Lan-fêng.

— Chekiang (now Zhejiang province) on the east coast of *China* at Taichow, Ning-hai and Taichow. At Ning-hai and Taichow, 550 persons drowned.

— During the period between 17 May and 15 June, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan and Hopei (now Hebei province) in northern *China* at Ho-chien.

— During the period between 15 July and 13 August, floods struck Liaoning province located in the southern part of *China*'s northeast at Liao-yang and K'ai-yüan; Szechwan (now Sichuan province) in southwest *China* at Wu-ch'i [uncertain location]; Hopei province at Lu-lung and Luan; and Chekiang province at Ting-hai. Houses and fields were damaged by the floodwaters and 119 persons drowned.

**Winter of 1303 / 1304 A.D.** In the Novgorod Republic [now part of *Russia*], the winter was a warm; there was no snow all through the winter. The people could not get corn [grain], and prices were very high. This resulted in great hardship and distress for the people.<sup>76</sup>

**1304 A.D.** In Damascus, *Syria*, there was an inundation.<sup>47, 92</sup>

In 1304 raged a mighty storm in *Germany* from the northeast along the shores from Rügen and Pomerania. [Rügen is Germany's largest island. It is located off the Pomeranian coast in the Baltic Sea.] The storm threw down many houses and church steeples. At that time the land that stretched from Mönchgut peninsula, south almost to the island of Ruden, between the two was such a small stream, that a man was able to leap across it. The terrible power of the northeast sea, caused the creation of a new sea route across the entire strip from Mönchgut to the promontory Thiessow. The newly formed route was called the "new low." Larger ships that only came from the north in their harbor were now also able to take the newly created passage from the southeast, right from Stralsund.<sup>172</sup>

In 1304, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 4 June and 3 July, floods struck Honan (now Henan province) in central *China* at Kaifeng, T'ai-k'ang, Yang-wu, Hua, and Chün. At Hua and Chün, the floodwaters damaged the fields. During the same period of time, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming.

— During the period 1-29 September, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ao-yang. Houses and fields were damaged by the floodwaters.

In 1304 during the period between 4 July and 1 August, a drought engulfed Shensi (now Shaanxi province) in central *China* at Fu-fêng, Ch'i-shan and Pao-chi.<sup>153</sup>

In 1304 during the summer, there was a drought in Shensi province in *China*.<sup>165</sup>

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**1305 A.D.** In the summers of 1305 and 1306 in *France*, the weather was very dry and hot. As a result the fruits of the earth suffered much.<sup>62</sup>

In 1305 in *France*, there was a severe drought during the summer.<sup>79</sup>

In 1305, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 24 May and 22 June, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping and Hunan province in south-central *China* at Tao.

— During the period between 23 June and 21 July, a drought engulfed Shensi (now Shaanxi province) in central *China* at Fu-fêng and Fêng-hsiang.

— During the period between 22 July and 20 August, a drought engulfed Hopei province at Jao-yang and Chin; and Hupeh (now Hubei province) in central *China* at Han-ch'uan.

— During the period between 21 August and 18 September, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Hsiang, Ma-p'ing and Jung. [Jung is located at longitude 109.10° East and latitude 25.02° North.]

In 1305 during the summer, there was a drought in Chihli, Hupeh, Kwangsi, Shansi and Shensi provinces in *China*.<sup>165</sup>

In 1305, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 23 June and 21 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang, Lin-ch'uan, and Ch'ing-chiang.

— During the period between 22 July and 20 August, floods struck Hupeh (now Hubei province) in central *China* at Mien-yang; Honan (now Henan province) in central *China* at Huai-yang; Shansi (now Shanxi province) in northern *China* at Chin-ch'êng; and Kiangsu (now Jiangsu province) on the east coast of *China* at T'ai-hsing, Yangchow and Huai-an.

— During the period between 21 August and 18 September, floods struck Honan province at Shang-ch'iu and Huai-yang; and Hopei (now Hebei province) in northern *China* at Ta-ming.

In 1305, there was a famine in the vicinity of Shanghai, *China*.<sup>166</sup>

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**Winter of 1305 / 1306 A.D.** In 1305, the Rhône River in *France* froze.<sup>58, 80</sup>

In 1305, the Rhône River and all the rivers of *France* froze.<sup>60, 62</sup>

In 1305, all rivers in *France* froze.<sup>79</sup>

In 1306, the *Baltic Sea* was passable by foot passengers and horsemen for six weeks.<sup>2</sup>

In 1306, the *Baltic Sea* was covered with ice for 14 weeks, between the *Danish* and *Swedish* islands.<sup>41, 42, 43, 47, 93</sup>

In the year 1305, the winter in *France* was very strong. The sea on the coasts of Flanders [now *Belgium*] and Holland [now *the Netherlands*], was frozen to a width of one and a half miles.<sup>62</sup>

During the winter of 1305-06 there was excessive flooding in *France* [spring thaw].<sup>79</sup>

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**1306 A.D.** In the summers of 1305 and 1306 in *France*, the weather was very dry and hot. As a result the fruits of the earth suffered much.<sup>62</sup>

In 1306 in *France*, an extreme drought ruled the spring and summer. The cold froze strongly the waters before they had diminished.<sup>79</sup>

An extraordinary drought fills the spring and summer of 1306 in *France*, and major flooding in the following winter. Intense cold froze the rivers quickly before they were able to decrease in river height. This ensured that the spring thaw produced many disasters.<sup>79</sup>

In 1306, there was a great flood at Würzburg and Frankfurt, *Germany*. The Rhine, Main, Werra, Weser and Saale rivers flooded. The Stone Bridge at Würzburg was damaged. There were 500 people on the bridge when it collapsed, of which ten died.<sup>172</sup>

In 1306 during the period between 5 February and 8 November, a severe drought engulfed Shensi (now Shaanxi province) in central *China* at Sian. Then during the period between 12 June and 10 July, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping.<sup>153</sup>

In 1306, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 12 June and 10 July, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow; Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing; Hopei (now Hebei province) in northern *China* at Hsiung and T'ung.

— During the period between 11 July and 9 August, floods struck Hopei province at Ta-ming, I, Pao-ting, Man-ch'êng, and Ting-hsing; and Shantung (now Shandong province) on the east coast of *China* at I-tu.

— During the period between 10 August and 8 September, a typhoon caused floods in Kiangsu province at Soochow.

— During the period between 7 November and 6 December, floods struck Kiangsu province at Wu-chiang.

In 1306 during the summer, there was a great drought in Chihli province in *China*.<sup>165</sup>

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**Winter of 1306 / 1307 A.D.** In 1307, the rivers of *France*, among others the Seine River, were frozen. Many rivers in Flanders [now *Belgium*] were also frozen solid enough that carriages could ride across them.<sup>62</sup>

In the year 1307 the winter in Flanders [now *Belgium*] was very severe. The rivers of *France* froze before the waters, which had risen due to great flooding, could substantially recede. As a result of these the ice conditions, the force of the ice was so great that the bridge, the mills along the rivers and standing houses collapsed. In Paris, at the Port of Grève, a large number of loaded barges sank on the Seine River with people and cargo onboard.<sup>62</sup>

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**1307 A.D.** In 1307, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 30 June and 29 July, floods struck Honan (now Henan province) in central *China* at Kaifeng, Nan-yang, and Shang-ch'iu; Kiangsi (now Jiangxi province) in southern *China*; Hupeh (now Hubei province) in central *China* at Wuchang; and Hopei (now Hebei province) in northern *China* at Lung-p'ing and Hsin-ch'êng.

— During the period between 30 July and 28 August, floods struck Hopei province at Pao-ting, Ho-chien and Chin; Shansi (now Shanxi province) in northern *China* at Yang-ch'ü and Wên-shui; and Kansu (now Gansu province) in northwest *China* at Ning [uncertain name].

— During the period between 29 August and 26 September, floods struck Hopei province at Lung-p'ing, An-kuo, Ching-hai, Jung-ch'êng, and Shu-lu; and Shansi province at Wên-shui, Huo, and P'ing-yao.

— During the period between 26 November and 25 December, floods struck Hopei province at Lu-lung, Ch'ien-an, Ch'ang-li and Fu-ning.

**1308 A.D.** In 1308 in *France*, just days after the Feast of the Ascension [40 days after Easter], there was a great violent storm producing severe cold, a lot of snow, great masses of hail and terrible winds. It destroyed the crops and [grape] vines, overthrew many buildings and uprooted several trees.<sup>79</sup>

In 1308 during the period between 23 February and 22 March, a drought engulfed Honan (now Henan province) in central *China* at Ju-nan and Shang-ch'iu. Then during the period between 21 May and 18 June, a drought engulfed Kansu (now Gansu province) in northwest *China* at Wei-yüan.<sup>153</sup>

In 1308 during the spring, there was a drought in Honan and Shensi provinces in *China*.<sup>165</sup>

In 1308 during the period between 18 July and 16 August, floods struck many regions of *China* including:<sup>153</sup>

— Shantung (now Shandong province) on the east coast of *China* at Chü-yeh. Houses were damaged by the floodwaters and 18 persons drowned.

— Hopei (now Hebei province) in northern *China* at Chêng-ting. One hundred seventy persons drowned.

— Honan (now Henan province) in central *China* at An-yang and Chi. Crops were damaged by the floodwaters.

**1309 A.D.** In 1309, there were terrible winds, which toppled many trees and buildings in *France*.<sup>79</sup>

In 1309 during the period between 6 August and 4 September, floods struck Honan (now Henan province) in central *China* at Shang-ch'iu and Fêng-ch'iu.<sup>153</sup>

### **1310 A.D. – 1319 A.D. Germany. Famine**

From 1310 to 1319, the weather conditions were very unfavorable. Crops failed causing famines. A third of the population of *Germany* starved to death.<sup>172</sup>

**1310 A.D.** In 1310, several regions of *China* were affected by drought including:<sup>153</sup>

— During the period between 6 May and 8 August, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Yung-nien. The drought was also accompanied by a plague of locusts.

— During the period between 28 June and 26 July, a drought engulfed Hopei province at Wei, Fei-hsiang and Chi-tsê. The drought was accompanied by a plague of locusts.

— During the period between 27 July and 24 August, a drought engulfed Hopei province at Wei and Tz'ü. The drought was accompanied by a plague of locusts.

— During the period between 23 October and 21 November, a drought engulfed the east coast of *China* at Shantung (now Shandong province) and Kiangsu (now Jiangsu province) at Suchow and P'ei. [P'ei is located at longitude 118.03° East and latitude 34.30° North.] The drought was accompanied by a plague of locusts. The area was also affected by floods.

In 1310 during the spring and summer, there was a drought in Chihli, Kiangsu and Shantung provinces in *China*. The drought was accompanied by a plague of locusts. There were also floods.<sup>165</sup>

In 1310, floods struck several regions of *China* including:<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at I-ch'ang. This was caused by heavy and protracted rains. Approximately ten thousand people drowned.
- During the period between 28 June and 26 July, floods struck Honan (now Henan province) in central *China* at Wei-ch'uan; and Shantung (now Shandong province) on the east coast of *China* at Wên-shang and P'u.
- During the period between 27 July and 24 August, floods struck Honan province at Fan-shui; Hupeh province at Ching-mên, Tang-yang, I-ch'ang, I-ch'êng, and Yüan-an; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lung-ch'uan and Hui-yang. Houses were damaged by the floodwaters in Kwangtung province.

In 1310, there was a great wind in the vicinity of Shanghai, *China*. As a result, the sea flowed over the fields.<sup>166</sup>

*Also refer to the section 1310 A.D. – 1319 A.D. for information on the famine in Germany during that timeframe.*

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**1311 A.D.** In 1311 during the period between 17 June and 16 July, a drought engulfed Hopei (now Hebei province) in northern *China* at Ho-chien and Shensi (now Shaanxi province) in central *China* at Sian. This area was also affected by floods.<sup>153</sup>

In 1311 during the summer, there was a drought in Chihli and Shensi provinces in *China*. There were also floods. The land tax was remitted.<sup>165</sup>

In 1311 during the period between 17 June and 16 July, floods struck *China* at:<sup>153</sup>

- Hopei (now Hebei province) in northern *China* at Ho-chien, Peiping, San-ho, T'ung and Lu-lung. Crops were damaged by the floodwaters.
- Shensi (now Shaanxi province) in central *China* at Sian. Crops were damaged by the floodwaters.
- Shansi (now Shanxi province) in northern *China* at Yung-chi, Ch'i and Huai-jên. Crops were damaged by the floodwaters.
- Shantung (now Shandong province) on the east coast of *China* at Chü-yeh, Tung-p'ing, and Kao-t'ang.
- Honan (now Henan province) in central *China* at Shang-ch'iu.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow and P'ei. [P'ei is located at longitude 118.03° East and latitude 34.30° North].

In 1311 during the period between 17 July and 14 August, floods struck *China* at:<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Chiang-ling and Sung-tzü. At Chiang-ling many people drowned.
- Shantung province at Tung-p'ing, Chü-yeh and Lin-ch'ü.
- Hopei province at Pao-ting.
- Hunan province in south-central *China* at Kuei-yang and Lin-wu.

*Also refer to the section 1310 A.D. – 1319 A.D. for information on the famine in Germany during that timeframe.*

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**1312 A.D.** A three-year famine struck Bohemia [now western *Czech Republic*] and *Poland*. This famine was so great and severe that children devoured their parents and parents ate their children. Some fed on the dead bodies of malefactors hung up on gibbets [gallows-type structure from which the dead bodies of executed criminals were hung on public display]. Wolves also were so famished, that they devoured all they met and fed on them.<sup>72</sup>

An old chronicle Würzburg reported: "the year 1312 brought an unusual amount of rain and storm [in *Germany*]. Everywhere the streams and creeks came out from their banks and flooded the fields. As a consequence of this, there was a great famine and the most terrible plague, which raged for a long time.

In some places there was no one who could bury the dead. Inflation of the following year [1313] was even greater and those spared by pestilence were now wiped out by hunger. This period of great misery lasted for a long time." Muellner wrote in his Nuremberg Chronicle: " the year 1312 caused the greatest mortality everywhere. One third of the population died. Parents were so hungry that they slaughtered and ate their children. The corpse of criminals were pulled down from the gallows and eaten." Afterwards there were deserted villages.<sup>172</sup>

In 1312, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 9 March and 7 April, floods struck Hopei (now Hebei province) in northern *China* at Pa and Wên-an.

— During the period between 6 June and 4 July, floods struck Honan (now Henan province) in central *China* at Shang-ch'iu.

— During the period between 5 July and 3 August, floods struck in Kirin (now Jilin province) in northeast *China* at Ninguta and in Szechwan (now Sichuan province) in southwest *China* at Wu-ch'i [uncertain name].

— During the period 2-30 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Sung-chiang.

In 1312 during the period 2-30 September, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Pin, Hui-min, Tê, P'u-t'ai and Yang-hsin.<sup>153</sup>

In 1312 during the autumn, there was a drought in Shantung province in *China*.<sup>165</sup>

*Also refer to the section 1310 A.D. – 1319 A.D. for information on the famine in Germany during that timeframe.*

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**1313 A.D.** In the year 1313 in March, April, and half of May had a summer-like warmth. On Pentecost Eve, a sudden sharp cold struck Pohlen, *Germany*. Snow two elbows deep [2 Ellen, 4 ½ feet or 1.5 meters] fell. It was feared that it would destroy all the fruits of the field. But on the 6<sup>th</sup> day, this snow melted by a warm rain. The ground was watered like by a sweet dew and made fruitful. There was no harm done to the seeds.<sup>172</sup>

On 1 May 1313, there was a high flood [in *Germany*], which did great damage.<sup>172</sup>

The entire empire of *China* was devastated by a massive drought.<sup>28</sup>

In 1313, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 26 May and 23 June, floods struck Hunan province in south-central *China* at Yüan-ling.

— During the period between 24 June and 23 July, floods struck in Honan (now Henan province) in central *China* at Huai-yang, Sui and Kaifeng, and in Anhwei (now Anhui province) in eastern *China* at Po. The floodwaters damaged houses and fields.

— During the period between 24 June and 23 July, floods struck in Hopei (now Hebei province) in northern *China* at Cho, An-tz'ü, Wan-p'ing, Ku-an, Pa, Yung-ch'ing and Wên-an, and in Honan province at Mêng-ching. Crops were damaged by the floodwaters.

— During the period between 22 August and 20 September, floods caused by a typhoon struck Kiangsu (now Jiangsu province) on the east coast of *China* at Chia-ting, Yangchow and Ch'ung-ming. At Yangchow and Ch'ung-ming houses were damaged.

In 1313 during the period between 21 September and 19 October, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping.<sup>153</sup>



In 1313 during the autumn, there was a great drought in Chihli province in *China*. Typhus fever raged.<sup>165</sup>

*Also refer to the section 1310 A.D. – 1319 A.D. for information on the famine in Germany during that timeframe.*

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**1314 A.D.** In 1314 [in *England*], it rained almost ten months continually, but during July and August, the rains were incessant. The husbandmen [farmers] could not get in the small crop they had on the ground, and what they got in, the yield from it was very small. Hence there was a grievous famine in 1315 that lasted two years and from it most mortal dysentery. So that it was drudgery on the surviving to bury the dead. Cattle and beasts being corrupted by the grass whereon they fed and then died; hence people dreaded eating their flesh. Only horseflesh was a delicate dish. The poor stole fat cats to eat. Criminals in gaols [jails] quickly pulled to pieces fresh malefactors and ate them. [Malefactors are evil doers or criminals.] Or the last imprisoned tore in pieces and devoured the old Goal Birds [jailbirds]. Hunger compelled some to eat their own children, and some stole other people to eat.<sup>72</sup>

Few English kings have lived through a greater period of distress than Edward II, who was scarcely able to secure food for his own immediate household when the heavy rains of 1314 spoiled the harvests. Misery in *England* was widespread and intense: the dead lined the roadsides; everything imaginable was eaten – dogs, horses, cats, even babies. The jails were crowded with felons, and when a new criminal was thrown into a cell, he was seized upon by the starving inmates and literally thorn to pieces for food.<sup>84</sup>

In *England* in 1314, grains spoiled by the rains. Famine so dreadful that the people devoured the flesh of horses, dogs, cats and vermin. Parliament passed a measure limiting the price of provisions.<sup>57</sup>

[In *England*] in 1314, there was a very grievous famine.<sup>72</sup>

In *Ireland* in 1314, famine and various distempers.<sup>57</sup>

In 1314 during the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping, Mi-yün and Chi. During the winter, there was no snowfall. [Chi is located at longitude 117.24° East and latitude 40.03° North.]<sup>153</sup>

In 1314 during the winter, there was a drought in *China*. No snowfall.<sup>165</sup>

In 1314, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 14 June and 12 July, floods struck Hunan province in south-central *China* at Ch'ang-tê. Houses were damaged by the floodwaters and 500 persons drowned.

— During the period between 13 July and 11 August, floods struck Hopei (now Hebei province) in northern *China* at Cho and Fang-shan. Fields were damaged by the floodwaters.

— During the period between 12 August and 9 September, floods struck Hopei province at Wu-ch'ing. Fields were damaged by the floodwaters. During the same period of time, floods struck Hunan province at Yüan-ling and Lu-ch'i.

— During the period between 10 September and 9 October, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow and Hunan province at Yüeh-yang, Wu-kang, Ch'ang-tê and Tao.

— During the period between 10 October and 7 November, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Kao-yao; Chekiang province at Chien-tê and Hangchow; Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking; Kiangsi (now Jiangxi province) in southern *China* at Hsing-tzū, Kiukiang, I-ch'un, Nan-ch'êng, Lin-ch'uan and Kan; and Anhwei (now Anhui province) in eastern *China* at Shou.

*Also refer to the section 1310 A.D. – 1319 A.D. for information on the famine in Germany during that timeframe.*

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**1315 A.D.** *Europe* hit by incessant rains. These were followed by a famine so severe that Polish poor ate hanged bodies.<sup>28</sup>

In 1315 in *France*, from the middle of April until late July, there was almost continual rainfall combined with an especially cold summer. The grains and the grapes did not ripen.<sup>79</sup>

So [terrible] was this famine in Thuringia [part of *Germany*]. . . the walls of Exford [Oxford], several people were starved and died. So great was it in *Poland* and *Silesia*, that parents abstained not from devouring their own children and the filthiest creatures. It continued for three years in *Lithuania*.<sup>72</sup> [The Kingdom of Lithuania during this period of time extended west into the Kievan Rus territory of *Russia*. *Silesia* is a historical region of Central Europe located mostly in *Poland*, with smaller parts also in the *Czech Republic*, and *Germany*]

In 1315 there was a famine that was worst in *England*, *Thuringia*, *Poland*, and *Silesia*. This famine lasted years in *Lithuania*.<sup>91</sup>

Crop failures and starvation in Northern *Estonia*.<sup>34</sup>

In *England*, there were great rains and floods during harvest; much grain spoiled.<sup>47</sup>

In 1315 in *England*, the grain was spoiled by the rain. Famine “so dreadful that people devoured the flesh of horses, dogs, cats, and vermin.” Parliament attempted to fix prices; and failed.<sup>91</sup>

In 1315, there was a dreadful famine in *England*. The poor ate horses, dogs, and cats. In King Henry III’s reign, in a dreadful famine, the people ate the bark of trees, and 20,000 persons starved to death in London alone.<sup>212</sup>

There was a famine in *England* in 1315 that was so dreadful that the people devoured the flesh of horses, dogs, cats and vermin.<sup>90</sup>

In 1315 in *Ireland*, there was famine and various distempers.<sup>91</sup>

In *Europe* from mid-April to late July 1315, it rained incessantly, and there was unusually cold weather. The cereals and the grapes did not come to fruition.<sup>62</sup>

In 1315, the Po River in *Italy* froze.<sup>58, 80</sup>

In 1315, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 6 January and 4 February, floods struck Honan (now Henan province) in central *China* at Kaifeng, Nan-yang, Shang-ch’iu and Ju-nan; and Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an.

— During the period 2-31 July, floods struck Honan province at Fan-shui and Chêng.

— During the period 1-30 August, floods struck Hopei (now Hebei province) in northern *China* at T’ung, Ch’ang-p’ing, Hsiang-ho, and Pao-ti. Houses and fields were damaged by the floodwaters. During the same time period, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ch’üan and Nan-tan. Crops were damaged by the floodwaters.

In 1315 during the period between 5 February and 6 May, a drought engulfed Anhwei (now Anhui province) in eastern *China* at Fêng-yang; and Hopei (now Hebei province) in northern *China* at Mi-yün and Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.] Then during the period

between 6 May and 8 August, a drought engulfed Kansu (now Gansu province) in northwest *China* at Lung-hsi and Lanchow.<sup>153</sup>

In 1315 during the spring and summer, there was a drought in Chihli, Kansuh and Shantung provinces in *China*.<sup>165</sup>

*Also refer to the section 1310 A.D. – 1319 A.D. for information on the famine in Germany during that timeframe.*

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**1316 A.D.** *England* struck by 2 years of rains and floods. Famine killed thousands.<sup>28</sup>

In *England* in 1316, there was a universal dearth and a great mortality [death of large number of people], particularly among the poor. As a result the living could scarcely bury the dead. There was a royal proclamation – no more beer to be made.<sup>57, 91</sup>

As of March 1316, there was a great famine in *England*. At Nottingham, the season for the past 3 years was so adverse that almost all the grains were destroyed and the people were driven to eat horses, dogs, cats, and vermin, etc. Even children were stolen and eaten. And prisoners were eaten by other prisoners. This was one of the most grievous famines that ever visited *Great Britain*. The famine was followed by a pestilence scarcely less destructive to life, so that the living scarce sufficed to bury the dead. This famine resulted from two or three years of continued rain, which destroyed the corn [grain] and caused a frightful mortality amongst the sheep and cattle. Corn [grain] was four to five times its ordinary price, (i.e. 60 to 90 shillings); oxen 48 to 70 shillings; fat hog 10 shillings; fat wedder 5 shillings; goose 7½ pence; fat hen 3 pence; two chickens 3 pence; 2 dozen eggs 3 pence. These articles were 6 to 8 times their average price. The famine lasted several years.<sup>212</sup>

In *Ireland* in 1316, there was a great dearth. Eight captured Scots were eaten at the siege of Carrickfergus in northern *Ireland*.<sup>57, 91</sup>

In *England* in 1316, wheat was sold at 40s. and 44s. per Quarter [quarter ton]. By reason of the murrain among cattle, beef and mutton were exceeding dear [scarce]. After this, both famine and mortality increased greatly, together with a general failure of all Fruits of the Earth. This was due to excessive rains and unseasonable weather. Provisions could not be obtained for the King's household; nor other great men to keep up their tables; as a result they were obligated to discharge their servants in great numbers. These servants having lived so delicately and not able to perform other work; felt scorn to take up begging. As a result these servants fell to stealing and robbing, which caused fresh misery to the Nation. So terrible was the famine two years before [in 1314] that not only horses and dogs; but also men and children were stolen for food. All malting throughout the Kingdom was forbidden, even for the King's family. [Malting is the process of converting barley into malt, for use in brewing or distilling.] When wheat was sold at 10d a bushel, it was so very cheap; but at 10s., it was monstrously dear.<sup>72</sup>

In the year 1316 in *France*, at St. Andrew's day (November 30) began a very hard winter, and this continued until Easter. In *Germany*, the harvests failed entirely because the cold had destroyed all of the seeds entrusted to the earth. A famine took hold, caused by a lack of food; poor nutrition produced many deadly diseases.<sup>62</sup>

The pretty rough winter of 1316 in northern *France* lasted without interruption from late November to Easter.<sup>79</sup>

In 1316, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 23 April and 21 May, floods struck Anhwei (now Anhui province) in eastern *China* at Fou-yang and T'ai-ho.

— During the period between 20 June and 19 July, floods struck Honan (now Henan province) in central *China* at Kaifeng and Nan-yang. Houses were damaged by the floodwaters.

— During the period between 20 July and 18 August, floods caused by heavy rains struck Anhwei province at Wu-yüan. Five thousand three hundred people drowned.

*Also refer to the section 1310 A.D. – 1319 A.D. for information on the famine in Germany during that timeframe.*

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**1317 A.D.** [There was a famine in *Ireland* whose cause was not necessarily weather related. In 1317 in *Ireland*, there was a great famine throughout the country in consequence of Bruce's invasion.<sup>57, 91</sup>]

In *England*, there was a very good summer, and early and plentiful harvest. Wheat, which sold for 10s. per bushel, now sold for 10d. On Saturday, it was 44s. per Quarter [quarter ton]; next Wednesday it was sold at 10s. in Leicester Market. At the same time, many who had been rich and had an abundance of all good things, came to want and were forced to beg. In the south [southern *England*], there was a murrain of cattle. This year and also in 1319, were both very fatal to people and several other animals, over the whole Kingdom. So that the survivors were not sufficient to plow and sow on the ground. Besides, many were still buried daily in every churchyard. This plague was two years in its perambulation over *England*. Hence there was great desolation from bad food in the famine.<sup>72</sup>

In 1317 during the period between 14 January and 12 February, floods struck Shansi (now Shanxi province) in northern *China* at Chieh. Then during the period between 12 May and 9 June, a drought engulfed Hopei (now Hebei province) in northern *China* at An-lu.<sup>153</sup>

In 1317 during the summer, there was a drought in Hupeh province in *China*.<sup>165</sup>

*Also refer to the section 1310 A.D. – 1319 A.D. for information on the famine in Germany during that timeframe.*

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**1318 A.D.** *China* experienced massive floods in which multitudes drowned.<sup>28</sup>

In *England* in 1318, there was a murrain of kine [cattle], that dogs or ravens, which ate their flesh were poisoned swelled and died. Therefore people dare not touch them.<sup>72</sup>

In 1318, the winter was severe in *France*, *Germany* and *Italy*. Wagons crossed on the ice on the Po River in *Italy*.<sup>62</sup>

In 1318 there was a great earthquake at Limburg ad der Lahn, *Germany*. This was followed by a severe famine. Farmers killed travelers and ate them.<sup>172</sup>

In 1318 during the period between 28 July and 26 August, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Chêng-ting, Ho-chien, Yung-nien and Ting.<sup>153</sup>

In 1318 during the autumn, there was a great drought in Chihli province in *China*.<sup>165</sup>

*Also refer to the section 1310 A.D. – 1319 A.D. for information on the famine in Germany during that timeframe.*

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**1319 A.D.** The murrain which last year was in the south of *England*, now reached the north and overspread the whole realm. The carrion still poisonous.<sup>72</sup>

In 1319, floods struck many regions of *China* including:<sup>153</sup>

— Hopei (now Hebei province) in northern *China* at Ta-ming. Houses were damaged by the floodwaters.

— Hopei province at Chêng-ting and Pao-ting. Floods were caused by heavy and protracted rains.

— Honan (now Henan province) in central *China* at Kaifeng, Nan-yang, Shang-ch'iu, Ju-nan, An-yang and Chi. Floods were caused by heavy and protracted rains.

— During the period between 18 June and 17 July, floods struck Shantung (now Shandong province) on the east coast of *China* at I-tu, Lin-ch'ü, Tsinan, Liao-ch'êng, Tung-p'ing, Chü-yeh, T'ai-an, Kao-t'ang, and P'u; Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an; Liaoning province located in the southern part of *China's* northeast at Liao-yang and Pei-chê; and Hopei province at Lu-lung and Ho-chien. Fields were damaged by the floodwaters at Ho-chien.

In 1319, there was a great drought in the vicinity of Shanghai, *China*.<sup>166</sup>

*Also refer to the section 1310 A.D. – 1319 A.D. for information on the famine in Germany during that timeframe.*

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**1320 A.D.** In 1320, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 9 May and 6 June, floods struck Anhwei (now Anhui province) in eastern *China* at Po, Shou and Ho-fei. At Shou and Ho-fei, crops were damaged by the floodwaters.

— During the period between 7 June and 6 July, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling.

— During the period between 7 July and 4 August, floods struck Hupeh province at Chiang-ling and Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu. During the same time period, floods from heavy and protracted rains struck Shantung (now Shandong province) on the east coast of *China* at Hui-min and Tê and as a result, the fields were damaged.

— During the period between 5 August and 2 September, floods struck Anhwei province at Fou-yang, and Honan (now Henan province) in central *China* at Hsi and Shang-ts'ai.

— During the period between 3 September and 2 October, floods struck Hopei (now Hebei province) in northern *China* at Ho-chien, Pa and Wên-an. At Pa and Wên-an, crops were damaged by the floodwaters. During the same time period, floods struck Shansi (now Shanxi province) in northern *China* at Fên-yang and P'ing-yao. Also during this time period, floods struck Suiyuan province (now part of *Inner Mongolia*) at Ordos (Right Wing Vanguard).

— During the period 3-31 October, floods struck Liaoning province located in the southern part of *China's* northeast at Liao-yang. Crops were damaged by the floodwaters.

In 1320 during the period between 7 July and 4 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Ching-mên, Huang-kang and Ch'i-ch'un. Then during the period 3-31 October, a drought engulfed Liaoning province located in the southern part of *China's* northeast at Mukden.<sup>153</sup>

In 1320 during the summer and autumn, there was a drought in Hupeh province in *China*. There were floods in the city of Moukden [now Shenyang].<sup>165</sup>

In 1320, there was a famine in the vicinity of Shanghai, *China*.<sup>166</sup>

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**Winter of 1320 / 1321 A.D.** During the period between 30 December 1320 and 28 January 1321, floods struck several regions of *China* including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Kaifeng, Nan-yang and Yüan-wu.

— Hopei (now Hebei province) in northern *China* at Wên-an. Houses and fields were damaged by the floodwaters.

— Suiyuan province (now part of *Inner Mongolia*) at Ordos (Right Wing Vanguard). Houses and fields were damaged by the floodwaters.

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**1321 A.D.** Ho-nan *China* [now Hénán Province, in northeastern, central *China*] experienced a severe drought that produced famine.<sup>28</sup>

In 1321, droughts affected many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 9 November, a drought engulfed Yunnan province in southwest *China* at Ho-hsi.

— During the period between 28 April and 27 May, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at I-ch'un; Szechwan (now Sichuan province) in southwest *China* at Hsi-ch'ang; and Anhwei (now Anhui province) in eastern *China* at Kuang-tê. As a result, the land tax was remitted.

— During the period between 28 May and 25 June, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu.

— During the period between 26 June and 24 July, a drought engulfed Kiangsi province at Ch'ing-chiang; and Shansi (now Shanxi province) in northern *China* at Tatung. Twenty percent of the land tax was remitted.

In 1321 during the summer, there was a drought in Chihli, Kiangsi, Kiangsu and Shansi provinces in *China*. The land tax was remitted.<sup>165</sup>

In 1321 during the period between 26 June and 24 July, floods struck Hopei (now Hebei province) in northern *China* at Pa. Then during the period between 25 July and 23 August, floods struck many regions of *China* including:<sup>153</sup>

— Liaoning province located in the southern part of *China's* northeast at Liao-yang and K'ai-yüan.

— Hopei province at Shun-i, Hsing-t'ai, T'ung, Cho, An-kuo, P'ing-ku, Peiping, Chêng-ting, Ta-ming, Lu-lung, Sha-ho, Ku-an, Yüan-shih, Pao-ti, Ch'ing-ho, An-tz'ü, and Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]

— Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an.

— Shantung (now Shandong province) on the east coast of *China* at Hui-min, Chü-yeh, Tung-p'ing, Liao-ch'êng, Kao-t'ang, Ho-tsê, and P'u.

— Jehol (formally Rehe province) at Karach'in (Left Wing). Rehe is located north of the Great Wall, west of Manchuria, and east of Mongolia. In 1955, the area was divided between Hebei province, Liaoning province and *Inner Mongolia*.

— *Outer Mongolia*.

— Honan (now Henan province) in central *China* at An-yang and Lin-chang.

— Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lien-chiang.

Then during the period between 24 August and 21 September, floods struck many regions of *China* including:

— Hupeh (now Hubei province) in central *China* at Chung-hsiang. Houses were damaged by the floodwaters.

— Kwangtung province at Kao-yao.

— Kiangsu province at Kao-yu, Hsing-hua, Huai-an and Yen-ch'êng. Fields were damaged by the floodwaters.

— Kwangtung province at Hai-k'ang and Sui-ch'i. Fields were damaged by the floodwaters.

— Hupeh province at Chung-hsiang. Fields were damaged by the floodwaters.

In *England*, there was the greatest drought, with heat.<sup>47, 72</sup>

The summer of 1321 [in *England*] was extremely hot and dry. The springs and the rivers were dried up. The domestic animals and the cattle suffered greatly. Many unfortunates died from lack of water to quench their thirst.<sup>62, 72</sup>

In *England*, there was famine again.<sup>57, 91</sup>

**1322 A.D.** In 1322, floods struck many regions of *China* including:<sup>153</sup>



— During the period between 20 December 1321 and 17 January 1322, floods struck Hopei (now Hebei province) in northern *China* at Chêng-ting, Pao-ting, Ta-ming, Hsing-t'ai, and T'ung; Honan (now Henan province) in central *China* at Shang-ch'iu; and Liaoning province located in the southern part of *China's* northeast at Liao-yang.

— During the period between 18 January and 16 February, floods struck Honan province at Lan-fêng. Crops were damaged by the floodwaters.

— During the period between 17 February and 17 March, floods struck Hopei province at Hsing-t'ai.

— During the period between 18 March and 16 April, floods struck Shantung (now Shandong province) on the east coast of *China* at P'u.

— During the period between 17 May and 14 June, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Sung-chiang and Shanghai.

— During the period between 15 June and 14 July, floods struck Honan province at Shang-ch'iu.

— During the period between 15 July and 12 August, floods struck Hunan province in south-central *China* at Yüan-ling. Houses were damaged by the floodwaters. During the same time period, floods struck Shensi (now Shaanxi province) in central *China* at Pin, Sian and Mei; Honan province at Shang-ch'iu; and Chekiang (now Zhejiang province) on the east coast of *China* at Chien-tê.

— During the period between 13 August and 11 September, floods struck Kiangsu province at Huai-an.

— During the period between 12 September and 10 October, floods struck Anhwei (now Anhui province) in eastern *China* at Ho-fei, Liu-an and Shu-ch'êng.

— During the period between 11 October and 9 November, floods struck Szechwan (now Sichuan province) in southwest *China* at Wu-ch'i [uncertain name]; and Kirin (now Jilin province) in northeast *China* at Ninguta. At Ninguta, crops were damaged by the floodwaters.

— During the period between 9 December 1322 and 7 January 1323, floods struck Kiangsu province at Soochow. Fields were damaged by the floodwaters.

In 1322, droughts affected several regions of *China* including:<sup>153</sup>

— During the period between 17 February and 17 March, a drought engulfed Hopei (now Hebei province) in northern *China* at Hsing-t'ai.

— During the period between 18 March and 16 April, a drought engulfed Hopei province at Ho-chien, Loyang and Sian.

— During the period between 17 April and 16 May, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Shanghai.

— During the period between 15 June and 14 July, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Hsing-tzũ.

— During the period between 15 July and 12 August, a drought engulfed Kiangsu province at Yangchow and Huai-an.

— During the period between 9 December 1322 and 7 January 1323, a drought engulfed Kansu (now Gansu province) in northwest *China* at Min.

In 1322 during the spring, summer and winter, there was a drought in Chihli, Honan, Kiangsu, Shensi Sze-ch'wan and Yünnan provinces in *China*. Half of the land tax was remitted in Chihli, Honan and Shensi.<sup>165</sup>

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**1323 A.D.** In 1323, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 8 January and 5 February, floods struck Anhwei (now Anhui province) in eastern *China* at Hsi, Ho-fei and Shou; Shantung (now Shandong province) on the east coast of *China* at Tsinan; Hopei (now Hebei province) in northern *China* at Chêng-ting, Ho-chien and Ta-ming; Honan (now Henan province) in central *China* at Shang-ch'iu, Ju-nan and Loyang; and Kansu (now Gansu province) in northwest *China* at Lung-hsi.

— During the period between 4 June and 3 July, floods struck Hopei province at An-tz'ü, Yung-ch'ing, Chêng-ting and Wu-i. At An-tz'ü, the fields were damaged by the floodwaters. At Chêng-ting and Wu-i, the floods were caused by heavy rains and the crops were damaged by the floodwaters.

— During the period between 4 July and 2 August, floods struck Hopei province at I, An-hsin, Ts'ang, Jên-ch'iu, Pa and An-kuo. The fields were damaged by the floodwaters.

— During the period 3-31 August, floods caused by heavy rains struck Hopei province at T'ung. Crops were damaged by the floodwaters.

— During the period 1-29 October, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Lung-ch'i and Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'êng and Hsing-tzû.

In 1323, droughts affected several regions of *China* including: <sup>153</sup>

— During the period between 8 January and 5 February, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Loyang. During the same time a drought engulfed Yunnan province in southwest *China* at Chao-tung.

— During the period between 6 April and 5 May, a drought engulfed *China*.

— During the period between 6 May and 8 August, a severe drought engulfed Hopei province at Hsing-t'ai and Chêng-ting. During the same time, a drought engulfed Shansi (now Shanxi province) in northern *China* at Yang-ch'ü.

— During the period between 17 May and 14 June, a drought engulfed Shansi province at Tatung and Tai.

— During December, a drought engulfed Anhwei (now Anhui province) in eastern *China* at Shou.

[Source gives time period as 12/29-12/27. As a result, timeframe is unclear.]

In 1323 during the summer, there was a drought in Chihli and Shansi provinces in *China*. In Chihli, this was a great drought. <sup>165</sup>

**Winter of 1323 A.D. / 1324 A.D.** The winter in 1323 was intensely cold and the *Baltic Sea* was so firmly covered with ice, from Mecklenburg, *Germany* to *Denmark*, that merchandise was conveyed over the *Baltic Sea* with horses and wagons. <sup>1</sup> [Mecklenburg was a historical region in northern *Germany*. The largest port cities of the region at this time were Rostock and Schwerin.]

In 1323, the *Baltic Sea* was frozen over, and during three months travelers passed from the continent to *Sweden* on the ice. Heavy wagon trains were substituted for the traveling vessels. <sup>63</sup>

In 1323, the *Baltic Sea* was frozen and passable to travelers for six weeks. <sup>90, 93</sup>

In 1323, a severe winter struck *Denmark*. The *Baltic Sea* was frozen. <sup>28</sup>

The winter of 1323 was a severe winter in the Baltic. The Sea between *Denmark* and Rügen, *Germany* was covered with thick ice. People would walk the distance of 8 miles between these two points. Huts were erected on the ice, where one could buy food and drink. This frozen passage was used for 10 weeks. <sup>172</sup>

The winter of 1323 was a very cold winter. At the end of February, the Elbe River stood hard like a rock. People traveled all over the ice from Teutschland [*Germany*] and the [frozen] *Baltic Sea*. <sup>172</sup>

In 1323, the *Baltic Sea* was frozen over and passable for foot passengers and horsemen for six weeks. <sup>30, 41, 42, 43, 47</sup>

In 1323, the Rhône River in *France* froze. <sup>58, 80</sup>

In 1323, the Po River in *Italy* froze.<sup>58, 80</sup>

In 1323, the Rhône River in *France* froze. In the *Baltic Sea*, travelers pass on foot and on horseback on the ice between *Denmark* and Lübeck in northern *Germany* and Danzig (now Gdańsk, *Poland*).<sup>60, 62</sup>

The Rhône River in southern *France* froze in 1323.<sup>79</sup>

In 1324, it was possible to travel from *Denmark*, Lübeck and Danzig on the ice.<sup>38</sup>

In the year 1323 the winter was very hard in *France* and *Germany*. In February, a lot of snow fell.<sup>62</sup>

**1324 A.D.** In 1324, there was a great flood in *China*. The Yellow River cut a new course to the sea.<sup>142</sup>

In 1324, droughts affected several regions of *China* including:<sup>153</sup>

— Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking and in an area south of Chin-kiang.

— Chekiang (now Zhejiang province) on the east coast of *China*. The drought was severe.

— Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng and Kuang-tê.

— During the period between 26 March and 23 April, a drought engulfed Kansu (now Gansu province) in northwest *China* at Lanchow and Lin-t'ao; and Shansi (now Shanxi province) in northern *China* at Yang-ch'ü, Li-shih and Chung-yang.

— During the period between 22 June and 21 July, a drought engulfed Hopei (now Hebei province) in northern *China* at Ho-chien and Chin; Kansu province at Ning and Ching-ch'uan; Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow; Anhwei (now Anhui province) in eastern *China* at Shou; Hupeh (now Hubei province) in central *China* at Wuchang; and Honan (now Henan province) in central *China* at Loyang. The drought was severe in Chekiang and Hopei.

— During the period between 19 September and 18 October, a drought engulfed Szechwan (now Sichuan province) in southwest *China* at Hsi-ch'ang.

In 1324, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 24 April and 22 May, floods struck Suiyuan province (now part of *Inner Mongolia*) at Mongolian Urad Banner; and Yunnan province in southwest *China* at K'un-ming.

— During the period between 23 May and 21 June, floods due to heavy and protracted rains struck Kansu (now Gansu province) in northwest *China* at Lung-hsi. Over 500 families were flooded. During the same time period, floods struck Chahar province (now eastern *Inner Mongolia*) at Yen-ch'ing. Crops were damaged by floodwaters. Also during this time period, floods struck Hopei (now Hebei province) in northern *China* at T'ung and Ku-an.

Also in 1324 during the period between 22 June and 21 July, floods struck many regions of *China* including:<sup>153</sup>

— Shansi (now Shanxi province) in northern *China* at Tatung.

— Hopei province at Chêng-ting.

— Shensi (now Shaanxi province) in central *China* at Sian.

— Szechwan (now Sichuan province) in southwest *China* at Ch'ü.

— Shantung (now Shandong province) on the east coast of *China* at I-tu, Tsinan, Lin-ch'ü, Liao-ch'êng, Tung-p'ing, Chü-yeh, Ho-tsê, P'u, Kao-t'ang and Tê. Houses and fields were damaged by the floodwaters.

— Honan (now Henan province) in central *China* at Huai-yang. Crops were damaged by the floodwaters.

— Shansi province at Fên-yang. Crops were damaged by the floodwaters.

— Hopei province at Shun-i, Chin and Shen. Crops were damaged by the floodwaters.

— Shantung province at Ên. Crops were damaged by the floodwaters.

Then during the period between 22 July and 19 August, floods struck the following regions of *China*:

- Shensi province at Ch'ao-i.
- Shantung province at Ts'ao.
- Hopei province at P'u-yang, Ku-an, Jên, Ting, Ta-ming.
- In Hopei province floods due to heavy and protracted rains struck Chêng-ting, Ho-chien, Pao-ting and Yung-nien. The crops were damaged by the floodwaters.

Then during the period between 19 September and 18 October, floods struck in several regions of *China* including:

- Shensi province at Sian.
- Fukien (now Fujian province) on the southeast coast of *China* at Nan-p'ing.
- Shantung province at P'u and Kuan-t'ao.

In 1324 during the spring and summer, there was a drought in Anhwei, Chêhkiang, Chihli, Honan, Hunan, Hupeh, Kansuh, Kiangsu, Kiangsi and Shensi provinces in *China*. There were great floods in Chêhkiang and Chihli.<sup>165</sup>

**Winter of 1324 A.D. / 1325 A.D.** During the period between 17 December 1324 and 14 January 1325, floods struck several regions of *China* including:<sup>153</sup>

- Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng and Kuang-tê. Fields were damaged by the floodwaters.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang, Soochow, Sung-chiang, Nanking and T'ai-ts'ang. Fields were damaged by the floodwaters.
- Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing, Hu-chou, Ningpo, Shao-hsing, Taichow, Chin-hua, Ch'ü, Chien-tê, Wên-chou, Li-chui and Yüeh-ch'ing. Fields were damaged by the floodwaters.
- Chekiang province at Hai-ning. The dikes were damaged by the flood.

**1325 A.D.** The Seine River in *France* froze twice at short intervals. The river was crossed with sleds with heavy loads.<sup>62</sup>

The cold winter of 1325 in *France* was so severe that the Seine River froze twice in a short time. The ice on the river was thick enough to support the weight of men and full barrels.<sup>79</sup>

During this winter of 1325, the cold was very great. It was even mentioned in the minutes of the Parliament of Dijon, *France*. In Paris, the ice conditions of the Seine River were so violent that the two wooden bridges were carried away.<sup>62</sup>

The extreme cold during the winter of 1325 quickly froze the Seine River twice. We crossed the frozen river at Paris, *France* with a burden [carrying weight]. The strength at its surface was strong enough to support rolling barrels full of wine over the ice. Large snow accompanied the frost. The ice melted completely at Easter.<sup>79</sup>

[In *Western Europe*] the summer of 1325 was extremely hot.<sup>62</sup>

The drought was so great in the year 1325 in *France* that there was barely two days worth of rain in the course of four moons [4 months].<sup>79</sup>

In 1325 in *France*, there was excessive heat with a severe drought, but no lightning or thunderstorms. The year produced little fruit. Only the wines were better than usual.<sup>79</sup>

In *England*, the earth was very fruitful. Air temperature and sea calm.<sup>72</sup>

In 1325, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 15 January and 13 February, floods struck Szechwan (now Sichuan province) in southwest *China* at Fêng-tu; Shantung (now Shandong province) on the east coast of *China* at Hui-min; Hopei (now Hebei province) in northern *China* at Peiping and Pao-ti; Kansu (now Gansu province) in northwest *China* at Lung-hsi; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Kao-yao.

— During the period between 14 February and 14 March, floods struck Hopei province at Hsiung.

— During the period between 15 March and 13 April, floods struck Kansu province at Chang-yeh. Cattle drowned.

— During the period between 14 April and 12 May, floods struck Liaoning province located in the southern part of *China's* northeast at K'ai-yüan.

— During the period between 13 May and 10 June, floods struck Hopei province at Fang-shan and Cho; Kansu province at Min, Lin-t'an and Wu-tu; and Szechwan province at Mao.

— During the period between 11 June and 10 July, floods struck Hopei province at Peiping and Mi-yün; Honan (now Henan province) in central *China* at Kaifeng; Hupeh (now Hubei province) in central *China* at Chiang-ling and Kung-an; Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu, Hsing-hua, Soochow, Sung-chiang and T'ai-ts'ang; and Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hu-chou.

— During the period between 11 July and 8 August, floods struck Sinkiang (now Xinjiang province) in far northwestern *China* at Chen-hsi; Liaoning province at Liao-yang; Hopei province at San-ho, Szechwan province at San-t'ai; Shansi (now Shanxi province) in northern *China* at Yang-ch'ü; Honan province at Shang-ch'iu and Yü-ch'êng; Anhwei (now Anhui province) in eastern *China* at Su; Shantung province at Chü-yeh and Shan; Suiyuan province (now part of *Inner Mongolia*) at Tokto; and Kiangsu province at Tang-shan and P'ei. [P'ei is located at longitude 117.00° East and latitude 34.47° North.]

— During the period between 9 August and 7 September, floods struck Honan province at Sui.

— During the period between 8 September and 7 October, floods struck Honan province at Chi; and Hopei province at Pa, Cho, Yung-ch'ing and Hsiang-ho. In Hopei province, crops were damaged by floodwaters.

— During the period between 8 October and 6 November, floods struck Liaoning province at K'ai-yüan.

— During the period between 7 November and 5 December, heavy and protracted rains caused floods in Ningsia (now Ningxia province) in northwest *China* on the Loess Plateau at Chung-wei.

— During the period between 6 December 1325 and 4 January 1326, floods struck Hunan province in south-central *China* at Ch'ang-tê.

In 1325, droughts affected several regions of *China* including:<sup>153</sup>

— During the period between 14 April and 12 May, a drought engulfed Hupeh (now Hubei province) in central *China* at Ching-mên.

— During the period between 11 June and 10 July, a drought engulfed Hupeh province at Yang-hsin; and Hunan province in south-central *China* at Changsha and Ch'a-ling. As a result, the land tax was remitted.

— During the period between 11 July and 8 August, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsin-hsing. As a result, the land tax was remitted.

— During the period between 11 July and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Hsing-t'ai; Honan (now Henan province) in central *China* at Lin-ju, Ju-nan and Kaifeng; Hupeh province at An-lu and Sui; and Shantung (now Shandong province) on the east coast of *China* at Ên. As a result, the land tax was remitted.

In 1325 during the spring and summer, there was a drought in Chihli, Honan and Hupeh provinces in *China*. The land tax was remitted.<sup>165</sup>



**1326 A.D.** On 30 January 1326, there was a great earthquake in southern *Germany*. There were very cold temperatures and the Lake Constance froze over. This was followed by a hot summer and a poor harvest.<sup>172</sup>

In 1326, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 3 February and 4 March, floods struck Shantung (now Shandong province) on the east coast of *China* at Ên.

— During the period between 5 March and 2 April, floods struck Honan (now Henan province) in central *China* at Shang-ch'iu.

— During the period 1-29 June, floods struck Anhwei (now Anhui province) in eastern *China* at Tang-t'u; and Kiangsu (now Jiangsu province) on the east coast of *China* at Hsing-hua and Yangchow.

— During the period between 30 June and 29 July, floods struck Honan province at Shang-ch'iu, Ju-nan and Huang-ch'uan; and Shansi (now Shanxi province) in northern *China* at Tatung.

— During the period between 30 July and 27 August, floods struck Honan province at Yang-wu and Chêng. Over 16,500 families were flooded. During the same time period, floods struck Shensi (now Shaanxi province) in central *China* at Fu-shih. Ninety families were flooded. During this same time, floods struck Hopei (now Hebei province) in northern *China* at Lu-lung and Peiping; Shansi province at Tatung; and Honan province at Kaifeng. Also during this time, floods struck several regions causing crop damage. These regions included Honan province at An-tz'ü and Hopei province at Mi-yün, Shun-i and T'ung.

— During the period between 28 August and 26 September, floods struck Kiangsu province at Yangchow and Ch'ung-ming. At Yangchow, the floods were caused by a typhoon and many people drowned.

Floods also caused by a typhoon struck Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning. This flood damaged the dikes. During the same time period, floods struck Anhwei province at Wu-wei, Ho and Han-shan; Hopei province at Chêng-ting and Li; and Shensi province at P'u-ch'êng and Sian.

— During the period between 27 September and 25 October, floods struck Kiangsu province at Yangchow; Anhwei province at Hsüan-ch'êng; Shansi province at Fên-yang and P'ing-yao.

During the period between 25 November and 24 December, floods struck several regions of *China* including:<sup>153</sup>

— Anhwei province at Po. Fields were damaged by the floodwaters and 800 odd families were flooded.

— Kiangsu province at Ch'ung-ming. Five hundred families were flooded.

— Jehol (formally Rehe province) at P'ing-ch'üan. Rehe is located north of the Great Wall, west of Manchuria, and east of Mongolia. In 1955, the area was divided between Hebei province, Liaoning province and *Inner Mongolia*. At P'ing-ch'üan, houses and fields were damaged by the floodwaters and many people drowned.

— Liaoning province located in the southern part of *China's* northeast at Chin-chou. The fields were damaged by the floodwaters and 100 people drowned.

— Liaoning province at Liao-yang. The flood produced a famine.

— Shensi province at An-k'ang. The flood produced a famine.

— Hopei at Lu-lung.

In 1326, droughts affected several regions of *China*. As a result of the hardship, the land tax was remitted. The regions affected include:<sup>153</sup>

— During the period between 6 May and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China*; and Honan (now Henan province) in central *China* at Loyang.

— During the period 1-29 June, a drought engulfed Anhwei (now Anhui province) in eastern *China*; Kiangsu (now Jiangsu province) on the east coast of *China*; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Yü-lin. Ho-fei in Anhwei province was affected by the drought.



— During the period 30 June and 29 July, a drought engulfed Hupeh (now Hubei province) in central *China* at I-ch'ang and An-lu; Anhwei province at Ho-fei; Kwangsi province at Ts'ang-wu; and Yunnan province in southwest *China* at K'un-ming.

— During the period 30 July and 27 August, a drought engulfed Hopei province at Ta-ming and Lu-lung; and Shensi (now Shaanxi province) in central *China* at Sian and the central part of the province.

— During the period 27 September and 25 October, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Yang-chiang.

— During the period 25 November and 24 December, a drought engulfed Honan province at Hsiu-wu and Hupeh province at Mien-yang.

In 1326 during the summer, there was a drought in Anhwei, Chihli, Honan, Sze-ch'wan, Kwangsi and Shensi provinces in *China*. The drought was accompanied by a plague of locusts. The land tax was remitted.<sup>165</sup>

**Winter of 1326 A.D. / 1327 A.D.** During the period between 25 December 1326 and 23 January 1327, floods struck several regions of *China* including:<sup>153</sup>

— Liaoning province at Liao-yang.

— Jehol province at P'ing-ch'üan and Kiangsi province at Kao-an. Fields and houses were damaged by the floodwaters and 150 people drowned.

**1327 A.D.** In 1327, there was a famine in *Great Britain*. Owing to a succession of cold rainy harvests, the whole kingdom experienced a most grievous famine.<sup>212</sup>

In 1327, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 24 January and 21 February, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning. The flood damaged the dikes. Also during this time frame, floods struck Jehol (formally Rehe province) at P'ing-ch'üan. Rehe is located north of the Great Wall, west of Manchuria, and east of Mongolia. In 1955, the area was divided between Hebei province, Liaoning province and *Inner Mongolia*.

— During the period between 22 April and 21 May, floods struck Chekiang at Hai-ning. The flood damaged the dikes.

— During the period between 20 June and 18 July, floods struck Honan (now Henan province) in central *China* at Kaifeng and An-tz'ü; and Hopei (now Hebei province) in northern *China* at Peiping, Ku-an, T'ung, Shun-i, Mi-yün, Yung-ch'ing, Liang-hsiang and Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]

— During the period between 19 July and 17 August, floods struck Chahar province (now eastern *Inner Mongolia*) at Ch'ih-ch'êng; Chekiang province at Ch'ü; Liaoning province located in the southern part of *China's* northeast at Liao-yang; and Szechwan (now Sichuan province) in southwest *China* at Yün-yang.

— During the period between 18 August and 15 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow, Ch-ung-ming and Hai-mên; and Chekiang province at Chien-tê, Hangchow and Ch'ü. During the same time period, floods struck Shantung (now Shandong province) on the east coast of *China* at Chü-yeh and Honan province at Yü-ch'êng damaging crops. Also during this same time, floods struck Honan province at Kaifeng, Fu-kou and Lan-fêng where houses and fields were damaged by the floodwaters.

In 1327, droughts affected many regions of *China*. As a result the land tax was remitted. The regions affected include:<sup>153</sup>

— Honan (now Henan province) in central *China* at Kaifeng, Nan-yang and Ju-nan.

— Shensi (now Shaanxi province) in central *China* at Fu-shih.

— Hupeh (now Hubei province) in central *China* at I-ch'ang.

- During the period between 22 February and 23 March, a drought engulfed Shensi province at Sian, Pin, Li-ch'üan and Ch'un-hua; and Hopei province at Hsing-t'ai and T'ang-shan.
- During the period between 22 May and 19 June, a drought engulfed Hopei province at Peiping; Honan province at Nan-yang and Ju-nan; and Anhwei (now Anhui province) in eastern *China* at Ho-fei.
- During the period between 20 June and 18 July, a drought engulfed Honan province at Ju-nan; Shansi (now Shanxi province) in northern *China* at Ch'ang-chih and Huo; and Shensi province at Sui-tê.
- During the period between 19 July and 17 August, a drought engulfed Shensi province at Fu-shih.
- During the period between 18 August and 15 September, a drought engulfed Hopei province at Chin and Chêng-ting; Kansu (now Gansu province) in northwest *China* at Ning; Shensi province at Fu-shih; Honan province at Loyang; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at T'êng.
- During the period between 14 November and 13 December, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang.
- During the period between 14 December 1327 and 12 January 1328, a drought engulfed Hopei province at Lu-lung.

In 1327 during the summer, autumn and winter, there was a drought in Anhwei, Chihli, Honan, Shansi, Sze-ch'wan, Shantung and Shensi provinces in *China*. The land tax was remitted.<sup>165</sup>

In 1327 A.D., there was a famine in Delhi and its neighborhood in *India*. During this famine, women ate the skin of horses that had been dead for several months. The skins were cooked and sold in the marketplace. Crowds fought over the blood at the slaughterhouse.<sup>179, 181</sup>

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**1328 A.D.** In 1328, floods struck many regions of *China* including:<sup>153</sup>

- During the period between 13 January and 11 February, floods struck Honan (now Henan province) in central *China* at Chung-mou, Kaifeng and Shang-ch'iu; Anhwei (now Anhui province) in eastern *China* at Su; and Kiangsu (now Jiangsu province) on the east coast of *China* at P'ei. [P'ei is located at longitude 118.03° East and latitude 34.30° North.]
- During the period between 11 April and 9 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning. The dikes were damaged by the floodwaters. During this same time period, floods struck Kiangsu province at Tang-shan and Honan province at Yü-ch'êng.
- During the period between 10 May and 8 June, floods struck Chekiang province at Hai-ning. Then during the period between 8 July and 5 August, heavy rains caused floods in many areas of *China* including:
  - Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Nanning.
  - Southern *Indo-China*.
  - Liaoning province located in the southern part of *China's* northeast at K'ai-yüan.
  - Hopei (now Hebei province) in northern *China* at Lu-lung and Ho-chien.
  - Shantung (now Shandong province) on the east coast of *China* at Tsinan, Lin-ch'ü, Chü-yeh, P'u, Tung-p'ing, Tê, and T'ai-an. Crops were damaged by the floodwaters.
- Then during the period between 6 August and 4 September, floods struck Yunnan province in southwest *China* at Lu-hsi; Kiangsu province; Anhwei province; and Kiangsi province.

In 1328, severe droughts affected many regions of *China* including:<sup>153</sup>

- During the period between 13 January and 11 February, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping, Pao-ting and Chêng-ting; Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing and Tsinan; and Honan (now Henan province) in central *China* at Ch'in-yang.
- During the period between 12 March and 10 April, a severe drought engulfed Hopei province at Yung-nien; and Honan province at An-yang.

— During the period between 9 June and 7 July, a severe drought engulfed Kansu (now Gansu province) in northwest *China* at Ling-t'ai.

— During the period between 8 July and 5 August, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Chiang-ling.

— During the period between 5 September and 3 October, a severe drought engulfed Shensi (now Shaanxi province) in central *China* at Sian. The drought was so severe that cannibalism was practiced.

In 1328 during the summer in Honan, Kiangsu and Shensi provinces in *China*, there was a great drought. The resulting famine was so severe that it led to cannibalism in Shensi.<sup>165</sup>

At the beginning of October 1328, the eve of Saint-Denis and during the octave of the feast, strong winds toppled many buildings in *France*.<sup>79</sup>

In 1328, it was so cold that the Danube River in *Europe* was frozen over for 17 weeks. It was a fruitful year, but again and again earthquakes.<sup>172</sup>

**1329 A.D.** In 1329, floods struck many regions of *China* including:<sup>153</sup>

— During the period 1-30 January, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing, Hu-chou and Chien-tê; Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Chinkiang; and Anhwei (now Anhui province) in eastern *China* at Kuei-ch'ih, Tang-t'u and Kuang-tê. Fields were damaged by the floodwaters.

— During the period 28 June and 26 July, floods struck Honan (now Henan province) in central *China* at Shang-ch'iu; Hopei (now Hebei province) in northern *China* at Lu-lung; and Kiangsu province at Yangchow, Suchow and P'ei. [P'ei is located at longitude 118.03° East and latitude 34.30° North.] During the same time period, heavy rains caused crop damage at Honan province at An-tz'ü and Hopei province at Peiping, T'ung, Pa, Ching-hai, Ho-chien, and Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]

In 1329, droughts affected many regions of *China* including:<sup>153</sup>

— During the period between 30 April and 28 May, a drought engulfed Shensi (now Shaanxi province) in central *China* at Sian; and Honan (now Henan province) in central *China* at Loyang.

— During the period between 6 May and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Chêng-ting, Ho-chien, Ta-ming, Yung-nien and I-ch'ang.

— During the period between 6 May and 8 November, a drought engulfed Hupeh (now Hubei province) in central *China* at Ch'i-ch'un.

— During the period between 25 August and 23 September, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hu-chou; Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, T'ai-ts'ang and Nanking; Anhwei (now Anhui province) in eastern *China* at Tang-t'u, Hsüan-ch'êng, Kuang-tê and Kuei-ch'ih; and Kiangsi (now Jiangxi province) in southern *China* at P'o-yang.

— During the period between 23 October and 20 November, a drought engulfed Hunan province in south-central *China* at Ch'ang-tê and Li; Hupeh province at Wuchang; and Kiangsi province at Kao-an, Nan-ch'ang, Hsing-tz'ü, Lin-ch'uan, I-ch'un, and Chi-an.

— During the period between 21 December 1329 and 19 January 1330, a drought engulfed Shansi (now Shanxi province) in northern *China* at Yang-ch'ü; Hupeh (now Hubei province) in central *China* at Huang-kang; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Yang-chiang.

**1330 A.D.** In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.<sup>1</sup>

The rain was so violent; the harvest did not begin till Michaelmas (29 September).<sup>2, 39, 40, 41, 56</sup>

In *England*, heavy rains; grain did not ripen; harvest not commenced till Michaelmas.<sup>47, 92</sup>

In *England*, exceedingly great rains fell from May to October. The corn [grains] could not ripen. In most places, harvest did not begin until 29 September. Wheat was not harvested before 21 November. Nor pease [pea] before 30 November. On 24 December at the break of day, a terrible hurricane came from the west, which demolished houses, trees, etc.<sup>72</sup>

*China* experienced floods that ruined harvest and produced famine.<sup>28</sup>

In 1330, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 18 May and 16 June, floods struck Hopei (now Hebei province) in northern *China* at Peiping. Crops were damaged by the floodwaters.

— During the period between 17 June and 15 July, floods struck Hopei province at Ta-ming. Fields were damaged by the floodwaters. During the same time period, floods struck Hopei province at Peiping and Shantung (now Shandong province) on the east coast of *China* at Kao-t'ang and Ho-tsê.

— During the period between 16 July and 14 August, floods struck Hopei province at Ho-chien.

Then during the period between 15 August and 12 September, floods damaged fields at:

— Hopei province at Peiping and Pao-ting.

— Jehol (formally Rehe province) at P'ing-ch'üan. Rehe is located north of the Great Wall, west of Manchuria, and east of Mongolia. In 1955, the area was divided between Hebei province, Liaoning province and *Inner Mongolia*.

— Shantung at I-tu.

— Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Ningpo and Shao-hsing. Also at Chia-hsing and Hu-chou both houses and fields were damaged by the floodwaters.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin and Chinkiang. Also at Sung-chiang and Soochow both houses and fields were damaged by the floodwaters.

— Anhwei (now Anhui province) in eastern *China* at Hsüan-ch'êng, An-ch'ing and Kuei-ch'ih.

— Hunan province in south-central *China* at Ch'ang-tê.

— Hupeh (now Hubei province) in central *China* at Ching-mên.

Then during the period between 13 October and 10 November, floods struck Liaoning province located in the southern part of *China's* northeast at Liao-yang and Kirin (now Jilin province) in northeast *China* at Ninguta.

In 1330 during the 7<sup>th</sup> moon, there was destruction [by flooding] of 36,600 chin = 61,000 acres in the vicinity of Shanghai, *China*. Over 45,000 families suffered in this and adjoining regions.<sup>166</sup>

In 1330, several regions of *China* experienced drought. As a result the land tax was remitted. The drought was accompanied by a plague of locusts. The following areas were affected:<sup>153</sup>

— During the period between 16 July and 14 August, a drought engulfed Liaoning province located in the southern part of *China's* northeast at K'ai-yüan; Shansi (now Shanxi province) in northern *China* at Tatung, Yang-ch'ü and Yü-tz'ü; Hopei (now Hebei province) in northern *China* at Chêng-ting, Yung-nien and Tz'ü; Kirin (now Jilin province) in northeast *China* at Fu-yü; Jehol (formally Rehe province) at Luan-p'ing; and Suiyuan province (now part of *Inner Mongolia*) at Tokto and Mongolian Mow-Mingan Banner.

— During the period between 13 October and 11 November, a drought engulfed Mongolia [uncertain name – T'ieh-li-kan-mu].

In 1330 during the summer and autumn, there was a drought in Anhwei, Chêhkiang, Chihli, Honan, Hunan, Hupeh, Kiangsi, Shantung, Shensi and Sze-ch'wan provinces in *China*. The land tax was

remitted. The drought was accompanied by a plague of locusts. There was a great drought in *Mongolia*. The resulting famine was so severe that it led to cannibalism in Honan.<sup>165</sup>

**Winter of 1330 / 1331 A.D.** The winter of 1330-31 in *France* produced long rains, which had lasted from the beginning of November 1330 until the beginning of 1331.<sup>79</sup>

During the winter of 1330-31 in *France*, the weather produced heavy rains and strong winds, which resulted in floods. These rains began in November 1330 and continued until March.<sup>79</sup>

There was early in October 1330 in *France*, a very heavy frost. Then since the beginning of November, there were almost constant high winds with heavy rains and floods. The rains lasted until the end of March.<sup>79</sup>

**1331 A.D.** *Ireland* in 1331 was grievously distressed by a famine. But in Dublin, *Ireland*, they were seasonably relieved by a shoal of fishes, called thurlheds, washed ashore. This had not been witnessed there for many ages before.<sup>72</sup>

In 1331 in *France*, a drought followed the wet winter.<sup>79</sup>

In France the rains lasted until the end of March. They were followed by an extraordinary drought in 1331. The grapes harvested in 1331 were in small quantities and the wine was detestable.<sup>79</sup>

Following the long rains that lasted until the beginning of 1331 was a severe drought in *France*. Farmers could not plow the land because of its hardness.<sup>79</sup>

There were very large floods in September 1331, in Aragon [now in Spain] and Provence [now *France*]. The rest of *France* felt no such thing, although the winter was very mild and rainy.<sup>79</sup>

In 1331, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 8 May and 5 June, floods struck Hopei (now Hebei province) in northern *China* at T'ung and Shansi (now Shanxi province) in northern *China* at Lu-ch'êng.

— During the period between 6 June and 5 July, floods struck Ningsia (now Ningxia province) in northwest *China* on the Loess Plateau at Ning-hsia; Szechwan (now Sichuan province) in southwest *China* at P'êng-shui; Hopei province at Pao-ting and Ho-chien; and Hupeh (now Hubei province) in central *China* at An-lu.

— During the period between 6 July and 3 August, floods struck Hopei province at Peiping, Pao-ting, Chêng-ting and Ho-chien; Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng; Honan (now Henan province) in central *China* at An-yang and Lin-chang.

— During the period between 4 August and 3 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou. One hundred ninety persons drowned. During the same time period, floods struck Hupeh province at Hanyang and Hopei province at Peiping and Ho-chien.

— During the period between 3 September and 1 October, floods struck Chekiang province at Hangchow. Fields and crops were damaged by the floodwaters.

— During the period 1-29 November, floods struck Chekiang province at Hangchow and Hu-chou and Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow. Crops were damaged by the floodwaters. Also during this same time period, a typhoon struck Kiangsu province at Wu-chiang. 1,970 families were flooded.

— During the period between 30 December 1331 and 27 January 1332, floods struck Hopei province at Shen and Chin.

In 1331 during the 7<sup>th</sup> moon, in the vicinity of Shanghai, *China*, there was a famine, with water calamity



[flood damage].<sup>166</sup>

In 1331, droughts engulfed many regions of *China* including:<sup>153</sup>

- Shensi (now Shaanxi province) in central *China* at An-k'ang.
- Kansu (now Gansu province) in northwest *China* at Hsi-ho.
- Shansi (now Shanxi province) in northern *China* at Yang-ch'ü, Huo, Hsi and Li-shih.
- Honan (now Henan province) in central *China* at Loyang.
- Anhwei (now Anhui province) in eastern *China* at Fou-yang
- Suiyuan province (now part of *Inner Mongolia*) at Liang-ch'êng.
- During the period between 8 May and 5 June, a drought engulfed Hopei (now Hebei province) in northern *China* at Chin and Ho-chien; Kansu province at Ning; and Shansi province at Yang-ch'ü and Tatung.
- During the period between 6 July and 3 August, a drought engulfed Hopei province at Chin; Kansu province at Ning; and Ningsia (now Ningxia province) in northwest *China* on the Loess Plateau at Etzina, the former Torgut Banner.
- During the period between 3 September and 1 October, a drought engulfed Hopei province at Ching.

In 1331 during the summer and autumn, there was a drought in Chihli, Honan and Shansi provinces in *China*.<sup>165</sup>

**Winter of 1331 / 1332 A.D.** The winter of 1331-32 in *France* was rainy but produced very little cold. There were almost no frosts.<sup>79</sup>

**1332 A.D.** *China* experienced heavy rains and floods killing 7 million.<sup>28</sup>

In 1332, floods struck many regions of *China* including:<sup>153</sup>

- During the period between 25 May and 23 June, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow and T'ai-hsing; Hupeh (now Hubei province) in central *China* at Yün-mêng and Ying-ch'êng; Honan (now Henan province) in central *China* at Sui, Huai-yang, Lan-fêng and Fêng-ch'iu; Hopei (now Hebei province) in northern *China* at Ho-chien; and Shantung (now Shandong province) on the east coast of *China* at I-tu.
- During the period between 24 June and 22 July, floods struck Anhwei (now Anhui province) in eastern *China* at Wu-wei and Ho; and Shansi (now Shanxi province) in northern *China* at Fên-yang.
- During the period between 22 August and 20 September, floods struck Kiangsu province at Pao-ying and Hsing-hua; and Hupeh province at Yün-mêng and Ying-ch'êng.
- During the period between 21 September and 19 October, floods struck Kiangsu province at Fêng, Soochow, Wu-chin, Chinkiang, Sung-chiang and Chiang-yin; Hupeh province at Chiang-ling; and Shantung province at Chü, T'ai-an, Yü-t'ai, Ts'ao and Lin-i. [Lin-i is located at longitude 118.24° East and latitude 35.07° North.]
- During the period between 20 October and 18 November, floods struck Shantung province at Ts'ao. The dikes were damaged.

In 1332, droughts engulfed many regions of *China* including:<sup>153</sup>

- During the period between 6 May and 9 September, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing.
- During the period between 12 July and 10 August, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-yin and Yangchow.
- During the period between 22 August and 20 September, a drought engulfed Shansi (now Shanxi province) in northern *China* at Yang-ch'ü and Ho-ch'ü; and in Hupeh (now Hubei province) in central *China* at Ching-mên.



— During the period between 21 September and 19 October, a drought engulfed Honan (now Henan province) in central *China* at Loyang.

— During the period between 8 December 1332 and 5 January 1333, a drought engulfed Kiangsu and Chekiang provinces.

In 1332 during the autumn, there was a drought in Chihli, Honan, Hupeh and Shansi provinces in *China*.<sup>165</sup>

The Rhône River in *France* overflowed its banks and the floodwaters reached the territory of Donzère.<sup>61</sup> [Other sources place this event at 1350 A.D.]

In *Ireland*, a peck of wheat sold for 22s.<sup>57, 91</sup>

### **1333 A.D. – 1337 A.D. China. Famine**

In 1333, in the vicinity of Shanghai, *China*, there was a famine.<sup>166</sup>

The four years between 1333 and 1337 were a period of unimagined suffering throughout *China*. Famine and pestilence laid the whole country waste. Excessive rains caused destructive flooding, and according to Chinese records 4,000,000 people perished from starvation in the neighborhood of Kiang alone.<sup>84</sup> [Kiang likely refers to the province of Jiangsu, located along the east coast of *China*. It is the province with the highest population density in *China*.]

*China* experienced droughts and floods and famine. Four million people killed in floods.<sup>28</sup>

In 1334 A.D. *China* experienced droughts and floods. Thirteen million were killed in the famines and floods in the Southern Provinces.<sup>28</sup>

During 1336 and the two years that followed, there were no harvests in the vicinity of Shanghai, *China*. People boiled and ate their sons and daughters.<sup>166</sup>

In *China* in 1337, a famine occasioned a pestilential epidemic.<sup>57</sup>

**Winter of 1332 / 1333 A.D.** In 1333, once again the winter produced a hard winter [in *Germany*] but not as hard as previous winters.<sup>172</sup>

**1333 A.D.** In Florence in Tuscany in central *Italy* in November, there was a great overflow of the Arno River.<sup>47, 92</sup>

In 1333, torrential flooding along the River Arno in *Italy* swept away the stone bridge Ponte Vecchio, which straddled the river in Florence.

In 1333, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 13 June and 11 July, floods struck Honan (now Henan province) in central *China* at Kiafeng and Yang-wu. Crops were damaged by the floodwaters.

— During the period between 12 July and 10 August, floods struck Shensi (now Shaanxi province) in central *China*; and Honan province at Loyang. During the same time period, floods caused by heavy and protracted rains struck Hopei (now Hebei province) in northern *China* at Peiping. Also during this time, floods caused by heavy rains struck Fukien (now Fujian province) on the southeast coast of *China* at Chin-chiang. As a result several hundred families were flooded at Chin-chiang.

— During the period between 11 August and 9 September, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Kuei-p'ing.

In 1333 during the summer, there was a drought in Chêhkiang and Kiangsu provinces in *China*.<sup>165</sup>

*Also refer to the section 1333 A.D. – 1337 A.D. for information on the famine in China during that timeframe.*

**Winter of 1333 / 1334 A.D.** In 1333-34 the winter was very severe in *Italy* and *Provence*. There was snow in Padua, *Italy* from November to March.<sup>62</sup>

In the year 1334, all the rivers in *Provence* and *Italy* were frozen.<sup>60, 62</sup> At Paris, *France*, the frost lasted two months and twenty days.<sup>38</sup>

The frost of 1334 stopped all the rivers of Italy and Provence, *France*.<sup>79</sup>

The winter of 1334 in *France* was very wet.<sup>79</sup>

In December 1333 and January 1334 in Paris, *France* and the surrounding country great thunder and lightning storms with wind and hail. Storms that were normally found in the month of July.<sup>79</sup>

In 1334, the Po River in *Italy* and the Rhône River in *France* froze.<sup>58, 80</sup>

**1334 A.D.** The summer of 1334 in *France* produced a drought. But the heat was less intense than the previous summer. The year produced many wines.<sup>79</sup>

In *England* on 23 November 1334, there was a prodigious inundation of the sea along the coast, especially about the River Thames. The violence of the water broke down the banks and drowned infinite number of beast and cattle and turned the pasture ground into salt marshes.<sup>72</sup>

In 1334, several earthquakes shook *France*. It was a rainy autumn [in *Germany*] and a hard winter.<sup>172</sup>

In 1334, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 5 March, floods struck Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing, Chi-ning and Ho-tsê.

— During the period between 6 March and 4 April, floods struck Hopei (now Hebei province) in northern *China* at Ch'ien-an and Lu-lung; Jehol (formally Rehe province) at Karach'in (Left Wing); and Kiangsi (now Jiangxi province) in southern *China* at Kao-an.

— During the period between 5 April and 3 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow and Chia-hsing; and Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang, Wu-chin, Sung-chiang and Chiang-yin. The floods were accompanied by a plague. Also during this time, floods caused by heavy rains struck Shantung province.

— During the period between 5 April and 3 May, floods struck Shantung province at I-tu and Tung-p'ing

— During the period between 2 June and 1 July, floods struck Kiangsu province at Chinkiang; and Chahar province (now eastern *Inner Mongolia*) at Hsüan-hua.

— During the period 2-30 July, floods struck Kiangsu at Huai-an. People and cattle were drowned and houses damaged by the floodwaters. During the same time period, floods struck Liaoning province located in the southern part of *China's* northeast at Pei-chên, Liao-yang, K'ai-yüan; and Hei-shan; and Szechwan (now Sichuan province) in southwest *China* at Wu-ch'i [uncertain name]. The floods were accompanied by a plague of locust.

— During the period between 29 September and 27 October, floods struck Kiangsi (now Jiangxi province) in southern *China* at Chi-an.

In 1334, droughts engulfed many regions of *China*. The drought was accompanied by a plague of locusts. The regions affected included:<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Wuchang.
- Honan (now Henan province) in central *China* at Loyang.
- Kiangsi (now Jiangxi province) in southern *China* at Hsing-tzū.
- During the period between 6 March and 4 April, a drought engulfed Anhwei (now Anhui province) in eastern *China* at Shou.
- During the period between 5 April and 3 May, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow and Chia-hsing; and Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang, Wu-chin, Sung-chiang and Chiang-yin. These regions were also affected by floods.
- During the period between 4 May and 1 June, a drought engulfed Kansu (now Gansu province) in northwest *China* at Ch'êng. The drought produced a famine.
- During the period 2-30 July, a drought engulfed Szechwan (now Sichuan province) in southwest *China* at Wu-ch'i; and Liaoning province located in the southern part of *China's* northeast at Pei-chên, Liao-yang, K'ai-yüan, Mukden and Hei-shan.

In 1334 during the spring, there was a drought in Chêhkiang, Honan, Hunan, Hupeh and Kiangsu provinces in *China*. The drought was accompanied by a plague of locusts. There was a drought in the city of Moukden [now Shenyang].<sup>165</sup>

*Also refer to the section 1333 A.D. – 1337 A.D. for information on the famine in China during that timeframe.*

**1335 A.D.** It rained so heavy in *England* that the grain was spoiled.<sup>40, 41, 56</sup>

In *England*, continued rainstorms; grain spoiled.<sup>47, 92</sup>

In *England*, famine occasioned by long rains.<sup>57, 90, 91, 212</sup>

[In *England*], there was floods, storms, tempests and meteors.<sup>72</sup>

In *England* after an abundance of rain came a murrain of cattle and dearth of corn [grain]. Wheat sold for 40s. a Quarter [quarter ton]. So great a death in *England*, that scarce could the living bury the dead.<sup>72</sup>

In the Novgorod [*Russia*], autumn ice and snow drifted into the Volkhov River, carrying away fifteen stays of the great bridge.<sup>76</sup>

In 1335, severe droughts engulfed many regions of *China* including:<sup>153</sup>

- During the period between 25 March and 23 April, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at I-shui, Jih-chao, Mêng-yin and Chü. The drought caused a famine.
- During the period between 24 April and 22 May, a severe drought engulfed Honan (now Henan province) in central *China* at Loyang.
- During the period between 6 May and 8 August, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China* at Shao-wu.

In 1335, floods struck Honan (now Henan province) in central *China* at Fêng-ch'iu.<sup>153</sup>

In 1335 during the spring and summer, there was a great drought in Honan and Shantung provinces in *China*.<sup>165</sup>

In 1335 during the 5<sup>th</sup> moon, in the vicinity of Shanghai, *China*, there was a hailstorm. The hailstones varied in size, from water lily seeds to hen's eggs.<sup>166</sup>

*Also refer to the section 1333 A.D. – 1337 A.D. for information on the famine in China during that timeframe.*

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**1336 A.D.** *Scotland* was desolated by a famine.<sup>57, 91</sup>

In *England* in 1336, there was so great a scarcity of money and plenty of corn that wheat was sold at 2s. a Quarter [quarter ton] and a fat ox at half a Mark.<sup>72</sup>

[In *England*] in 1336, there was an extraordinary plenty [plentiful harvest].<sup>72</sup>

On August 4, 1336, a terrible storm broke out in Paris, *France* and its countryside. This storm toppled tents erected at Vincennes [now an eastern suburb of Paris] and uprooted thousands of trees in this woods.<sup>79</sup>

In 1336, severe droughts engulfed several regions of *China* including:<sup>153</sup>

— During the period between 12 April and 11 June, a severe drought engulfed Shensi (now Shaanxi province) in central *China* at Sian.

— During the period between 10 June and 8 July, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua.

— During the period between 6 September and 4 October, a severe drought engulfed Chekiang province and Kiangsu (now Jiangsu province) on the east coast of *China*.

In 1336, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 10 June and 8 July, floods struck Honan (now Henan province) in central *China* at Têng.

— During the period between 9 July and 6 August, the Ching River flooded in Kansu (now Gansu province) in northwest *China* and Shensi (now Shaanxi province) in central *China*.

— During the period between 6 September and 4 October, floods due to heavy rains struck Hopei (now Hebei province) in northern *China* at Peiping and T'ung.

In 1336 during the spring, there was a drought that caused great distress in Chêhkiang, Hupeh, Kiangsi, Kiangsu and Shensi provinces in *China*.<sup>165</sup>

*Also refer to the section 1333 A.D. – 1337 A.D. for information on the famine in China during that timeframe.*

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**1337 A.D.** In *England*, there was a severe frost without snow.<sup>47, 72, 93</sup>

In *England*, there was a severe frosty winter without snow. Wheat was very dear.<sup>72</sup>

In 1337, there was a major earthquake in Wuerttemberg, *Germany*. Then came a severe drought, poor grain and grape harvests, followed by a famine.<sup>172</sup>

In 1337 the whole of Moscow, *Russia* was burnt down and then came heavy rains, which flooded everything. The rains flooded both in the cellars and in the squares wherever anything had been carried out [from the fires]. In the same year Toropets in east-central *Russia* was burnt down and flooded.<sup>76</sup>

In 1337 in *China*, there was a famine, which occasioned a pestilential epidemic.<sup>91</sup>

In 1337, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 3 March and 1 April, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing.

— During the period between 31 May and 28 June, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ho. Crops were damaged by the floodwaters.

— During the period between 29 June and 27 July, floods due to heavy and protracted rains struck Hopei (now Hebei province) in northern *China* at Peiping and Honan (now Henan province) in central *China* at Loyang and Chi. People and cattle were drowned and houses were damaged by the floodwaters. During the same period, floods struck Honan province at An-yang.

— During the period between 28 July and 25 August, floods struck Honan province at Chi. People were drowned and houses, fields and crops were damaged by the floodwaters. During the same time period, floods struck Honan province at Ch'in-yang, Lan-fêng, Yü-shih and Shang-ch'iu; Hopei province at Ch'ing-ho; Hupeh (now Hubei province) in central *China* at Huang-kang; and Chekiang province at Ch'ü and Ch'ang-shan.

*Also refer to the section 1333 A.D. – 1337 A.D. for information on the famine in China during that timeframe.*

**1338 A.D.** In the Novgorod Republic [now part of *Russia*], the water was big in the Volkhov River as it never had been before [a great flood], three weeks after Easter Day on Wednesday, and it carried away ten stays of the great bridge; at the same time it carried away the bridge over the stream Zhilotug, and much harm was done.<sup>76</sup>

In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.<sup>1</sup>

In *England*, it rained from the beginning of October to December.<sup>2, 40, 41, 56</sup>

In *England*, there was continuous rain from beginning of October to December.<sup>47, 92</sup>

In *England*, there was a severe frost for twelve weeks, after rain.<sup>47, 72, 93</sup>

[In *England*], there was heavy rains from 1 October to 1 December and then frost.<sup>72</sup>

In *England*, there was a very rainy harvest, which hindered sowing of winter corn [grain]. From 1 December to 1 March there was a most rigorous frost, which killed the little sown seed. Yet such a scarcity of money, that grain was not dear. Wheat 2s. a fat ox 6s., a sheep 6d.<sup>72</sup>

The *Western Europe*, the Meuse River froze.<sup>62</sup>

In 1338, by a great flood of water, strong currents cut violently Eydersted and completely demolished Dithmarschen, *Germany*. Great quantities of rain fell which caused a dearth and then a great famine. Many people died of hunger.<sup>172</sup>

In 1338, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 20 May and 18 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Chi-an; and Shantung (now Shandong province) on the east coast of *China* at Fei and Lin-i. [Lin-i is located at longitude 118.24° East and latitude 35.07° North.]

— During the period between 19 June and 17 July, floods due to heavy and protracted rains struck Fukien (now Fujian province) on the southeast coast of *China* at Shao-wu.

**1339 A.D.** In northeastern *England* on 22<sup>nd</sup> March, there was a great flood of the River Tyne; many lives lost.<sup>47, 72, 92</sup>

In northeastern *England*, 120 laymen, and several priest, besides women, were drowned by an inundation at Newcastle upon Tyne.<sup>41, 43</sup>

In *England*, on 22 March 1339, in the night there was a great flood in the River Tyne, which broke and carried down six perches of the wall of Newcastle wherein 120 men, several priest, and many women were drowned. This year a Quarter of wheat cost 40*d.* and sometimes less; barley 10*d.*; peas and beans 12*d.*; oats 10*d.*<sup>72</sup>

In *Ireland* in 1339, there was a general famine.<sup>57, 91</sup>

In 1339, there was a famine in *Scotland*. The crops failed and such a famine ensued that the poor were reduced to feeding on grass. Yet at the same time, wheat in *England* was only 3 shillings 4 pence per quarter [quarter ton].<sup>212</sup>

In 1339, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 7 July and 5 August, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Ch'ang-t'ing. Over 800 families were flooded. Fields were damaged by floodwater.

— During the period between 6 August and 3 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-shan and Kiangsu (now Jiangsu province) on the east coast of *China* at I-hsing. Houses were damaged by the floodwaters. During the same time period, floods struck Shantung (now Shandong province) on the east coast of *China* where fields and crops were damaged by floodwaters. Also during this time, floods struck Fukien province at Shao-wu.

**1340 A.D.** In 1340, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 28 February and 28 March, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Hsia-p'u and Hopei (now Hebei province) in northern *China* at Peiping. In Hsia-p'u people drowned.

— During the period between 27 May and 25 June, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Fêng-hua. Many people drowned.

— During the period between 26 June and 24 July, floods struck Chekiang province at Ch'ü, Lung-yu, Sung-yang, Lung-ch'uan and Sui-ch'ang. In Sung-yang, Lung-ch'uan and Sui-ch'ang, over 500 people drowned.

— During the period between 25 July and 23 August, floods struck Fukien province at Nan-p'ing. Over 100 people drowned and over 500 families were flooded. Fields were damaged by the floodwaters. During the same time, floods struck Shensi (now Shaanxi province) in central *China* at Chou-chih, where people drowned.

— During the period between 22 October and 19 November, floods struck Honan (now Henan province) in central *China* at I-yang and Yü. Houses were damaged by the floodwater and many people drowned.

In 1340 during the period between 27 May and 25 June, a drought struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Nan-hsiung.<sup>153</sup>

In 1340 during the summer, there was a drought in Kwangtung province in *China*.<sup>165</sup>

**1341 A.D.** The cold of this winter in *Livonia* (currently comprising present day Estonia and parts of Latvia) was so great that many soldiers of the army of the Crusades froze to death or sustained frozen noses, fingers and limbs.<sup>62</sup>



In *England* and *Scotland* in 1341, there was a great dearth in this year and the next. People ate horses, dogs, cats, etc. to sustain life.<sup>57, 91</sup>

In 1341, there was a great flood [in *Germany*] that drowned many people. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

In 1341 during the period between 14 July and 12 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Ch’ung-ming, Nan-t’ung and T’ai. Over 1,600 persons drowned.<sup>153</sup>

In 1341 during the 4<sup>th</sup> moon, a water calamity [flood] occurred in the vicinity of Shanghai, *China*.<sup>166</sup>

**1342 A.D.** In *India* in 1342, there was a very severe famine in Delhi. Few of the inhabitants could obtain the necessities of life.<sup>57</sup>

In 1342 A.D., during the reign of Sultan Muhammad Tughlaq, there was a famine in Delhi and its neighborhood in *India*.<sup>179</sup>

On 9 July 1342, a great flood struck Hannoversch Münden, *Germany*. The floodwater went through the upper gate and stood for several days in the city. The flood swept away numerous bridges and caused many houses to collapse. The water was 8.91 meters [29.2 feet] high.<sup>172</sup>

The flood of 21 July 1342 was one of *Central Europe’s* largest floods during the millennium. There was a long drought followed by two days of sustained extraordinary downpours. At Würzburg, *Germany*, the River Main was very close to the cathedral. In the Rhine region, at the Mainz Cathedral, the water was up to a man’s waist. In Cologne, boat could travel over the city walls on the floodwaters. In the chronicles of Regensburg [in Bavaria, *Germany*], Passau [in Bavaria, *Germany*] and Vienna [*Austria*], the St. Magdalen day flood was described as a catastrophic Danube River flood. It was the same in Moselle, Vitava, Elbe, Werra, Unstrut and Weser. Even Carinthia and Lombardy were ravaged by floods.<sup>172</sup>

“This summer [July 1342], there was such a great flood of waters by the whole world, that there was a flood not created by rain but it seemed as though water was gushing from everywhere, even from the tops of mountains. It flowed over the walls of the city of Cologne and boats went over the walls. The Danube, Rhine and Main rivers destroyed towers, very strong city walls, bridges, houses and the bulwarks of cities. It was as if the floodgates of heaven were opened and the rain fell to the Earth as it did in the 600<sup>th</sup> year of Noah’s life. At Würzburg, *Germany* the River Main smashed the bridge and forced many people to leave their homes.”<sup>172</sup>

On the Feast of Mary Magdalene [22 July] 1342, poured a great flood and put many places underwater [in *Central Europe*].<sup>172</sup>

In 1342, there was a severe drought in several regions of *China*. [The resulting famine was so severe that] cannibalism was practiced throughout these regions.<sup>153</sup>

During the period of 5 February - 8 November, the following regions were affected by the drought:

- Honan (now Henan province) in central *China* at An-yang.
- Shansi (now Shanxi province) in northern *China* at Tatung, Yang-ch’ü, Taiyuan, Yü-tz’ü, Hsü-kou, Fên-yang and Hsiao-i.
- Shantung (now Shandong province) on the east coast of *China* at Lin-i. [Lin-i is located at 118.24 E. longitude and 35.07 N. latitude.]

During the period of 8 August - 8 November, the following region was affected by the drought:

- Honan (now Henan province) in central *China* at Chi.

In 1342 during the spring, summer and autumn, there was a great drought in Chihli, Honan and Shansi provinces in *China*. The resulting famine was so severe that it led to cannibalism.<sup>165</sup>

In 1342, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 5 May and 3 June, floods struck Honan (now Henan province) in central *China* at Sui and Lan-fêng.

— During the period between 3 July and 1 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan. Over 1,000 families were flooded and innumerable people drowned. Also during this time, floods struck Shansi (now Shanxi province) in northern *China*, where crops were damaged.

**1343 A.D.** In 1343, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 25 February and 26 March, floods struck Kansu (now Gansu province) in northwest *China* at Kan-ku, Wu-shan and T'ien-shui. Innumerable people drowned.

— During the period between 24 May and 22 June, floods struck Hopei (now Hebei province) in northern *China* at Ch'ang-yüan [uncertain location].

— During the period between 22 July and 20 August, floods struck Honan (now Henan province) in central *China* at Chung-mou, Fu-kou, Yü-shih, Wei-ch'uan, Chêng, Jung-yang, Fan-shui, and Ho-yin.

In 1343 during the period between 22 July and 20 August, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Yang-hsin.<sup>153</sup>

In 1343 during the autumn, there was a drought in Hupeh province in *China*.<sup>165</sup>

**1344 A.D.** All the rivers in *Italy* were frozen over.<sup>30</sup>

In *India* in 1344-45, there was a famine that extended over the whole of Hindustan. It was very severe in Deccan. The Emperor Mohommed, it is said, was unable to procure the necessities for his household.<sup>57</sup>

In 1344 A.D., there was a famine in Deccan in southern *India*.<sup>179</sup>

In 1344, several regions of *China* experienced flooding.<sup>153</sup>

During the period of 16 January – 14 February, the following areas were affected:

— Shantung (now Shandong province) on the east coast of *China* at Ho-tsê experienced flooding.

— Honan (now Henan province) in central *China* at Kaifeng experienced flooding.

During the period of 11 June – 9 July, the following areas were affected:

— Shantung (now Shandong province) on the east coast of *China* at Ho-tsê, P'u, Chi-ning, and Tzū-yang experienced flooding.

— Hopei (now Hebei province) in northern *China* at Pa experienced flooding.

During the period of 10 July – 8 August, the following areas were affected:

— Honan (now Henan province) in central *China* at Kung experienced flooding. Several hundred families flooded. Flooding at Yen-ling, Hsü-ch'ang, Kaifeng and Lin-ying damaged crops. [The resulting famine was so severe that] cannibalism was practiced.

— Shantung (now Shandong province) on the east coast of *China* at Tzū-yang experienced flooding. Crops were damaged. [The resulting famine was so severe that] cannibalism was practiced.

— Hopei (now Hebei province) in northern *China* at T'ung experienced flooding. Crops were damaged. [The resulting famine was so severe that] cannibalism was practiced.

During the period of 9 August – 6 September, the following areas were affected:

— Hopei (now Hebei province) in northern *China* at Ch'ien-an and Lu-lung experienced flooding. Crops and housing were damaged.

— Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou and Ch'ü experienced flooding. The typhoon and earthquake damaged houses.

— Shantung (now Shandong province) on the east coast of *China* at Tung-a, Yang-ku, Wên-shang, and P'ing-yin experienced flooding.

In 1344 during the period between 7 September and 8 October, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China* at Foochow, P'u-t'ien and Shao-wu; Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang; and Hunan province in south-central *China* at Kuei-yang.<sup>153</sup>

In 1344 during the spring, summer and autumn, there was a drought in Fuhkien, Hunan and Kiangsu provinces in *China*. In Fuhkien, this was a great drought.<sup>165</sup>

**1345 A.D.** Rains began in *Italy* in July and lasted 6 months. Famines followed.<sup>28</sup>

[On 21 November] in the Novgorod [*Russia*], a southerly wind arose, with snow, and drove the ice into the Volkhov River, and carried away seven stays [of the great bridge].<sup>76</sup>

In 1345, there was a drought [in *England*]. It was called “the dry summer”. From March to the end of April, there was little to no rain. As a result, grain was very meager the rest of the year.<sup>212</sup>

Around 1345, a famine struck in and around the Delhi district of *India*. The famine was caused by a failure of the rains.<sup>156</sup>

— Ibn Batuta, a native of Tangiers, Africa, was visiting the region at the time and wrote: “Distress was general, and the position of affairs very grave. One day I went out of the city to meet the wazir, and I saw three women who were cutting in pieces and eating the skin of a horse, which had been dead for some months. Skin was cooked and sold in the markets. When bullocks were slaughtered, crowds rushed forward to catch the blood, and consumed it for their sustenance. . . The famine being unendurable, the Sultan ordered provisions for six months to be distributed to all the population of Delhi. The judges, secretaries, and officers inspected all the streets and markets, and supplied to every person provisions for half a year.” Other sources confirmed the relief was real.

In 1345 a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at Yü-ch'êng. During the period between 6 May and 8 August, a drought engulfed Shantung province at Kao-mi.<sup>153</sup>

In 1345, there was a great drought in Shantung province in *China*.<sup>165</sup>

In 1345, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 29 July and 27 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Ho-tsê. Houses were damaged by the floodwaters.

— During the period between 26 October and 24 November, the Yellow River flooded.

**1346 A.D.** In 1346, floods struck *China* and the Yellow River flooded. In the same year a drought engulfed the east coast of *China* in Kiangsu (now Jiangsu province) at Chinkiang and Chekiang (now Zhejiang province) at Fêng-hua.<sup>153</sup>

In 1346, there was a drought in Kiangsu province in *China*.<sup>165</sup>

**1347 A.D.** Droughts struck Ho-tong *China*. Many died.<sup>28</sup> [Ho-tong is possibly Yüenchêng in Shanxi province, inland northeastern *China*.]

In 1347, a severe drought engulfed Honan (now Henan province) in central *China* at Ch'in-yang, Chi, Kaifeng and Mêng-ching; Shansi (now Shanxi province) in northern *China* at Yung-chi; and Shensi (now Shaanxi province) in central *China* at Ch'i-shan. During the period between 9 June and 8 July, floods struck Hupeh (now Hubei province) in central *China* at Huang-kang. Then during the period between 6 September and 4 October, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Shanghai.<sup>153</sup>

In 1347 during the summer, there was a great drought in Honan and Shensi provinces in *China*.<sup>165</sup>

In *Italy* in 1347, a dreadful famine swept away by absolute starvation vast numbers of the inhabitants. And in the following year a pestilence of a deadly nature swept the peninsula. "Such was the sufferings produced by these visitations that it was calculated that two-thirds of the whole population were destroyed."<sup>57</sup>

[In *England*], there were many tempest and hurricanes. It rained daily from Christmas to Midsummer.<sup>72</sup>

There was a great famine in 1347 [in *Germany*]. The misery in 1347 is described by Müllner in his Nuremberg Chronicle: "it was a very barren year. Everywhere the grapes and fruit froze. So this year started the cruel mortality of almost the whole world was stricken until the fourth year. There was a great mass of locust. Everywhere in the fields there were big piles of dead locusts. In some places, whirlwinds carried the dead locust into the sea, where they washed ashore. The great stench from these rotting locusts poisoned the air. Others blamed the plague on the Jews and accused them of poisoning the wells and they were persecuted in a most violent manner. This mortality [great death] affected not only municipalities [large cities] but also villages and caused many to become deserted. In many cities neither the council nor the court was held. Parents abandoned their children and children their parents."<sup>172</sup>

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**1348 A.D.** In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.<sup>1</sup>

It rained from Midsummer to Christmas, so that there was not one day or night dry together.<sup>2, 40, 41, 56</sup>

[One source has the timing reversed.] In *England*, it rained from Christmas 1347 until Midsummer [around 20 June 1348], without one fair day, hence great floods.<sup>72</sup>

In *England*, there were violent rains from Midsummer to Christmas "so that there was not one day and night dry together."<sup>47, 92</sup>

On 2 January, there was a flood of the River Ouse, which overflowed York, *England*, as far up as Micklegate.<sup>72</sup> [Micklegate Bar is the most Westerly and main gate through York's walls. It was and is still used by royalty to enter the city of York. Historically it is where heads of traitors were displayed on spikes.]

It rained from Midsummer to Christmas, so that there was not one day or night dry together. This wet season caused great floods, and a pestilence which raged a whole year. The earth was at the same time barren, and even the sea did not produce such plenty of fish as formerly. The mortality was so great that in the city of London, *England*, two hundred bodies were buried every day in the Charter-house-yard, besides those interred in other common burying places. This loss of life lasted from Candlemas to Easter. Fourteen thousand people were carried off by a remarkable pestilence in Dublin, *Ireland*.<sup>39</sup>

In 1348, there was a dry fog in *England* with earthquakes and volcanic eruptions.<sup>212</sup>

In 1348, the pestilence in London, *England* was terrible, where 50,000 people perished. At Yarmouth 7,000 perished.<sup>212</sup>

The summer of 1348 in southern *France* was remarkably hot producing a drought.<sup>79</sup>

The year 1348 was a year of the plague. On 19 April, it snowed and there was an earthquake. Villach, *Austria* was totally destroyed.<sup>172</sup>

A severe winter struck *Iceland*. The sea was frozen around *Iceland*.<sup>28</sup>

[The Black Death: It began at Cathay [*China*] in Asia, and in the neighborhood near the great sea. But whether it arose in *India*, *Scythia*, *Tartary* or *Arabia*, it went sweeping along through the *Indians*, *Tartareans*, *Saracens*, *Turks*, *Syrians*, *Palestinians*, *Persians*, *Egyptians*, *Ethiopians*, *Africans*, with the parts about *Tunis* or *Trisibon*. Then it went over all the *Levant*, through *Mesopotamia*, *Chaldea*, *Cyprus*, *Gandy*, *Rhodes*, and every island of the archipelago. Then it came to *Greece* and overran *Europe*. About the latter part of 1346 or the beginning of 1347, it reached *Italy*. On 28 September 1347, it landed on the *English coast* in Dorsetshire. In 1350 or 1351, it reached *Scotland* and *Ireland*. In 1350, it reached the *Hungarians*, *Goths*, *Vandals*, and the most northerly people. It had not fully finished its perambulation over the world before 1360 or 1362. If it was so favorable as to leave a third part of men alive in some few places. In others, it took 15 out of every 16 people. In more, it utterly exterminated the human race. It laid waste some places as *Arthemusia*. In the *Eastern parts* died in one year 23,840,000. The Venetians lost 100,000. In Florence, *Italy* died in one year 60,000. In *Germany* died 1,244,434. Out of Yarmouth, *England* died 7052. In Norwich, *England*, 57,000 people died from the first of January to the first of July. In London, *England* from the first of February to the first of May, there were 2,000 deaths per week. From its landing place in Dorsetshire, it spread into Devon, and Somersetshire and Bristol, then to Gloucester, Oxford, and London.<sup>72</sup>]

In 1348, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 31 January and 29 February, the Yellow River flooded.

— During the period between 29 April and 28 May, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Sung-chiang.

— During the period between 29 May and 26 June, floods struck Hunan province in south-central *China* at Shao-yang. During the same time, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam*. In Kwangsi, people and cattle were drowned and houses damaged.

— During the period between 27 June and 26 July, floods struck Hupeh (now Hubei province) in central *China* at Sung-tzū. Sixty li [about 21 miles] were flooded and 1,500 persons drowned. During this time, floods also struck Shantung (now Shandong province) on the east coast of *China* at Chiao.

— During the period between 27 July and 24 August, floods struck Shantung province at Kao-mi.

In 1348 during the period between 30 March and 28 April, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at I-tu and Lin-tzū. During the period between 29 March and 26 June, a drought engulfed Szechwan (now Sichuan province) in southwest *China*.<sup>153</sup>

In 1348 during the summer, there was a great drought in Honan, Shantung and Sze-ch'wan provinces in *China*.<sup>165</sup>

**1349 A.D.** The winter was similar to the winter of 1323 A.D.<sup>1</sup>

The *Baltic Sea* was frozen over and passable from Stralsund to *Denmark*.<sup>2, 41, 42, 43, 47, 93</sup> [Stralsund is located on the Baltic sea coast in northern *Germany*.]

The *Baltic Sea* was frozen over.<sup>30</sup>

On 7 March 1349, an earthquake rocked northern *Germany*. There was a cessation of a two-year plague. One-fifth of the people died.<sup>172</sup>

In 1349, the plague was very violent in Waghén [in the East Riding of Yorkshire], *England*. The abbot and six monks died. It was also very violent at Beverley. It was also very violent at St. Alban's where the abbot, sub-prior, and many of the monks died. At Oxford, it was so dreadful that the colleges were closed, and there was scarce enough left in the city to bury the dead. The plague extended into Nottinghamshire and Derbyshire.<sup>212</sup>

In 1349, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 20 March and 17 April, floods struck Honan (now Henan province) in central *China* at Chi.

— During the period between 6 May and 8 November, floods struck Hupeh (now Hubei province) in central *China* at Ch'i-ch'un. Crops were damaged by the floodwaters.

— During the period between 16 July and 14 August, floods struck Hupeh at Kung-an, Shih-shou, Ch'ien-chiang, Chien-li and Mien-yang.

**1350 A.D.** In *England*, there was a drought that came after floods, storms and meteors.<sup>47, 72</sup>

In 1350 in *England*, there were “floods, storms, tempests and fiery meteors in the air.”<sup>72, 92</sup>

There was a terrible thunder and lightning storm [in *England*].<sup>72</sup>

In 1350 in *Barbary*, the grains exported from *England* caused a dearth in *England*.<sup>57, 91</sup> [Barbary is now the region of *Morocco*, *Algeria*, *Tunisia*, and *Libya*.]

In 1350 there was a famine in *Barbary*, then in *England* on exporting corn [grains] thither.<sup>72</sup>

There was a great famine in *Barbary* and *Morocco*. Christian nations came to their relief transporting large quantities of corn [grain]. This made the grain so cheap and plentiful in *Barbary*, but left a famine at home [*England*]. In *England*, this was followed by terrible inundations, storms, and tempests. These were succeeded by excessive drought and want of water. This led to the destruction of most animals and vegetables.<sup>72</sup>

In 1350 the plague returned [to *Germany*]. The winter was cold and dry. A third of humanity died.<sup>172</sup>

In 1350, there was a terrible disease throughout *Europe* called the Black Death. It killed men, horses, cattle, deer, bears, wolves, foxes, sheep, goats, hares, etc.<sup>212</sup>

In 1350, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 5 June and 4 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang and Kao-an.

— During the period between 5 July and 3 August, floods struck Shansi (now Shanxi province) in northern *China* at Huo. Dikes and houses were damaged by the floodwaters.

— During the period between 4 August and 1 September, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Kuei-lin and Li-p'u. Crops were damaged by the floodwaters. During the same time, floods struck Shansi province at Fên-yang and P'ing-yao.



In 1350 during the period between 6 May and 8 November, a drought engulfed Honan (now Henan province) in central *China* at An-yang.<sup>153</sup>

In 1350 during the summer and autumn, there was a drought in Honan province in *China*.<sup>165</sup>

**1351 A.D.** In 1351, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang.<sup>153</sup>

In 1351, there was a drought in Kiangsu province in *China*.<sup>165</sup>

In 1351, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 6 May and 8 August, floods struck Anhwei (now Anhui province) in eastern *China* at T'ung-ch'êng. Over 400 families were flooded. During the same time, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang and Hsin-chien.

— During the period between 24 July and 21 August, floods struck Shansi (now Shanxi province) in northern *China* at Taiyuan and Wên-shui. Fields and crops were damaged by the floodwaters. During the same time period, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Kuei-lin. Dikes were damaged. Also during this time, floods struck Yunnan province in southwest *China* at Lu-hsi and Honan (now Henan province) in central *China* at Yung-ch'êng.

**1352 A.D.** In *England*, there was a drought.<sup>47, 72</sup>

In *England* in 1352, there was a dearth from a drought.<sup>72</sup>

In *England* in the summer was a great drought. The cattle died in the pastures for want of water. The Fens and marshes dried up. There was a way through them where none was before. This was a very dear year in *England* [everything was scare and dear]. About the Feast of All Saints [1 November], came a tempest of wind stripping houses and churches, blowing down mills, rooting up trees.<sup>72</sup>

In 1352, the heat was excessive in Toscana (Tuscany), *Italy*. The drought of the summer was on the Continent [*Europe*] so badly that many cattle perished on the field. The marshes and ponds were completely dry. This year was a very hard in *England*. Also a great flood occurred on the Rhône River.<sup>62</sup>

In 1352, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Ch'i-ch'un and Huang-kang; and Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing. During the period between 10 August and 8 September, a drought engulfed Chekiang province at Taichow.<sup>153</sup>

In 1352 during the summer and autumn, there was a drought in Chêhkiang and Hupeh provinces in *China*. In Hupeh, this was a great drought.<sup>165</sup>

In 1352 during the period between 12 July and 9 August, floods struck Hupeh (now Hubei province) in central *China* at Sung-tzū. Over 1,000 families flooded and over 700 people drowned. Then during the period between 10 August and 8 September, floods struck Ch'ü.<sup>153</sup>

**Winter of 1352 / 1353 A.D.** In *England*, the frost was “very cruel” from 6<sup>th</sup> of December to 12<sup>th</sup> of March.<sup>47, 72, 93</sup>

In *England*, there was a terrible hard and long frost from 6 December 1352 to 12 March 1353.<sup>72</sup>

From the commencement of December 1352 to the middle of March 1353, the country [*England*] was visited by an extraordinary hard frost. The bitter cold was ended by a furious hurricane, which did untold

damage to buildings and trees.<sup>177</sup>

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**1353 A.D.** This year was remarkable for scarcity of grain and provisions in *England* and *France*, occasioned by a great drought. It was called the “Dear Summer”. Rye was brought out of *Zealand* to support the poor, who otherwise must have perished for want of sustenance.<sup>39</sup> [*Zealand* is the largest island of *Denmark*.]

In 1353, there was a great famine in *England* and *France*.<sup>57, 90, 91, 212</sup>

In 1353 in *England*, the famine continued.<sup>72</sup>

From March to July 1353 [in *England*], the country sustained a severe drought. Then famine ruled the land, and the peasantry, irritated by the attempted regulation of wages, in many places broke out in discontent. In Cheshire they rose in open revolt and attacked the servants of the Prince [Edward of Woodstock, Prince of Wales, Duke of Cornwall, and Prince of Aquitaine] who were entrusted with supervising his interest.<sup>177</sup>

In March 1353, there was the severest drought in *Italy*.<sup>72</sup>

In *Italy*, there was drought.<sup>47</sup>

In *England*, in early spring there was a hurricane. From March to July came a scorching drought in *England*. In Rome, *Italy* there was terrible thunder and lightning during the summer. At Cremona, *Italy*, there was a prodigious hailstorm. Each hailstone weighted from one to eight and a quarter pounds. This made a fearful slaughter of people and cattle. This year produced a great dearth in *England*, but plenty of corn [grain] imported from *Ireland* settled it.<sup>72</sup>

[Another account place this event in 1355.] In *England* in 1355, there was great scarcity. Grain was brought from *Ireland*, which afforded much relief.<sup>57</sup>

In the middle of May 1353, a deep snow fell in *Silesia* and *Poland* after Gronau, *Germany*. It did not damage the fields or fruit gardens even though it lay on the ground for six days.<sup>172</sup>

In 1353, a severe drought engulfed many regions of *China* including:<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Ch’i-ch’un and Huang-kang.
- Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo, Ch’ü and Chin-hua.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.
- Anhwei (now Anhui province) in eastern *China* at Tang-t’u, Hsüan-ch’êng, and Kuang-tê.
- Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P’o-yang, Nan-ch’ang, Kao-an, Nan-ch’êng, and Chi-an.
- Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Nan-hsiung.
- Hunan province in south-central *China* at Ling-ling and Kuei-yang.

During the period between 29 August and 27 September, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping.

In 1353 during the summer, there was a great drought in Chihli, Chêhkiang, Hunan, Hupeh, Kiangsi and Kwangtung provinces in *China*.<sup>165</sup>

In 1353, floods struck Hopei (now Hebei province) in northern *China* at Fêng-jun, Yü-t'ien, Tsun-hua and P'ing-ku. During the time period 1-30 July, floods struck Hopei province at Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]<sup>153</sup>

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**1354 A.D.** In 1354, there was a drought in *England*. At Nottingham, no rain fell from the end of March to the end of July, a period of 4 months. Nottingham suffered very severely from this great drought. A few years previous, there was a severe frost, which began at the end of the harvest and continued to April, with scarcely any break.<sup>212</sup>

In 1354, there was a severe drought in several regions of *China*. [The resulting famine was so severe that cannibalism was practiced throughout these regions.]<sup>153</sup>

— Honan (now Henan province) in central *China* at Ch'in-yang, Mêng and Kaifeng.

— Fukien (now Fujian province) on the southeast coast of *China* at Chin-chiang.

— Hunan province in south-central *China* at Ling-ling and Shao-yang.

— Kiangsi (now Jiangxi province) in southern *China* at Ts'ang-wu.

In 1354, there was a great drought in Fuhkien, Honan, Hunan and Kwangsi provinces in *China*. The resulting famine was so severe that it led to cannibalism.<sup>165</sup>

In 1354 during the period between 21 June and 19 July, floods struck Honan (now Henan province) in central *China* at Kung. Houses were damaged by the floodwaters and over 300 people drowned. During the same time, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling. Then during the period between 8 August and 8 November, floods struck Hopei (now Hebei province) in northern *China* at Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]<sup>153</sup>

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**1355 A.D.** On 31 December 1355, there was a terrible flood [in *Germany*] that smashed dikes and dams and broke into local land drowning 2,000 people. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

In 1355, a severe drought engulfed Honan (now Henan province) in central *China* at Chi. During the period between 10 July and 7 August, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling and a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow.<sup>153</sup>

In 1355, there was a great drought in Honan province in *China*.<sup>165</sup>

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**1356 A.D.** In *England*, there was drought and heat.<sup>47</sup>

In *England*, there was no rain in April, May and June.<sup>72</sup>

In *England*, there was a drought in May and June.<sup>72</sup>

[In *England*], there was a terrible storm of thunder and lightning.<sup>72</sup>

In 1356 [in *Germany*], the year began dry without snow. At Easter and Pentecost, there was a great snowfall. The autumn was cold but the winter was warm. At Christmas, the flowers were blooming and the trees gave forth buds. Shortly before the end of the year, there was a major earthquake in *Switzerland*. Twenty-four castles were totally destroyed.<sup>172</sup>

In the Novgorod Republic [now part of *Russia*], in autumn the water was high [flood].<sup>76</sup>

In *France*, the Rhône and the Durance rivers overflowed their banks and ravaged the surrounding countryside. The winter that followed was most severe. The river was filled with ice flows. Famine followed.<sup>61</sup>

In 1356, floods struck Honan (now Henan province) in central *China* at Ho-yin. All the houses were damaged by the floodwaters. Also during the year, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua and Li-shui. During the period between 27 August and 24 September, floods struck Shantung (now Shandong province) on the east coast of *China*.<sup>153</sup>

In 1356, there was a great drought in Chêhkiang province in *China*.<sup>165</sup>

**1357 A.D.** About the year 1357, there were earthquakes in *Germany*, at Mainz, in Hesse and Thuringia. There was major damage everywhere. The plague broke out again.<sup>172</sup>

There was a great thunderstorm; the Igumen [head of the monastery] of St. Nikola in Lyatka [perhaps Vyatka now Kirov, *Russia*] was struck [by lightning], and others; and in the Rogatitsa [Street in Novgorod, *Russia*] one was struck dead, while other individuals by the mercy of God remained alive.<sup>76</sup>

In 1357 during the period between 18 June and 17 July, floods struck Hopei (now Hebei province) in northern *China* at Yung-nien. Then during the period between 16 August and 14 September, floods struck Hopei province at Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]<sup>153</sup>

In 1357 during the 6<sup>th</sup> moon on the 23<sup>rd</sup> day in the vicinity of Shanghai, *China*, at the sea side, towards dawn, the tide rose suddenly, causing great alarm, as it was not the time for high-water. At the proper high-water time it rose again, so that it was known that the first rise was not the tide. At places, which are situated quite beyond the reach of tide, in the canal and lakes near Pingkiang and Kiahing, the waters suddenly rose some four or five feet.<sup>166</sup>

**1358 A.D.** In Bologna, *Italy*, the snow was 10 Ellen (approximately 23 feet, 7 meters) deep.<sup>60, 62</sup>

In 1358 in Bologna, *Italy*, the snow was 10 Braccia (approximately 22 feet, 6.7 meters) deep.<sup>80</sup>

In the regions around Metz, *France* in 1358, the great heat caused the vines to dry up and all the grapes to shrivel up. As a result, a glass of wine cost 5 sous [five centimes].<sup>62</sup>

After heavy rains, the Rhône and the Durance Rivers in *France* overflowed their banks in November 1358 and the floodwaters spread far into the countryside.<sup>79</sup>

A prodigious amount of snow fell in Provence, *France* during the winter of 1358. The harsh rains that succeeded the winter produced devastating floods.<sup>79</sup>

In 1358, a drought affected several regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]

— During the period between 5 February and 8 November, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at Chü, Pin, Tzū-ch'uan; Shansi (now Shanxi province) in northern *China* at Huo; and Shensi (now Shaanxi province) in central *China* at Fêng-hsiang, Ch'i-shan and Fu.

In 1358 during the spring and summer, there was a great drought in Chihli, Shantung and Shensi provinces in *China*. The resulting famine was so severe that it led to cannibalism in Shantung and

Shensi.<sup>165</sup>

In 1358 during the period between 8 August and 8 November, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hui-yang; Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ho; and Hopei (now Hebei province) in northern *China* at Peiping and Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]<sup>153</sup>

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**1359 A.D.** [The Black Death – revisited *England* in 1358 and other placed in 1359. One hundred thousand people died in Florence, *Italy* between March and July. There were scarce 10 people out of 1000 left alive in *Italy*. In Numidia, *North Africa*, 800,000 people perished. In *Greece*, the living were insufficient to bury the dead.<sup>72</sup> Numidia is the Old Berber Kingdom roughly corresponding to modern *Morocco*, *Algeria*, and *Tunisia*.]

On 20 April 1359, the church of Sienna [*Siena, Italy*] was struck by thunder and lightning. Many people were slain or hurt, being at the sacrament.<sup>72</sup>

In 1359, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-fên; Shensi (now Shaanxi province) in central *China* at Fêng-hsiang; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu and Hsiang. Also during the period between 28 April and 26 May, floods struck Shansi province at Fên-yang. During the period between 23 September and 21 October, floods struck Shantung (now Shandong province) on the east coast of *China* at Chi-ning.<sup>153</sup>

In 1359, there was a great drought in Kwangsi and Shensi provinces in *China*.<sup>165</sup>

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**1360 A.D.** King Edward III ambition to conquer *France* during the Hundred Year's War was dealt a devastating blow by a tremendous hailstorm. By the spring of 1360, the English army had pillaged and burnt many of the suburbs around Paris before making camp outside Chartres. But on April 13 dark storm clouds billowed up and a fierce, bitterly cold wind blew. "A foul dark day of mist and hail, and so bitter cold, that sitting on horseback men died," described one chronicle. Thunder and lightning erupted. The storm unleashed a barrage of hailstones described as big as pigeon eggs, and even suits of armor appeared to give little protection. According to one estimate 1,000 men and 6,000 horses were killed in "such a tempest of thunder, lightning and hail that it seemed the world should have ended." This disaster became known as Black Monday.<sup>6</sup>

When Edward III of *England* was on his march, within two leagues of Chartres, *France*; there happened a storm of piercing wind that swelled to a tempest of rain, lightning and hailstones, so prodigious, as to instantly kill 6,000 of his horses and 1,000 of his best troops in 1359 [misprint for 1360].<sup>2, 39, 40, 41, 43, 56, 57</sup>

[Another account places this event in the year 1339.] In 1339, there was a violent storm of hail near Chartres, in *France*, which fell upon the army of Edward III, which was then on its march. The hail was so large that the army and horses suffered very much, and Edward was obliged to conclude a peace.<sup>90</sup>

[Another account places this event in the year 1351.] In 6 April 1351 in *France*. On Easter Monday hailstones fell so large as to have killed both men and horses forming part of the army of the English King Edward, then invading *France*. This is asserted by Bailey, and repeated by Stow, who however implies that the men died of the intense cold, which accompanied the mist and hail. This day is called in early history Black Monday.<sup>93</sup>

In 1360, at the end of April, while the King Edward of England was encamped around Ruel, [*France*] there was a storm so terrible that the tents were torn and men and horses were swept away by water. He lost over a thousand archers and six thousand horses.<sup>79</sup>

In *England* in 1360, there was a great dearth this year and mortality of people. This was called the second plague because it was the second in the reign of King Edward III. There was a very great death of cattle and horses. 6,000 horses died in the army. Many houses were burnt by thunder and lightning. On 16 February there was a hurricane, the greatest. It did more damage than any within the memory of *England*. On 14 April there was a very bitter cold combined with mist and hail, which killed many people.<sup>72</sup>

In 1360, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Nan-t'ung. During the period between 8 August and 8 November, a drought engulfed Shansi (now Shanxi province) in northern *China* at Fên-yang and Chieh-hsiu. During the period between 12 August and 10 September, floods struck Kiangsu province at Nan-t'ung. During the period between 11 September and 10 October, a severe drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Pin-yang.<sup>153</sup>

In 1360 during the summer and autumn, there was a great drought in Chihli, Kwangsi and Shansi provinces in *China*.<sup>165</sup>

In 1360, there was a great drought in the vicinity of Shanghai, *China*.<sup>166</sup>

**1361 A.D.** In *England*, there was a drought, “very grievous in summer.”<sup>47, 72</sup>

In *England* after the beginning of May, there was a great drought, scarcity of corn [grain] and hay. There was a famine in *Poland*.<sup>72</sup>

In 1361, there was a great thunderstorm [in *England*]. “Men and beasts perished in divers [diverse] places with thunder and lightning.”<sup>212</sup>

The summer of 1361 in southern *France* was remarkably hot.<sup>79</sup>

Wine, fruit and wheat were plentiful in 1361.<sup>79</sup>

The winter of 1361 in *France* was much wetter and warmer than usual: lots of trees flowered before Christmas.<sup>79</sup>

In *Poland* in 1361, there was a famine.<sup>57, 91</sup>

**1362 A.D.** In the evening of 15 January 1362 in *England*, there began a very strong wind from the Southwest. It blew with such force so as to overthrow many strong and mighty buildings, towers, steeples, houses, and chimneys. This wind continued for six or seven days. Many edifices standing after the storm was over had been so shaken that they required restoration to prevent them from collapsing. This was followed by a very wet season; chiefly summer and harvest. Much corn [grain] and hay was lost or spoiled by the unseasonableness of the weather. There was great sickness in *Britain* for a year.<sup>72</sup>

On 15 January 1362, a particularly dramatic first Mandränke [large drowning] occurred, in consequence large parts of the outer *North Frisian* country perished. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.] According to a Russian church clerk, the flood began on 15 January 1362, reached a climax on 16 January and ended a day after that. The chronicler Anton Heimreich reported that the western sea went 4 Ellen [9 feet, 3 meters] above the highest levees. A



total of 21 levees were breached. Rungholt along with seven other parishes in the Edomsharde were destroyed and 7,600 people perished. The chronicles speak of a total of 100,000 deaths, a number that is certainly exaggerated. In some coastal sections of *North Friesland* before the tide came in, were part of the edge of the geest. Tidal currents caused large bays to extend into wide estuaries. The present course of the *German North Sea* coast has been largely mapped out by the storm surge.<sup>172</sup>

Between 8 and 9 September 1362 a sea storm struck [*Germany*]. Many who had survived the plague drowned. The waters of western sea swept away 30 localities. The islands of Föhr and Sild [Sylt] were completely demolished. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

In 1362, during the week of Easter, on April 17, a very severe frost killed the [grape] vines completely, along with walnut and other fruit trees in *France* at Tours, Angers, even in the Lorraine and beyond. These frosts, the humidity from the winter and almost continual rains combined to completely destroy the grapes, nuts and other fruits almost everywhere.<sup>79</sup>

In 1362, there was a fearful mortality in London, *England* and Paris, *France*.<sup>212</sup>

In October, the Rhône River in *France*, flooded with such violence that the ramparts of Avignon, which had been raised shortly after the flood of 1226, were overthrown.<sup>61</sup>

The winter of 1362 was very wet in *France*.<sup>79</sup>

In 1362, a severe drought engulfed Honan (now Henan province) in central *China* at Loyang, Mêng-ching and Yen-shih. During the period between 27 March and 24 April, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Kuang-tê. Then during the time period between 22 July and 19 August, floods struck Hopei (now Hebei province) in northern *China* at Cho. Houses were flooded.<sup>153</sup>

In 1362, there was a great drought in Honan province in *China*. The resulting famine was so severe that it led to cannibalism.<sup>165</sup>

**1363 A.D.** In 1363 in Mainz, *Germany*, there was a great plague that also killed the horses. The winter was so cold that even the birds froze.<sup>172</sup>

In 1363, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tsinan; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ho.<sup>153</sup>

In 1363, there was a great drought in Kwangsi and Shantung provinces in *China*.<sup>165</sup>

**Winter of 1363 / 1364 A.D.** A severe winter struck *Europe* beginning in September 16. The winter produced frost from September to April. The Rhine River was frozen.<sup>28</sup>

In 1364, the Rhône River in *France* froze.<sup>58, 80</sup>

In 1364, the Rhône River at Arles, *France* froze to a considerable depth; loaded carts traveled on the ice.<sup>60, 62</sup> [At Arles, the Rhône River divides in two major arms, forming the Camargue delta.]

This winter in 1364 was very severe, particularly in the north and the south of *France* where all the fruit trees tended to die. In Paris, the frost began on 6 December, and lasted 14 weeks. The snow was lying on the ground the whole time. As a result of this extreme cold, an extraordinary lack of meat soon followed. In *England*, the frost lasted from mid-September until April.<sup>62</sup>

In *France*, all the rivers froze in 1364. The frost accompanied by snow lasted until the end of March. The vines froze in several places into the roots. Very deep caves although they were protected by straw were not immune to the frost. Loaded carts crossed the Rhône River and the ice was in some places fifteen-feet thick.<sup>79</sup>

In *England*, the frost was “very terrible” between the 16<sup>th</sup> of September to the 6<sup>th</sup> of April.<sup>47, 72, 93</sup>

In *England*, a hard frost struck between 16 or 28 September and continued until 6 April. The ground lay unplowed to the great loss of corn and fruit.<sup>72</sup>

**1364 A.D.** The summer of 1364 in southern *France* was remarkable due to excessive heat and extreme cold.<sup>79</sup>

In 1364, the tide of the River Humber in *England* rose to such an extraordinary height, that it overflowed its banks and inundated the adjacent countryside, destroying a once noted seaport called Ravenspur.<sup>212</sup>

**1365 A.D.** In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.<sup>1</sup>

It rained violently in *England*.<sup>40, 41, 47, 92</sup>

In June 1365 for several days both night-and-day, there were great thunders with lightning storms in *France* and Burgundy. The torrents of rain that fell during the storms knocked down the newly repaired walls of Dijon in east-central *France*, and overran a neighboring village with its inhabitants.<sup>79</sup>

In 1365 during the period between 19 July and 17 August, floods struck Hopei (now Hebei province) in northern *China* at Peiping. Then during the period between 8 August and 8 November, floods struck Shantung (now Shandong province) on the east coast of *China* at Tung-p’ing, Tung-a and P’ing-yin. Houses and crops were damaged by the floodwaters. During the same time, floods struck Hopei province at Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]<sup>153</sup>

**1366 A.D.** [In *England*] it rained all harvest.<sup>72</sup>

In *England* in 1365 or 1366, there fell an abundance of rain in the time of hay harvest, whereby much hay and corn [grain] were lost. A great mortality of people followed. So many who went to bed well at night were found dead the next morning. Many of all ages and sexes died of smallpox.<sup>72</sup>

The year 1366 was a cold and wet year. The grain was expensive due to grasshoppers and mice feeding upon it. In Brunswick, *Germany*, a great mortality as the plague begins.<sup>172</sup>

In 1366, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 12 March and 10 April, floods struck Hopei (now Hebei province) in northern *China* at Tung-ming and Shantung (now Shandong province) on the east coast of *China* at P’u, Ho-tsê and Chü-yeh.

— During the period between 9 July and 6 August, floods from heavy and protracted rains struck Honan (now Henan province) in central *China* at Loyang. Several hundred families were flooded.

— During the period between 7 August and 4 September, floods struck Honan province at Chi, Kaifeng and Yü and Hopei province at Chi [located at longitude 117.24° East and latitude 40.03° North]. Crops were damaged by the floodwaters. During the same time, floods struck Shansi (now Shanxi province) in northern *China* at Chieh-hsiu.

— During the period between 5 September and 4 October, floods struck Shantung province at Hui-min, Pin, Chü-yeh and Ch'i-ho. At Chü-yeh and Ch'i-ho, crops were damaged by the floodwaters.

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**1367 A.D.** In 1367, there was a “morbida pestis”, a new type of plague in Mainz, *Germany* which struck people with a bloody cough followed by death in 3 days. The year was barren and everything was expensive. In the fall the plague struck Lübeck.<sup>172</sup>

In 1367, there was a fearful mortality in London, *England* and Paris, *France*.<sup>212</sup>

Violent winds struck in December 1367, during the night of the Feast of Saint Lucia [13 December] in Flanders [now *Belgium*] and Brabant in Picardy in northern *France*, which had never seen the like. The winds came from the northwest. The ocean overflowed during the storm and swallowed several homes and villages on the banks of the sea.<sup>79</sup>

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**1368 A.D.** [In *England*], there was a dearth from scarcity.<sup>72</sup>

In 1368, floods struck Shantung (now Shandong province) on the east coast of *China* at Ho-tsê.<sup>153</sup>

In 1368 during the spring and summer, there was a drought in Chêhkiang province in *China*. The land tax was remitted.<sup>165</sup>

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**1369 A.D.** In *England*, there was a dearth. Wheat sold for 20s. per Quarter [quarter ton]. This year began the next great plague called the third mortality. This was very great both for people and cattle, the like seldom heard of. The west country, as Oxford, was most afflicted by it.<sup>72</sup>

In 1369 in *England*, there was great pestilence among men and large animals. This was followed by inundations and extensive destruction of grain. Grain was very dear.<sup>57,91</sup>

In 1369 during the period between 5 February and 6 May, a drought engulfed many regions of *China*.<sup>153</sup>

In 1369 during the spring, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

In 1369, floods struck Shantung (now Shandong province) on the east coast of *China* at Ts'ao. During the period between 7 April and 6 May floods struck Kiangsi (now Jiangxi province) in southern *China* where the city walls largely collapsed.<sup>153</sup>

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**1370 A.D.** In 1370, there was a dreadful mortality in *Ireland*.<sup>212</sup>

In 1370 during the period between 24 June and 22 July, a drought engulfed many regions of *China*.<sup>153</sup>

In 1370 during the summer, there was a drought in *China*.<sup>165</sup>

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**1371 A.D.** In 1371 during the 7<sup>th</sup> moon on the 16<sup>th</sup> day, in the vicinity of Shanghai, *China*, there was a great wind, which rose from the sea. Dust and sand filled the sky. Objects like hawks and [roof] tiles were observed in the air. A flagstaff was broken and carried to a distant place where the wind ceased, leaving bank notes or sacrificial paper scattered about a villager's house.<sup>166</sup>

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**1372 A.D.** The year 1372 was a hard winter. In *Prussia* and Thorn [now Torun, *Poland*], many people died from the cold. From 6 January, there was a lot of snow. This was followed by a dry autumn and a plentiful harvest.<sup>172</sup>

In 1372 during the period between 6 May and 30 June, a drought engulfed many regions of *China*. During the period between 31 July and 28 August, floods caused by a typhoon struck Chekiang (now Zhejiang province) on the east coast of *China* at Yü-hang. Houses were damaged.<sup>153</sup>

In 1372 during the summer, there was a drought in *China*.<sup>165</sup>

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**1373 A.D.** In the Novgorod Republic [now part of *Russia*], the Volkhov River flowed backwards for seven days [owing to floods downriver].<sup>76</sup>

The flood of 9 October 1373 [second Marcellus flood] affected mainly *East Friesland*. The storm surge was higher than the previous floods but the damage was not as great. This is because many people permanently abandoned the harbor towns and villages moving miles inland from the sea. For example Westeel along Leybucht bay was abandoned. Many dikes failed. Norden and Marienhafé [today kilometers from the sea coast] became port towns.<sup>172</sup>

In 1373 during the period between 19 August and 16 September, floods struck Shantung (now Shandong province) on the east coast of *China* at Ch'i-ho, Hui-min and Shang-ho. Over 70 li [about 24.5 miles] were flooded.<sup>153</sup>

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**1374 A.D.** In *Italy* in 1374 and 1375, there was a famine.<sup>57, 72, 91</sup>

The summer of 1374 in southern *France* was remarkably hot.<sup>79</sup>

The year 1374 produced heavy rains in southern *France*.<sup>79</sup>

In October 1374, flooding from the sea amid storms swamped several cities in Holland [now *the Netherlands*].<sup>79</sup>

In 1374, floods struck Shantung (now Shandong province) on the east coast of *China* at Chü-yeh. Houses and fields were damaged by the floodwaters. Also floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou.<sup>153</sup>

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**1375 A.D.** In *England*, there was an excessive drought with heat.<sup>47, 72</sup>

In *Italy* in 1374 and 1375, there was a famine.<sup>57, 72, 91</sup>

On 10 February 1375, the Weser River flooded. The water was in the cathedral in Minden, *Germany*.<sup>172</sup>

On 13 November 1375, a storm damaged the steeple of the church of Saint Jakobi in Lübeck, *Germany*.<sup>172</sup>

The winter of 1375 was extremely cold in *Germany*. The Rhine River was frozen over for a quarter of the year. A four week market [fair] was held on the ice.<sup>172</sup>

In 1375 during the period between 1 February and 2 March, floods struck Honan (now Henan province) in central *China* at Kaifeng. During the period between 27 August and 25 September, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping [source cited province at Honan which appears to be in error].<sup>153</sup>

In 1375 during the autumn, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

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**1376 A.D.** In the Novgorod Republic [now part of *Russia*], for the second time in three years the Volkhov River flowed backwards seven days [into lake Ilmen, owing to floods downstream].<sup>76</sup>

In 1376, floods struck Fukien (now Fujian province) on the southeast coast of *China*. Innumerable houses damaged by the floodwaters. During the period between 19 May and 17 June, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow and Yü-hang.<sup>153</sup>

In 1376 during the 12<sup>th</sup> moon [winter], there was a freshet [flood] in the vicinity of Shanghai, *China*.<sup>166</sup>

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**1377 A.D.** In spring there was a fire in Novgorod [*Russia*], it broke out in Lyudgoshcha Street and extended to Yakov Street, and seven wooden and three stone churches were burnt. In the same year the Church of the Holy Mother of God in the Mikhalitsa [Street] was struck by lightning and burnt.<sup>76</sup>

In 1377 during the period between 7 June and 5 July, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling and Ch'i-ch'un.<sup>153</sup>

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**1378 A.D.** In 1378, floods caused by a typhoon struck Kiangsu (now Jiangsu province) on the east coast of *China* at T'ai-ts'ang. Floods also struck in Hunan province in south-central *China* at Yüeh-yang. Also during the year, a severe drought engulfed Szechwan (now Sichuan province) in southwest *China* at Jung-ch'ang.<sup>153</sup>

In 1378, there was a great drought in Sze-ch'wan province in *China*. The drought produced a great mortality.<sup>165</sup>

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**1379 A.D.** On 26 May 1379, a big storm destroyed all the vineyards in the Minden region of *Germany*.<sup>172</sup>

The year 1379 was a year of plenty [in *England*]. Wheat was so plentiful that a bushel of wheat sold for sixpence.<sup>212</sup>

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**1380 A.D.** In 1380, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling. During the period 3-31 July, floods struck Honan (now Henan province) in central *China* at Loyang and Shantung (now Shandong province) on the east coast of *China* at Ts'ao and Shan.<sup>153</sup>

In the year 1380, a strong thunderstorm took place near Aschersleben, *Germany* causing such a strong downpour that locally the fields were flooded.<sup>172</sup>

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**1381 A.D.** In December of 1381 or 1382 in *England*, there were excessive long rains, great floods and losses.<sup>72</sup>

In 1381, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking. During the period between 20 August and 17 September, floods struck Honan (now Henan province) in central *China* at Yüan-wu, Kaifeng and Chung-mou.<sup>153</sup>

In 1381, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

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**1382 A.D.** In the *English Channel* in January, there was a great storm, which destroyed the ships from which Richard II's queen had just landed (from Bohemia) and many others.<sup>57</sup>

When Richard II's first wife came to *England* in 1382 from Bohemia, she had no sooner set foot on shore, but such a storm immediately arose as has not been seen for many years, when several ships were dashed to pieces in the harbor, and the ship in which the Queen came over was shattered and broken.<sup>40, 41, 56</sup>

An awful storm arose on January 1382, when Richard II's queen arrived from Bohemia, on her setting foot on the *English* shore. Her ship and a number of others were dashed to pieces in the harbor.<sup>90</sup>

In January 1382, there was a great gale on the south coast [of *England*].<sup>212</sup>

In different parts of *England*, many houses were thrown down by a storm, cattle destroyed and trees uprooted.<sup>41, 43</sup>

In 1382 as of 24 May, there was great disease in *England* and *Germany*. In *Germany* there was a complete absence of winds.<sup>212</sup>

In the beginning of May, flooding occurred on the River Sweet in *France*, which destroyed the work undertaken to rebuild the "Big Bridge" between Tournon and Saint-Jean-de-Muzols.<sup>61</sup>

[In *England*] in December, the rains produced great floods and losses. But there was no wind this year in *Germany*.<sup>72</sup>

There was no wind in *Germany* in 1382; yet it was a time of great plenty.<sup>72</sup>

In 1382 during the period between 10 August and 7 September, floods struck Honan (now Henan province) in central *China* at Jung-yang and Yang-wu.<sup>153</sup>

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**1383 A.D.** In 1383, there was a great pestilence in *Ireland* that destroyed many people.<sup>212</sup>

During the night of 25 March 1383 in *England*, there was thunder, lightning and a great tempest. During Lent, the Duke of Lancaster and the English Army, lying on a marshy ground in *Scotland*, sustained great loss of men and horses, from the extreme cold and wetness.<sup>72</sup>

Severe storms reigned over the *English Channel* in 1383.<sup>79</sup>

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**1384 A.D.** In 1384, an unbearable dry heat reigned throughout *France* from the spring until the middle of August.<sup>79</sup>

The sources of water dried up during the summer of 1384 in *France* by the lack of rainfall and prolonged drought.<sup>79</sup>

In *France*, after a long drought and heat unbearable that extended until the middle of August 1384, there came heavy rains that lasted until March 1385. This caused the grapes to rot.<sup>79</sup>

On 23 April 1384, rye already had ears and was harvested in June. Towards the end of August, a severe frost began that lasted until the end of the year. On 20 December, there was a great earthquake throughout Teutschland [*Germany*].<sup>172</sup>

In 1384, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 19 June and 18 July, floods struck Honan (now Henan province) in central *China* at Sui.

— During the period between 19 July and 16 August, floods struck Honan province at Loyang.

— During the period between 17 August and 15 September, floods caused by a typhoon and heavy storm struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow. The occupants were drowned. Also during this time, floods struck Chekiang province at Li-shui.



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**Winter of 1384 / 1385 A.D.** In 1384, during the winter the Rhine River, the Scheldt River and the Sea of Venice were frozen.<sup>1</sup> [The Scheldt River is a long river in northern *France*, western *Belgium* and the southwestern part of *the Netherlands*.]

In 1384, the Rhine and the Gulf of Venice were frozen over.<sup>30</sup>

During the year 1385, the winter was very cold in *Northern Europe*.<sup>62</sup>

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**1386 A.D.** In *England*, there was such plenty, that 100 Quarters [quarter ton] of Barley cost 100 shillings and wine 13 shillings per ton.<sup>72</sup>

In 1386 [in *England*], there was a surprising great plenty [plentiful harvest].<sup>72</sup>

In September 1386, a terrible wind with lightning and thunder reigned throughout the kingdom of *France*.<sup>79</sup>

In 1386, floods struck several regions of *China* including:<sup>153</sup>

— Fukien (now Fujian province) on the southeast coast of *China*. Many people drowned and the fields were damaged by the floodwaters.

— During the period between 29 April and 27 May, floods caused by a typhoon and heavy storm struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing. Forty to fifty of the occupants were drowned. During the same time period, floods struck Honan (now Henan province) in central *China* at Loyang and Kaifeng. At Kaifeng, houses were damaged by the floodwaters.

In 1386, in the vicinity of Shanghai, *China*, there was a famine.<sup>166</sup>

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**1387 A.D.** In 1387, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China*.<sup>153</sup>

In 1387, there was a great drought in Fuhkien province in *China*.<sup>165</sup>

On 1 May 1387, there was a great flood [in *Germany*].<sup>172</sup>

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**1388 A.D.** In the Novgorod Republic [now part of *Russia*], in autumn at midnight on October 26, a southerly wind arose and drove the ice from the lake into the Volkhov River, which broke away nine stays of the great bridge.<sup>76</sup>

In 1388, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Chang-yüeh.<sup>153</sup>

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**1389 A.D.** In *England*, on 5 March, there rose a sore and terrible wind which overthrew houses, broke and rent trees, destroyed much cattle. Later there was a great dearth of corn [grain].<sup>72</sup>

In 1389, there was a great gale on the south coast [of *England*].<sup>212</sup>

[In *England*] in 1389, there was scarcity and dearth.<sup>72</sup>

In the year 1389, wares [in *Germany*] were inexpensive. A cow cost 3 Thaler. A sheep cost one Thaler [a silver coin used throughout Europe]. A bushel [of grain] cost 11 Pf [Pfennig – an old German coin, penny]. A pound of butter cost 2 Pf. A number (15-16) of eggs cost 1 Pf.<sup>172</sup>

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**1390 A.D.** In *England*, there was a great famine arising from the scarcity of money to buy food.<sup>57, 91</sup>

[In *England*] during the years 1390 to 1392, there was a great dearth from hoarding up corn [grains].<sup>72</sup>

In 1390, there was a dreadful pestilence at York, *England*.<sup>212</sup>

The summer of 1390 in southern *France* was remarkably hot.<sup>79</sup>

The year 1390 produced heavy rains in southern *France*.<sup>79</sup>

A strong wind blew across the world on Christmas Eve 1390. The sea flooded beaches in *France*.<sup>79</sup>

In 1390 during the period between 11 August and 8 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China*; Kiangsi (now Jiangxi province) in southern *China*; Anhwei (now Anhui province) in eastern *China*; and Honan (now Henan province) in central *China* at Loyang.<sup>153</sup>

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**1391 A.D.** Beginning on July 9, the sun appeared to be obscured by certain thick and dreary clouds between that and the earth. The clouds rose daily for almost six weeks together. The north and east part of *England* were, at the same time, sorely afflicted with a pestilence. In a few weeks there died eleven thousand persons in the city of York.<sup>39</sup>

For 6 weeks after 9 July 1391 in *England*, great, thick, dark clouds. At the same time there was a great mortality over all of *England*, especially in Norfolk. In York, 11,000 people died. During both this and last year was great scarcity and dearth. The mortality was from an epidemic bloody flux, from eating large quantities of green fruits during harvest time.<sup>72</sup>

In 1391, there was a plague all over *England*, when 11,000 people died in York.<sup>212</sup>

[In *England*] during the years 1390 to 1392, there was a great dearth from hoarding up corn [grains].<sup>72</sup>

In 1391, there was a high water flood [in *Germany*]. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

In September 1391 in Lombardy (*Italy*) ruled a huge hiss. During the siege of Alexandria, *Italy*, the young count d'Armagnac died following a stroke, because he had drunk cold water.<sup>62</sup> [During the attack on Alexandria, it was so very hot that those that bore arms thought they were in an oven, for there was not any wind, and the young men-at-arms were overpowered by the heat and unable to exert themselves. This was an unfortunate day for the count, who towards the end of the battle was so overcome by the heat, and near fainting, that he withdrew from the battle, without friend or foe knowing whither he was gone. He had retreated to a small grove of alders, through which ran a little brook; and he no sooner felt his feet in the water, than he thought he was in paradise, and seated himself by the side of the stream. He, with some difficulty, took off his helmet, and remained covered only by the linen scull-cap, and then plunged his face in the water, at the same time, unfortunately, drinking large draughts; for he was thirsty from the heat, and could not quench it. He drank so much water, that his blood was chilled, and a numbness of limbs seized him, with a strong inclination to faint. He could not move, and lost the use of speech.]

In 1391 during the period 2-31 July, floods struck Honan (now Henan province) in central *China* at Yüan-wu.<sup>153</sup>

In 1391 in the vicinity of Shanghai, *China*, the sea suddenly overflowed and drowned 20,000 persons.<sup>166</sup>

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**1392 A.D.** Since the water in tree sap acquires greater volume when it freezes, in extreme cold, trees burst apart with a loud noise. In Strasbourg, *France* more fruit trees burst when the cold reaches  $-16^{\circ}$  Reaumur ( $-20^{\circ}$  C,  $-4^{\circ}$  F). A great number of trees in *France* burst in the winter of 1392.<sup>58, 80</sup>

In the year 1392 in *France*, the winter was severe. The trees were shattered due to the extreme cold.<sup>62</sup>

The winter of 1392 in *France* and in the North produced a very great cold.<sup>79</sup>

In 1392, during the marriage of Isabel [of France who was 6 years old at the time], daughter of Charles VI, to King Richard II of England, there were wondrous winds that lasted for three months. [The marriage ceremony took place at Calais, *France*.]<sup>79</sup>

The persistent drought in the summer of 1392 dried up water sources and prevented the largest rivers in *France* from being navigable.<sup>79</sup>

[There was a famine in *England* that does not appear to be weather related.] In *England* in 1392, there was a great scarcity for two years. People ate unripe fruit and suffered greatly from "Flux". The Corporation of London advanced money and corn [grain] to the poor at easy rates. One researcher attributes the cause of this famine to the hoarding of corn.<sup>57, 91</sup>

[In *England*] during the years 1390 to 1392, there was a great dearth from hoarding up corn [grains]. In 1392 there was a very bountiful good harvest.<sup>72</sup>

In *England* during 1392 and the previous two years, wheat sold from 16 shillings to 26 shillings per Quarter [quarter ton]. After a long period of plenty came this dearth, chiefly in the center of *England*. This dearth came about not from want of corn [grain] but partly because the corn was hoarded and partly due to transportation. *England* had sufficient corn to serve its needs for five years. All the wool in *England* had been laid up for three years unsold. The parliament having prohibited its transportation and merchants would not buy it but at a very low price. For it was sold from 22*d.* to 3*s.* per stone. But in 1392 came both money and a plentiful harvest. The poor were relieved and the Nation was well stored. During the dearth, the poor suffered much in the bloody flux. In September, there were great and terrible thunder and lightning. In October, there were very great and long rains.<sup>72</sup>

In 1392 [in *Germany*], there was a late harvest, which came with an abundance not seen since in human history. The summer was hot. Beginning on 25 November, there were great snowfalls and many people met with an accident.<sup>172</sup>

In 1392 during the period 25 January and 22 February, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Jung. [Jung is located at longitude  $109.10^{\circ}$  East and latitude  $25.02^{\circ}$  North.]<sup>153</sup>

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**1393 A.D.** In *France*, the heat is so strong that the earth is burned and the rivers are dry.<sup>61</sup>

In 1393 and 1394, the summers were dry and excessively hot [in *England*].<sup>212</sup>

In 1393, floods caused by a typhoon struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing. Houses and fields were damaged by the floodwaters. During the period between 11 May and 9 June, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping.<sup>153</sup>

In 1393 during the summer, there was a great drought in Chêhkiang province in *China*.<sup>165</sup>

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**1394 A.D.** In 1393 and 1394, the summers were dry and excessively hot [in *England*].<sup>212</sup>

In *England* in September 1394, great damage was done by thunder, lightning and tempest, especially in Cambridgeshire, where many houses and much corn were burnt up [by lightning strikes]. This was followed by great rains and floods in October, which did great damage.<sup>72</sup>

In 1394, there was a drought during the summer [in *Germany*].<sup>172</sup>

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**Winter of 1394 / 1395 A.D.** During the months of December, January and February during the winter of 1394-95, the weather was extremely wet. Because of the rains, all the rivers of the kingdom [of *France*] overflowed their banks three times.<sup>79</sup>

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**1395 A.D.** In 1395, there was a high water flood [in *Germany*]. [This entry was listed under the category “storm surge”, which might include an inundation of the sea.]<sup>172</sup>

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**1396 A.D.** In 1396 in Holland [now *the Netherlands*], there was “another deluge,” which formed the Marsdiep, separated the islands of Texel, Vlielandt, and Wieringen from the mainland, and submerged other districts. “This first raised the commerce of Amsterdam.”<sup>47, 92</sup> [The Marsdiep is the gap between Den Helder (on the mainland of Holland) and Texel (the largest Dutch Wadden Island). The Marsdiep connects the Northsea with the Waddensea. Texel is the large island in the Waddensea. Vlielandt or Vlieland is one of the West Frisian Islands, lying in the Wadden Sea. It is the second island from the west in the chain, lying between Texel and Terschelling. Wieringen at that time was an island. Today, a large dike links Wieringen with Friesland.]

[Other sources places this flood in the year 1400.] In 1400, there was an inundation at Texel in *the Netherlands*, which first raised the commerce of Amsterdam.<sup>90</sup> In 1400 at the Taxel, there was an inundation, which first raised the commerce at Amsterdam.<sup>43</sup>

In the *English Channel*, there was another great storm, on the occasion of the second Queen of Richard II landing.<sup>57</sup>

The second wife of Richard II brought a storm with her to the *English Coast* in which the King’s baggage was lost, and many ships of the Fleet cast away.<sup>40, 41, 56</sup> [One source shows the date of this event as 1381, another as 1389 but the most likely date is 1396.]

In 1396, Richard's second queen also brought a storm with her to the *English* coasts. In this storm the king's baggage was lost, and many ships cast away.<sup>90</sup>

In *England* in 1396, in July and August, but especially in September, there were terrible hurricanes. These did great damage to churches and houses in many parts of the country.<sup>72</sup>

There was in Paris, *France* at the end of October 1396, a terrible storm of wind, rain and thunder, which was felt throughout the north. The storm was so violent that it knocked down the tents of the royal camp.<sup>79</sup>

In Ardres, *France* at the end of October 1396, there came a terrible storm, mingled with torrents of rain. Then a north wind blew across continually with great fury for three months. This year was called “the year of the high wind”. These winds intensified the night of November 17 for three hours. The Sea [*English Channel*] overflowed this year.<sup>79</sup>

Beginning in 1396, there was an extreme famine in the Deccan region of *India*.<sup>156</sup>

— “In 1396, the dreadful famine, distinguished from all others by the name of the ‘Durga Dewee’, commenced in Maharashtra. It lasted, according to the Hindoo [Hindu] legends, for twelve years. At the end of that time, the periodical rains returned, but whole districts were entirely depopulated, and a very scanty [tax] revenue was obtained from the territory between the Godavery and Kistna [now Godaverri and Krishna Rivers] for upwards of thirty years afterwards.”

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**1397 A.D.** In 1397 during the period between 23 August and 21 September, floods struck Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

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**1398 A.D.** In 1398, floods struck Fukien (now Fujian province) on the southeast coast of *China*. Houses were damaged by the floodwaters.<sup>153</sup>

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**1399 A.D.** In 1399, the winter was remarkable in *the Netherlands* and particularly in *Northern Europe*. In Paris, *France* the spring thaw produced a great flood.<sup>62</sup>

Excessive rains of 1399 brought the overflow of several rivers in the kingdom [of *France*], particularly the Seine River, from late March to mid-April.<sup>79</sup>

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**Winter of 1399 / 1400 A.D.** The winter of 1399 was a very hard winter in *Germany*. The earth and sea froze hard in a short period of time. Not only did people use the Elbe River as a bridge to travel over the ice, but also went across the ice to *Denmark*.<sup>172</sup>

In 1400, the winter was very severe in *Northern Europe* and the frozen seas offered several armies an alternate route on the ice.<sup>62</sup>

“In 1400, the seas froze in *Northern Europe*”.<sup>62</sup>

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**1400 A.D.** In 1400, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hsiao-shan.<sup>153</sup>

In 1400, a large storm surge called “the Frisian Flood” raged on the *Frisian coast* [coastal region along the southeastern corner of the North Sea that extends from Netherlands to Denmark].<sup>172</sup>

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**1401 A.D.** In May 1401, a terrible storm burst upon the Beauvoisis [Beauvoisin in the Picardy region north of Paris, *France*]. Hailstones the size of goose eggs were driven by a strong wind. During the second week of June, Paris, *France* was struck by a terrible thunderstorm. Again on the last days of June, a terrible storm broke out in Paris. The violent winds uprooted and scattered over a thousand fruit trees at Mesnil-Aubry near Paris.<sup>79</sup>

In 1401 during the period between 11 July and 9 August, a flood struck Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua.<sup>153</sup>

In 1401 [in *Germany*], it began to rain on the [feast of Saint] Gregory [March 12] until the feast of St. Lambert [September 17]. For almost a half year there was not a day that it did not rain. The winter grain was spoiled by the cold rain. The summer grain produced long stalks but little grain. Then came a famine and a miserable time.<sup>172</sup>

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**1402 A.D.** In *England*, on the Feast of Corpus Christi [generally occurs in May or June] in the evening, there fell a tempest of wind, thunder and lightning, that the highest part of Danbury Church in Essex was blown down and the chancel [sanctuary] was all shaken, rent and torn in pieces.<sup>72</sup>

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**Winter of 1402 / 1403 A.D.** The winter of 1402 was similar to the winter of 1323 A.D.<sup>1</sup>

In 1402 the *Baltic Sea* was quite frozen over from Pomerania to *Denmark*.<sup>2, 40, 41, 42, 43, 47, 90, 93</sup> [Pomerania was a historical region on the southern shore of the Baltic Sea between *Germany* and *Poland*.]

In the Novgorod Republic [now part of *Russia*], during the winter of 1402/03 from St. Georgi's Day up to March, horses could travel over the Volkhov [River on the ice].<sup>76</sup>

**1403 A.D.** In 1403 during the period between 21 April and 20 May, a flood struck the east coast of *China* in Chekiang (now Zhejiang province) at Chia-hsing; and in Kiangsu (now Jiangsu province) at Soochow and Sung-chiang. During the period between 18 August and 16 September, a flood struck Chekiang province at Hai-ning and the fields were damaged by the floodwaters.<sup>153</sup>

In 1403, a severe drought engulfed Hunan province in south-central *China* at An-hsing and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh.<sup>153</sup>

In 1403, there was a great drought in Hunan and Kwangsi provinces in *China*.<sup>165</sup>

In 1403, there was a famine at Shanghai city in *China*.<sup>166</sup>

In 1403, there was a huge snowfall in *Silesia*, particularly at Glatz [now Kłodzko, *Poland*], Patschkau [now Paczków, *Poland*], Reiß and [now Głucholazy, *Poland*] so that high waters and floods destroyed many houses and tore through the city gates and took great multitudes of people away. The floods destroyed the bridge of Troppau [now Opava, *Czech Republic*].<sup>172</sup>

On 25 November 1403, there was a very large storm surge along the *North Sea*.<sup>172</sup>

**1404 A.D.** In *England*, there was an inundation from the sea.<sup>47, 72, 92</sup>

In *France* in June, a strong mist covered the whole country.<sup>61</sup>

In 1404 or 1406, there were great losses in Kent, *England*, in Holland [now *the Netherlands*], in *Zealand*, in Flanders [now *Belgium*], etc. by breaking in of the waters that overflowed the sea banks, to the drowning and loss of much cattle, etc.<sup>72</sup>

In 1404, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 10 April and 8 May, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hui-yang.

— During the period between 9 May and 7 June, floods struck Anhwei (now Anhui province) in eastern *China* at Fêng-yang.

— During the period between 7 July and 5 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Sung-chiang; and Chekiang province at Chia-hsing and Hu-chou.

— During the period 3-31 December, floods struck Chekiang province at Hangchow.

In 1404 during the 6<sup>th</sup> moon, in the vicinity of Shanghai, *China*, there was excessive rain for 10 days. High places were covered with water several feet. In low places the water was more than ten feet deep.<sup>166</sup>

**1405 A.D.** In 1405, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Hangchow. During the same year a drought engulfed Chekiang province at Taichow.<sup>153</sup>

In 1405, there was a drought in Chêhkiang province in *China*.<sup>165</sup>



In 1405 during the 7<sup>th</sup> moon on the 2<sup>nd</sup> day, a typhoon struck in the vicinity of Shanghai, *China*. A great wind and rain; sea overflowed, drowning more than 1,000 persons.<sup>166</sup>

In 1405, there was a famine in the vicinity of Shanghai and three neighboring fus [prefectures] in *China*.<sup>166</sup>

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**1406 A.D.** In Novgorod [*Russia*] on Easter, April 11, heavy ice came from the lake and broke away a stay of the great bridge.<sup>76</sup>

In *England*, there was a warm southerly wind all summer, moist corrupt air; hence a plague.<sup>72</sup>

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**1407 A.D.** In 1407, there was a dreadful pestilence in London, *England*, where 40,000 people perished.<sup>212</sup>

In 1407 during the period between 6 June and 4 July, a flood struck Kiangsi (now Jiangxi province) in southern *China* at Yang-shuo.<sup>153</sup>

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**Winter of 1407 / 1408 A.D.** The winter was similar to the winter of 1323 A.D.<sup>1</sup>

The whole sea between Gothland and Geland was frozen, and from Restock to Gezoer.<sup>2, 41, 42, 43</sup>

In *England* the winter was severe. It produced a great frost lasting 25 weeks. In *Europe* the winter was also very severe. Norway wolves reached Jutland across ice rivers and Swiss lakes froze.<sup>28</sup>

In *England*, there was a long and severe winter, frost and snow in December 1407 and January, February and March in 1408. Thrushes, blackbirds and many thousand of smaller birds died of hunger and cold.<sup>72</sup>

In December 1407, began a frost of such violence and continuance, that the like was never heard of in *England*. It lasted fifteen weeks, and being accompanied with abundance of snow, it was greatly destructive to the smaller birds.<sup>39</sup>

During the winter of 1407, there was a great frost in *England*, with deep snow, for 15 weeks, which killed the small birds.<sup>212</sup>

In *England* in 1407, the frost lasted fourteen weeks; small birds perished. In the *Baltic Provinces* in 1408 the frost was very severe.<sup>47, 93</sup> [Baltic Provinces in this time period were the Hanseatic League Baltic provinces of *Estonia* and *Latvia*.]

In *England* in 1408, the frost lasted for 15 weeks. Most small birds died.<sup>72</sup>

In *England* during the winter of 1407-08, all the small birds perished from the frost.<sup>90</sup>

The *Baltic Sea* was frozen over.<sup>30</sup>

In 1408, the vines and fruit trees in *France* were killed [by the extreme cold].<sup>58, 80</sup>

In 1408, the Danube River freezes over its entire length. The ice stretches uninterrupted from *Norway* into *Denmark*. Carts cross the Seine River in *France* on the ice.<sup>60</sup>

In 1408, carts traveled on the ice across the frozen Seine River in *France*. The Danube River across its entire course was frozen, and the Maas [Meuse] River was frozen. The ice extends without interruptions from *Norway* to *Denmark*, so that the wolves invaded from the north into Jutland.<sup>62</sup>

The winter of 1408 began November 11 and did not end until late January. It froze all the rivers in *France* and destroyed the roots of vines and fruit trees. In Paris, *France*, the wagons rolled down the Seine River.<sup>79</sup>

In the year 1408 "The winter of this year, ruled strictly in *Northern Europe* to the banks of the Danube, and was the cruelest in 500 years. The winter was so long that it stopped by Feast of St. Martins (11 November) by the end of January, and so severe that the roots of the vines and fruit trees froze to death."<sup>62</sup>

"Since last Feast of St. Martins such a cold occurred, that no one could do business, and if I had just asked the clerk for an additional shovel of coal in order to protect the inkwell from freezing. So the ink froze but always after two or three words with the pen so he couldn't keep records."<sup>62</sup>

The acute shortage of wood and bread was painfully felt. The mills were collectively still on the frozen river because of the frost. The thaw in *France* caused terrible devastation because of the flowing pieces of ice and because the rivers overflowing their banks. The first shock of the ice against the arch warned the inhabitants of many houses built along the shoreline to run for their safety. For when the ice flows broke, one could see icebergs 100 meters (330 feet) in length floating. The little known wooden bridge at the Chatelet, and the bridge of St. Michael (then called the New Bridge) collapsed. The foundations of the large bridge mills were swept away. In many places similar misfortunes occurred.<sup>62</sup>

**1408 A.D.** A terrible hailstorm struck in Vexin in northwestern *France* on September 5, 1408. Hailstones, driven by a furious wind, were as big as ostrich eggs.<sup>79</sup>

In *England* on 7 September, there was a great flood.<sup>72</sup>

In 1408, there was a flood in the River Ware [Wear] in *England* that caused great damage.<sup>212</sup>

In 1408, a flood struck Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning.<sup>153</sup>

**1409 A.D.** In 1409, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an and Yangchow; Anhwei (now Anhui province) in eastern *China* at Fêng-yang; and Honan (now Henan province) in central *China* at Huai-yang. As a result, the land tax was remitted. During the period between 9 September and 8 October, a flood struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui.<sup>153</sup>

**1410 A.D.** In *Ireland*, there was a great famine.<sup>57, 91</sup>

In 1410, several regions of *China* experienced flooding including:<sup>153</sup>

- During the period between 3 June and 1 July, floods struck Shensi (now Shaanxi province) in central *China* at An-k'ang. The city walls and granaries were damaged by the floodwaters and people drowned.
- During the period 2-31 July, floods struck Anhwei (now Anhui province) in eastern *China* at Fou-yang and T'ai-ho. As a result, the land tax was remitted.
- During the period 1-29 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at P'ing-yang.

**1411 A.D.** A terrible storm struck around Paris, *France* in 1411, on the Feast of the Conversion of St. Paul [January 25].<sup>79</sup>

In 1411, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 26 December 1410 and 23 January 1411, floods struck Honan (now Henan province) in central *China* at Loyang.

— During the period between 24 January and 22 February, floods struck Hopei (now Hebei province) in northern *China* at Peiping and An-kuo. As a result, the land tax was remitted.

— During the period between 23 February and 23 March, floods struck Shantung (now Shandong province) on the east coast of *China* at Lin-i. [Lin-i is located at longitude 118.24° East and latitude 35.07° North.]

— During the period between 21 June and 20 July, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.

— During the period between 15 December 1411 and 13 January 1412, floods struck Hopei province at Peiping. As a result, the land tax was remitted.

**1412 A.D.** In *India*, there was a great drought on the Ganges-Jumna Delta from 1412-1413.<sup>47</sup>

In 1412-13 in *India*, there was a great drought followed by a famine which occurred in the Ganges-Jumna delta.<sup>57</sup>

In *England* on 12 October 1412, the “sea flooded thrice without ebbing.”<sup>47, 72, 92</sup>

In *England* beginning on October 12, there were three floods in the River Thames, one upon another and no ebbing between. The likes of this event was never known before.<sup>72</sup>

In 1412, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 11 April and 10 May, floods struck Hopei (now Hebei province) in northern *China* at Peiping. As a result, the land tax was remitted. During the same time period, floods struck Honan (now Henan province) in central *China* at Sui-p’ing. Dikes and fields were damaged by the floodwaters and 130 families were flooded.

— During the period between 9 June and 8 July, floods caused by heavy and protracted rains struck Kiangsi (now Jiangxi province) in southern *China* at Wu-ning. Houses were damaged by the floodwaters.

— During the period between 9 July and 7 August, floods struck Honan province at Yen-ling and Lin-chang. Fields and crops were damaged by the floodwaters.

— During the period between 8 August and 5 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Wu-chiang, K’un-shan and Ch’ang-shou. As a result, the land tax was remitted. During the same time, floods struck Hopei province at Peiping. Dikes and fields were damaged by the floodwaters and people and cattle drowned. Floods also struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing.

— During the period between 4 December 1412 and 2 January 1413, floods struck Hopei province at Tientsin. Dikes and crops were damaged by the floodwaters. During the same time, floods also struck Hopei province at Jao-yang and Wu-ch’iang. Dikes, fields and houses were damaged by the floodwaters. Also during this time, floods struck Hunan province in south-central *China* at Hsiang-yin; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hai-k’ang and Sui-ch’i. As a result, the land tax was remitted.

**1413 A.D.** In London, *England* on the 25<sup>th</sup> of November, the leads of the Grey-friars church, and the whole side of a street, called the Old Exchange were beat down by a storm.<sup>41, 43, 56</sup>

[In *England*] in April 1413, there was a great snowfall.<sup>72</sup>

In 1413 A.D., there was a famine in the Ganges [the river that separates *India* from *Bangladesh*] and Jumna Doab [the track of land between the Ganges river and the Jumna (now Yamuna) river in northern *India*].<sup>179</sup>

In 1413, flooding affected many regions of *China* including:<sup>153</sup>

— During the period 3-31 January, floods struck Hupeh (now Hubei province) in central *China* at Huang-kang; Hunan province in south-central *China* at Ch'ang-tê; and Honan (now Henan province) in central *China* at Chung-mou and Ch'in-yang. As a result of the hardship, the land tax was remitted. During the same time period, floods struck Hopei (now Hebei province) in northern *China* at An-hsin. Dikes were damaged. During this time, floods also struck Hunan province at Hua-jung. Dikes and crops were damaged by the floodwaters. Floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at P'ei. [P'ei is located at longitude 118.03° East and latitude 34.30° North.]

— During the period between 30 May and 27 June, floods caused by a typhoon struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow.

— During the period between 28 June and 27 July, floods struck Hopei province at Yüeh-t'ing. Crops were damaged by the floodwaters and the land tax was remitted. Floods also struck Kiangsu province at Suchow.

**1415 A.D.** In the Novgorod Republic [now part of *Russia*], the water [in the Volkhov River] flowed backwards [into the lake, owing to floods downstream].<sup>76</sup>

In 1415 during the period between 11 January and 9 February, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Sung-chiang; and Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Hu-chou and Hangchow. As a result, the land tax was remitted.<sup>153</sup>

**1416 A.D.** In 1416, flooding affected many regions of *China* including:<sup>153</sup>

— During the period between 30 January and 28 February, floods struck Honan (now Henan province) in central *China* at Ch'in-yang and An-yang. As a result, the land tax was remitted.

— During the period between 27 May and 24 June, floods struck Shansi (now Shanxi province) in northern *China* along the Han River. Houses were damaged by the floodwaters. Floods also struck Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua.

— During the period between 6 May and 8 August, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Nan-p'ing, Chiang-yüeh, Sha and Shun-ch'ang.

— During the period between 24 July and 22 August, floods struck Fukien province at Shao-wu and Kuang-tsê. Houses were damaged by the floodwaters and tens of thousands of people drowned. Also during this time, floods struck Kiangsi (now Jiangxi province) in southern *China* at Shang-jao and P'o-yang; and Chekiang province at Ch'ü and Chin-hua. The city walls and houses were damaged by the floodwaters and people and cattle drowned.

— During the period between 21 September and 20 October, floods struck Honan province at Ning-ling and Kiangsu (now Jiangsu province) on the east coast of *China* at Yen-ch'êng. As a result, the land tax was remitted. At Yen-ch'êng, the fields were damaged by the floodwaters.

In 1416 during the period between 6 May and 8 August, a severe drought engulfed several regions of *China*. The drought was accompanied by a plague.<sup>153</sup>

In 1416 during the summer, there was a great drought in Chêhkiang province in *China*. Typhus raged.<sup>165</sup>

**1417 A.D.** On June 10 there was a thunderstorm and in the Church of St. Eupati on Rogatitsa [Street in Novgorod, *Russia*] the images [sacred icons] were burnt.<sup>76</sup>

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**1418 A.D.** In *England*, there was such a storm and hideous tempest as endangered the loss of the whole English Navy.<sup>72</sup>

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**1419 A.D.** In the Novgorod [*Russia*], during the evening service on April 9, Sunday, there was a violent storm of wind, and clouds and very thick rain; the water from the springs ran like a strong river; lightning flashed, and there was terrible thunder, and [the lightning] killed the watchman Andrei in the Church of the Holy Mother of God by the town gates. The chain of the candelabra from the ceiling of the cupola was all torn; and the Holy Gates were burnt. [The lightning] caused damage in [the churches of] St. Ioan the Forerunner, of St. Nikola and of St. Vasili, but by God's mercy the churches were spared. But below the churches in the gateway two men were killed [by lightning], others fell down as dead, and others were struck deaf; some lost their legs, and others were struck dumb, but by the mercy of God they were assuaged with water and carried to their homes, where, after having lain down a little on their beds, by the grace of God they got up again; and at that same time the icons in the Church of St. Kostyantyn were scorched.<sup>76</sup>

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**Winter of 1419 / 1420 A.D.** In 1420, the sea between Constantinople (Istanbul) and Iskodar (Üsküdar) *Turkey* was frozen and passable on ice.<sup>2, 42, 43, 47, 93</sup>

In 1420, the severe winter increased the misery in *France*; a nation tattered by war, with its capital in the hands of the English. The famine was in Paris so great that the unfortunates spent their days searching for food. The wolves advanced to the suburbs of the city that was now like a vast wasteland.<sup>62</sup>

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**1420 A.D.** The weather in 1420 was exceptionally good for the wine in Dijon, *France*. They drank the new vintage on 25 August, which was about 30 days ahead of the average time. In the first days of April, the farmers came to the door of the cathedral at Metz, *France* to offer lilies of the valley. On 10<sup>th</sup> of April, the strawberries were ripe. On 22 June, the grapes were crushed. On 22 July the harvest was completed. And they drank at the end of the month, the new wine.<sup>62</sup>

On 7 April 1420 [in *Germany*], the roses bloomed and cherries and strawberries were picked. In June grapes and peaches were ripe. On 8 June there was frost and snow but it did little damage. The autumn was beautiful.<sup>172</sup>

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**Winter of 1420 / 1421 A.D.** [In *Europe*], the winter was so mild that in April 1421 there were cherries and in May grapes.<sup>62</sup>

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**1421 A.D.** The sea broke in at Dort, and drowned 72 villages, and 100,000 people and formed the Zuyder Sea [*Zuiderzee, the Netherlands*].<sup>40, 41, 43</sup>

On 17 April 1421, the sea broke in at Dort [Dordrecht, in southwestern *Netherlands*], and drowned 72 villages, and 100,000 people.<sup>90</sup>

In 1421 in Holland [now *the Netherlands*], a dreadful and most destructive inundation, overwhelming seventy-two villages, twenty of which were never recovered. The loss of life [nearly 100,000 persons on some authorities] and property was immense; many noble families were reduced almost to beggary. By this inundation the Biesbosch was formed, and the town of Dordrecht separated from the mainland of Holland [now *the Netherlands*].<sup>47, 92</sup> [The Biesbosch is a freshwater tidal area and network of rivers and smaller and larger creeks with islands.]

[Some authorities give the date of this event as 1446.] In 1446, the sea breaks in on Dort and drowns 100,000 persons.<sup>128</sup>

In the Novgorod [*Russia*], the Volkhov River flooded and washed away the great bridge, also the Neredich and the Zhilotug bridges. [The Neredich and Zhilotug bridges were bridges over small tributaries of the Volkhov River in Novgorod.] At Kolomentsa [the city of Kolmovo near Novgorod] it carried away the Church of the Holy Trinity, and in Shchilova, Sokolnitsa, and Radokovitsi [Streets] and in the Resurrection in the Lyudin quarter, service in the churches was performed only on raised platforms, and in the different quarters it washed away dwellings with all their stores; and it was so great that it poured out through the town gates to Rybniki [the Fisheries]. On May 19, during Peter's Fast, there was a great storm by night in the skies; clouds came up from the south, and in the north thunder and fiery lightning came from the skies with frightful noise, and purple rain fell with stones and hail. During these two years [1421 & 1422] there were great famine and plague, and three public graves were filled with the dead, one behind the altar in St. Sophia and two by the Nativity in the field.<sup>76</sup>

In 1421 during the period between 26 October and 24 November, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow. As a result, the land tax was remitted.<sup>153</sup>

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**Winter of 1421 / 1422 A.D.** “This year was the Seine, which was large, becomes quite firm.” [In 1492, the Seine River in *France* was swollen and then froze solid.]<sup>62</sup>

In 1422, wine, verjuice [juice of unripe grapes] and vinegar froze in the basement. The Seine River in Paris, *France*, whose waters were high, froze in less than three days as the cold grew sharply. Frost began on January 12<sup>th</sup> and there was still ice at Notre Dame in March.<sup>79</sup>

On 12 January 1422, there was the most severe cold that had ever been seen by man. It froze so terribly that in less than three days, the vinegar and wine in the cellars solidified into icicles hanging from the vaults of the cellar. The Seine River in *France* was swollen, and froze completely. The wells froze within four days. There was eighteen full days of this harsh cold. About a day or two before the severe cold started, there was a heavy snowfall (similar to the snowstorm that took place 30 years ago in the year 1392). Due to the severity of the frost and snow and because of the extreme cold, no one undertook to their jobs, but rather resorted to jumping, ball and other games to heat up. The cold was so intense that the ice in the courtyards, streets and near the fountain lasted until the Feast of the Annunciation (March 25). It was so cold that the ridges (comb) were frozen on the heads of roosters and hens.<sup>62</sup>

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**1422 A.D.** The weather was good for the crops in 1422 in Dijon, *France*. They completed the harvest on 28 August.<sup>62</sup>

In 1422, flooding affected several regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Hsiang-shan. As a result, the land tax was remitted.

— During the period between 21 May and 18 June, floods due to a heavy storm struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton. Over 360 people drowned and 1,200 houses and granaries were damaged by the floodwaters.

— During the period between 14 December 1422 and 12 January 1423, floods struck Anhwei (now Anhui province) in eastern *China* at Fêng-yang. As a result, the land tax was remitted.

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**Winter of 1422 / 1423 A.D.** The winter was similar to the winter of 1323 A.D.<sup>1</sup>

In 1423, the ice was thick enough to ride on from Lübeck to *Prussia*, and the *Baltic Sea* was covered with ice from *Mecklenburgh* to *Denmark*.<sup>2, 41, 42, 43</sup>

In 1423, one could travel between Lübeck and *Prussia* on the ice.<sup>30</sup>



In 1423, the travelers went on the ice from Lübeck, *Germany* to Danzig (now Gdańsk, *Poland*).<sup>62</sup>

In the winter of 1423, the shores of the *Baltic Sea* from Lübeck to Danzig were frozen.<sup>62</sup>

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**1423 A.D.** In *France*, the year followed a very severe winter. During the summer, it rained constantly and as a result, the fruits did not come to maturity. The wine vintage at Dijon, *France* was harvested on 23 September.<sup>62</sup>

In 1423, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou.<sup>153</sup>

In 1423, the drought in Chêhkiang province in *China* caused a great mortality.<sup>165</sup>

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**1424 A.D.** In 1424, flooding affected several regions of *China* including:<sup>153</sup>

— During the period between 23 September and 21 October, floods struck the east coast of *China* in Kiangsu (now Jiangsu province) at Soochow, Wu-chin and Sung-chiang; and in Chekiang (now Zhejiang province) at Chia-hsing, Hu-chou and Hangchow. Crops were damaged by the floodwaters.

— During the period between 22 October and 20 November, floods struck Hopei (now Hebei province) in northern *China* at Kuang-tsung and Shantung (now Shandong province) on the east coast of *China* at P'êng-lai and Yeh. Crops were damaged by the floodwaters and the land tax was remitted. Also during this time, floods struck Kiangsu province at Soochow and Suchow. Fields were damaged and the land tax was remitted.

— During the period between 21 November and 20 December, floods struck Honan (now Henan province) in central *China* at Yung-ch'êng. Crops were damaged by the floodwaters and the land tax was remitted.

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**1425 A.D.** In 1425, flooding affected several regions of *China* including:<sup>153</sup>

— During the period between 20 March and 17 April, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Huang-yen. Five hundred families were flooded and over 800 persons drowned.

— During the period between 12 October and 9 November, floods struck Chekiang province at Hu-chou, Chia-hsing and Hangchow; Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang and Wu-chin; and Hopei (now Hebei province) in northern *China* at Kuang-tsung. Crops were damaged by the floodwaters.

In 1425, the summer rains injured the crops in the vicinity of Shanghai, *China*.<sup>166</sup>

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**1426 A.D.** The winter was similar to the winter of 1323 A.D.<sup>1</sup>

The ice was thick enough to ride on from Lübeck to *Prussia*, and the *Baltic Sea* was covered with ice from *Mecklenburgh* (part of Germany) to *Denmark*.<sup>2, 41, 42, 43</sup>

In 1426, the ice bore riding upon it from Lübeck to *Prussia*.<sup>90</sup>

In 1426 in *North of Europe*, the ice carried traffic from Lübeck to *Prussia*.<sup>93</sup>

One could travel between Lübeck and *Prussia* on the ice.<sup>30, 47</sup>

[In *England*] on 30 September, there was a terrible storm of thunder and lightning.<sup>72</sup>

In 1426, floods struck Hupeh (now Hubei province) in central *China* at Huang-mei. During the period between 6 May and 8 August, a severe drought engulfed Hupeh province at Chia-yü.<sup>153</sup>

In 1426 during the summer, there was a great drought in Hupeh province in *China*.<sup>165</sup>

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**1427 A.D.** [In *England*], it rained almost continually from Easter to Michaelmas [29 September]; hence dearth, famine and sickness. The sickness also came from the winter without cold. At the Feast of Saint Nicholas [6 December], all vegetables flourished. Next summer the plague raged.<sup>72</sup>

In 1427 in *Great Britain*, the “rain began on April 1, and did not cease till Hollontide [Hollantide, today celebrated as Halloween, was in earlier times celebrated on November 11].”<sup>212</sup>

In *England*, famine from great rains.<sup>57, 72, 91</sup>

In 1427, it rained continuously from April to June 9. In Paris, *France*, the Seine River entirely covered the island “Ile de la Cité” of Notre Dame and the island “Île Saint-Louis”, and rose on the embankment Saint-Paul to the height of the first floor of houses. The floods drowned the marshlands. The water level in the marshes rose over two feet.<sup>79</sup>

In 1427 during the period between 6 May and 9 October, a drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-fên. During the period between 18 December 1427 and 16 January 1428, a drought engulfed Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 1427 during the summer and autumn, there was a drought in Shansi and Shensi provinces in *China*. As a result, the granaries were opened and the land-tax was remitted.<sup>165</sup>

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**Winter of 1427 / 1428 A.D.** The winter in 1427, produced no frost and the fruit trees bloomed in *Saxony* to the Feast of Saint Nicholas [6 December]. The same occurred in *Belgium* and *Italy*. But in *Germany*, as a result of this weather a very severe plague materialized.<sup>62</sup>

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**1428 A.D.** In 1428 in Paris, *France*, the spring was rainy and the summer was cold. As a result of these troubled seasons the [grape] vine had not yet bloomed on June 15.<sup>79</sup>

In 1428, a severe drought engulfed Shensi (now Shaanxi province) in central *China* at Sian. During the period between 13 July and 10 August, a drought engulfed Shansi (now Shanxi province) in northern *China* at Taiyuan, Tatung, Ch'in, and Fên-yang. Also during the period between 13 July and 10 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow.<sup>153</sup>

In 1428 during the summer, there was a drought in Shansi and Shensi provinces in *China*. In Shensi, this was a great drought.<sup>165</sup>

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**1429 A.D.** In *Scotland*, there was a dearth.<sup>57, 91</sup>

In 1429 during the period between 28 September and 27 October, a drought engulfed Shansi (now Shanxi province) in northern *China* at Wan-ch'üan. The drought led to a famine.<sup>153</sup>

In 1429 during the summer, there was a drought in Shansi province in *China*. The land tax was remitted.<sup>165</sup>

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**1430 A.D.** In the Novgorod Republic [now part of *Russia*], there was a great drought. In autumn the water [level in the rivers and lakes] was exceeding low; the soil and the forests burned, and very much

smoke, some times people could not see each other, and fishes and birds died from that smoke; the fish stank of the smoke, for two years.<sup>76</sup>

In 1430, the vine and fruit trees in *France* were killed [by the extreme cold].<sup>58, 80</sup>

The Danube was frozen for two months; the Seine River in *France* was crossable by pedestrians. Travelers go on the ice between *Denmark* and *Sweden*.<sup>62</sup>

In the year 1430, the winter was very strict in the north and the [grape] vine suffered greatly in *Germany*.<sup>62</sup>

**1431 A.D.** In 1431 during the period between 9 July and 7 August, floods struck Hopei (now Hebei province) in northern *China* at Peiping.<sup>153</sup>

**Winter of 1431 / 1432 A.D.** A severe winter began in *Germany* in 20 November 1431 and lasted until 4 March 1432. The rivers were frozen.<sup>28</sup>

[Another source gives this as the winter of 1432-33.] “In 1432-1433, the Seine and all the rivers of *Germany* were frozen.”<sup>62</sup>

During the winter of 1432, the frost was very severe in *England*.<sup>212</sup>

**1432 A.D.** In 1432, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch’ang-hua.<sup>153</sup>

**1433 A.D.** A terrible flood of the Rhône River in *France* ravaged the territory of Arles and destroyed a large number of cattle.<sup>61</sup>

In *Ireland*, there was a famine of great severity.<sup>57, 91</sup>

In 1433, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch’ang, P’o-yang, Kiukiang, Shang-jao, and Nan-k’ang. During the period between 20 April and 18 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping; Honan (now Henan province) in central *China* at Loyang; Shantung (now Shandong province) on the east coast of *China* at Tsinan; and Shansi (now Shanxi province) in northern *China* at Taiyuan. This drought led to a famine.<sup>153</sup>

In 1433 during the summer, there was a drought in Honan, Shansi and Shantung provinces in *China*. The land tax was remitted. [The source document cited this as year 1333 but was out of chronological order and appeared to be an obvious mistake.]<sup>165</sup>

**Winter of 1433 / 1434 A.D.** During the winter in 1434, the River Thames was frozen below Gravesend.<sup>1</sup>

In London, *England*, the river was frozen below London Bridge to Gravesend from 24 November 1433 to 10 February 1434. The price of wheat rose to 27 shillings per quarter [quarter ton], but afterwards fell back down to 5 shillings.<sup>212</sup>

In *England* from 24 November to 10 February 1434, the River Thames was frozen below London-bridge to Gravesend because of the severe frost.<sup>2, 39, 40, 41, 43, 90</sup> [Gravesend is a town in northwest Kent, *England*, on the south bank of the Thames, opposite Tilbury in Essex.]

In *England* in 1434, there was one continued severe frost from 25 November to 10 February. Ships lying at the mouth of the River Thames could not come up the river.<sup>72</sup>

In *England*, the frost lasted from 15<sup>th</sup> November to 10<sup>th</sup> February. The River Thames frozen down to Gravesend.<sup>47, 93</sup>

In *England* in the year 1434, a great frost began on the 24<sup>th</sup> of November, and held till the 10<sup>th</sup> of February, following; whereby the River Thames was so strongly frozen, that all sorts of merchandizes and provisions brought into the mouth of the said river were unladen, and brought by land to the city.<sup>29</sup>

In 1433, the River Thames and all other rivers of *England* and *Scotland* froze over; the Seine, Rhine and Danube rivers were closed to navigation early in December. The *Dardanelles* and *Hellespont* froze, as did many bays and inlets of the *Mediterranean*. Ice formed in Algiers, *Algeria* and the *Strait of Gibraltar* was almost impassable from drift ice.<sup>63</sup>

The frost began in Paris, *France* towards the end of December 1433, and continued during 3 months, less nine days. It recommenced towards the end of March, and continued until the 17<sup>th</sup> of April. The same year it snowed in Holland [now *the Netherlands*] forty consecutive days.<sup>38, 60</sup>

During the winter of 1433-34, the frost began on 31 December 1433 and persisted for three months minus nine days. The frost reappeared at the end of March and continued until 17 April. The snow was higher than six-feet in the streets of Carcassonne in the Languedoc region of southern *France*. Winter ruled in the city for three months.<sup>79</sup>

In 1434, it snowed in the *Netherlands* and in Paris, *France* for almost 40 days in a row.<sup>58, 80</sup>

In 1433, the winter was very severe again in *Germany*.<sup>47, 62, 93</sup>

In 1433, there were severe frosts, when the large fowl of the air sought shelter in the towns of *Germany*.<sup>90</sup>

In 1434, all the rivers in *Northern Europe* and *Germany* froze. The River Thames in *England* froze at Gravesend.<sup>62</sup>

During the winter of 1433-34 [in *Western Europe*], "The frost began at the end of December and lasted three months less 9 days, the frost began again at the end of March, and lasted until Easter, which this year fell on the 17<sup>th</sup> of April." In Holland [now *the Netherlands*] it snowed 40 days in succession. On 25 April and the following night, there was such a heavy snowfall accompanied by extreme cold, that the greater part of the [grape] vines in *Austria*, Swabia [region of *Germany*], and *Hungary* were destroyed. This winter has been named in *England*, "the big chill"; the cold lasted from 24 November 1433 until 10 February 1434.<sup>62</sup>

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**1434 A.D.** The summer weather was good for the wine in 1434. At Dijon, *France*, the vintage was ready on 1 September.<sup>62</sup>

On 7 October 1434, a terrible wind blew for nearly nine hours in Paris, *France* and the countryside. Many houses were toppled, and an infinite number of trees were uprooted. In Vincennes alone lost more than three hundred trees.<sup>79</sup>

In 1434, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Taichow and Chin-hua; and Hunan province in south-central *China* at An-hsiang and Tz'ü-li. During the period between 7 June and 5 July, a drought engulfed Kwangsi (now Guangxi province) in southern

*China* along the border with *Vietnam* at Nanning. During the period between 3 September and 4 October, a drought engulfed Honan (now Henan province) in central *China* at Loyang; Kiangsi province at Nan-ch'ang; and Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow, Chinkiang, Sung-chiang and Wu-chin.<sup>153</sup>

In 1434 during the autumn, there was a drought in Anhwei, Chêhkiang, Honan, Hunan, Hupeh, Kiangsi, Kiangsu and Kwangsi provinces in *China*. As a result, the rivers dried up.<sup>165</sup>

In 1434, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Hupeh (now Hubei province) in central *China* at Wuchang. During the period between 3 September and 2 October, floods struck Hopei (now Hebei province) in northern *China* at Peiping; Shensi (now Shaanxi province) in central *China*; and Szechwan (now Sichuan province) in southwest *China*.<sup>153</sup>

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**1435 A.D.** The winter of this year was remarkable for the duration and severity of cold. Winter in Flanders [now *Belgium*] lasted from the beginning of December to mid-March, and the thickness of the ice was more than an Elle (~ 2.3 feet, 70 centimeters). In *Germany*, many people died from the cold.<sup>62</sup>

In 1435 during the period between 5 February and 8 August, a severe drought engulfed Hunan province in south-central *China* at Tz'ü-li. The drought was accompanied by a plague.<sup>153</sup>

In 1435 during the summer, there was a great drought in Hunan province in *China*. Typhus raged.<sup>165</sup>

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**1436 A.D.** In autumn, a frost struck the crops during harvest throughout the entire Novgorod province [now *Russia*]. Also during the autumn there were great floods. On a frosty night the ice carried away seven stays of the great bridge in Novgorod, and the little Zhilotug bridge was carried away.<sup>76</sup>

During the summer of 1436 in southern *France*, humidity and heat competed.<sup>79</sup>

In 1436 during the period between 7 April and 15 May, a drought engulfed *China*.<sup>153</sup>

In 1436 during the summer, there was a drought in *China*.<sup>165</sup>

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**1437 A.D.** In 1437 in *England*, there was scarcity. A bushel of wheat sold for 7 shillings being very dear [scarce], according to that time, so that the poor in Chester made bread of peas, veitches, and fern root.<sup>212</sup>

In the Novgorod Republic [now part of *Russia*], during the spring, floods washed away the wall of the Detinets [Citadel], and the earth from the wall slipped down and the stonewall fell together with the belfry by the Volkhov River. The Church of St. Nikola collapsed at Vezhishchi.<sup>76</sup>

In 1437 during the period between 30 September and 28 October, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow. People and cattle drowned and houses were damaged. At Sung-chiang, a typhoon and storm caused the floods. At I-hsing, the typhoon caused the floods and over 1,000 families were flooded.<sup>153</sup>

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**1438 A.D.** In *England*, there was a great frost that was unusually long.<sup>47, 72, 93</sup>

In *England* in 1438, came a great tempest, terrible winds and rains. As a result came great scarcity of corn [grain], wine and bay salt. But the citizens of London, from their prudent care of their Lord Mayor, had a good supply of rye from Prussia. But the poor starved people in the country made bread of fern roots and the like. Wheat sold for 24s. a Quarter [quarter ton]. In November began a terrible winter of frost and snow.<sup>72</sup>

In *England* in 1438 “In the 17<sup>th</sup> yeere of Henry the Sixt, by meanes of great tempests, immeasurable windes and raines, there arose such a scarcitie that wheat was sold in some places for 2 shillings 6 pence the bushell.”<sup>57</sup>

[Another account places this event in 1439.] In *England* in 1439, during the 18<sup>th</sup> year of King Henry VI reign – “Wheat was sold at London for 3s. the bushell, mault at 13s. the quarter, and oates at 8d. the bushell, which caused men to eat beanes, peas, and barley, more than in an hundred years before: wherefore Stephen Browne, then maior [mayor], sent into Pruse (Prussia), and caused to be brought to London many ships laden with rye, which did much good; for bread-corne was so scarce in *England* that poor people made their breade of ferne rootes.”<sup>57</sup>

In 1438, there was a famine in *England*. The people of *England* obligated to make bread of fern roots.<sup>212</sup>

[In *England*], there were tempestuous winds and rains all summer; hence dearth.<sup>72</sup>

In *England* in 1438, there was a famine so great that bread was made from fern roots.<sup>90</sup>

In *England* from 1437 to 1438, wheat rose from its ordinary price of 4s. - 4s. 6d. per Quarter to 26s. 8d. Bread was made from fern roots. There was rain and tempest.<sup>57, 91</sup>

In 1438, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. During the period between 24 May and 21 June, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an and Yangchow.<sup>153</sup>

In 1438, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

**1439 A.D.** [In *England*] in 1439, there was a famine from rains and tempests. Bread was made from roots.<sup>72</sup>

In 1439, there was a great flood in Lincolnshire, *England*.<sup>212</sup>

In 1439 during the period between 12 June and 10 July, floods caused by heavy and protracted rains struck Hopei (now Hebei province) in northern *China* at Peiping. Houses were damaged by the floodwaters and many people drowned. The flooding at Peiping continued into the period between 10 July and 9 August.<sup>153</sup>

**1440 A.D.** In *England*, there was a scarcity and in *Scotland* a famine.<sup>57, 91</sup>

In *England* in 1440, there was a great scarcity.<sup>72</sup>

In *England*, there was a great scarcity and dearth of corn [grain]. People were forced to make bread of beans, peas, barley and fern roots, etc. In *Italy* the weather held a southerly constitution, with great soaking rains that prevailed for a long time. The earth became a marsh and fruits abounded, then depopulating epidemics set in.<sup>72</sup>

The year 1440 produced heavy rains in southern *France*.<sup>79</sup>

In 1440, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hsiang-shan. During the period 2-30 April, a severe drought engulfed Hopei (now Hebei province) in northern *China* at



Peiping. During the period between 23 November and 23 December, floods struck Chekiang province at Hangchow, Chia-hsing and Hu-chou.<sup>153</sup>

In 1440 during the spring, there was a great drought in Chihli province in *China*.<sup>165</sup>

In 1440 during the 7<sup>th</sup> moon, Suchau, Sungkiang and two adjacent fus [prefectures] in *China* visited by a violent wind, which tore up trees and damaged crops.<sup>166</sup>

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**1442 A.D.** The rivers in the south of *France* froze.<sup>62</sup>

In the year 1442, the king spent the winter in Montauban in southwestern *France*, which was so severe that all flows [rivers, streams] in that region were frozen. The troops held back in their quarters, because they could not move out in the severe weather. In Flanders [now *Belgium*], a lot of the trees and fruits of the earth were frozen.<sup>62</sup>

In the regions around Metz, *France* in 1442, there was great heat from April to June. [The next passage appears to read that it was so hot that several people worked the field without shirts, skirts or pants on.] A portion of the wine was sour in the runners. The harvest began in Dijon, *France* on 13 September.<sup>62</sup>

In *Sweden* there was a famine.<sup>57,91</sup>

In 1442, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing. During the period between 10 May and 7 June, a severe drought engulfed *China*. During the period between 8 July and 5 August, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping.<sup>153</sup>

In 1442 during the summer, there was a great drought in Chihli province in *China*.<sup>165</sup>

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**1443 A.D.** In *England*, due to a lightning storm; St. Paul's steeple caught fire from lightning, and the steeple of Waltham-cross was consumed.<sup>40,41,43</sup>

In *England* on 1 February 1443, Saint Paul's church was set on fire by thunder and lightning and a great tempest.<sup>72</sup>

The winter of 1443 was very harsh in *Germany*. The frost began with the Feast of Saints Simon and Jude (28 October) and lasted until the Feast of the Chair of St. Peter (22 February), and then it started back up again, and lasted until the Feast of St. George (April 23). In the past 60 years, no similar winter had been experienced because it was cold to the Feast of St. Urban (25 May).<sup>62</sup>

In 1443, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua. During the period between 31 March and 29 April, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow.<sup>153</sup>

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**1444 A.D.** In 1444, during a thunderstorm, St. Paul's Cathedral in London, *England* was struck by lightning and the steeple caught fire, on Candlemas Eve.<sup>212</sup>

In 1444 during the period between 17 April and 17 May, a drought engulfed *China*. Then during the period between 15 July and 13 August, floods struck Hopei (now Hebei province) in northern *China* at Peiping; Kiangsu (now Jiangsu province) on the east coast of *China*; and Anhwei (now Anhui province) in eastern *China*. As a result, the land tax was remitted. During the period between 14 August and 11

September, floods struck Kiangsu province at Soochow, Sung-chiang and T'ai-ts'ang; and Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hu-chou.<sup>153</sup>

In 1444 during the summer, there was a drought in *China*.<sup>165</sup>

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**1445 A.D.** In 1445, during a thunderstorm, the steeple of St. Mary Redcliff in Bristol [in southwestern *England*] was thrown down, and the rest of the church was significantly damaged at St. Paul's Tide.<sup>212</sup>

Bread was dear in Novgorod [*Russia*], and not only this year but during ten whole years: one poltina [half a rouble] for two korobyas [baskets]; sometimes a little more, sometimes less; sometimes there was none to be bought anywhere. And amongst the Christians there was great grief and distress; only crying and sobbing were to be heard in the streets and market place, and many people fell down dead from hunger, children before their parents, fathers and mothers before their children; and many dispersed, some to Lithuania, others passed over to Latinism [Roman Rite], and others to the Besermeny [Muslims] and to the Jews, giving themselves to the traders for bread. [The cause of this famine may have been related more to war than to poor weather.]<sup>76</sup>

In 1445 during the period between 6 June and 4 July, floods struck Fukien (now Fujian province) on the southeast coast of *China*. During the period 2-30 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning.<sup>153</sup>

In 1445 during the 7<sup>th</sup> moon on the 17<sup>th</sup> day, a typhoon struck in the vicinity of Shanghai, *China*. Great wind, which tore up trees and leveled houses; rain for a day and night incessant. Lake and sea overflowed. Several places were covered several feet with water; innumerable dwellings floated away.<sup>166</sup>

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**Winter of 1445 / 1446 A.D.** In 1445 during the 12<sup>th</sup> moon, snow fell seven days and nights in the vicinity of Shanghai, *China*. It was 12 feet deep; people were obliged to remain in their houses until streets were cut out of the snow.<sup>166</sup>

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**1446 A.D.** [This passage was out of order in the source chronology, and I suspect the actual year was 1446.] In 1466 there was a great pestilence in *Ireland*, super induced by a famine.<sup>212</sup>

In the Novgorod Republic [now part of *Russia*] on January 3, there were heavy clouds with rain and the wheat and rye and corn [the autumn-sown crops] were beaten down altogether, both in the fields, and in the forests, all round the town for five versts [a verst is two-thirds of a mile, or 1,067 metres] from the Volkhovets [river], and as far as the Msta river, for fifteen versts. The people bore into the town whatever they could gather up; and the townspeople collected to see this curious marvel, whence and how it came. [This account might refer to a tornado.]<sup>76</sup>

In 1446, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Huang-mei. During the period between 26 May and 23 June, a drought engulfed Hopei province at Peiping. Also during the period between 26 May and 23 June, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing.<sup>153</sup>

In 1446 during the summer, there was a drought in Chihli and Hupeh provinces in *China*. In Hupeh, this was a great drought.<sup>165</sup>

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**1447 A.D.** In *Ireland*, there was a great famine in the spring.<sup>57, 91</sup>

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In 1447, the summer [in *England*] was very hot.<sup>212</sup>

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**1448 A.D.** In 1448 during the period between 31 July and 28 August, floods struck Honan (now Henan province) in central *China* at Jung-yang, Kaifeng and Ch'ên-liu; Anhwei (now Anhui province) in eastern *China* at Mêng-ch'êng; and Shantung (now Shandong province) on the east coast of *China* at Ts'ao, P'u and Yang-ku.<sup>153</sup>

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**1449 A.D.** In 1449, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hsin-ch'ang.<sup>153</sup>

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**Winter of 1449 / 1450 A.D.** The winter of 1449-50 in *France* was very cold, very wet and very snowy. The winter began as early as October. The olive trees died.<sup>79</sup>

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**1450 A.D.** In 1450 during the period between 11 May and 9 June, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.<sup>153</sup>

In 1450 during the summer, there was a drought in *China*.<sup>165</sup>

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**1451 A.D.** In 1451 during the period between 5 February and 8 November a severe drought engulfed *China*.<sup>153</sup>

In 1451 during the spring and summer, there was a great drought in Fuhkien province in *China*.<sup>165</sup>

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**1452 A.D.** In 1452 during the period between 13 October and 10 November, floods struck Kiangsu (now Jiangsu province) on the east coast of *China*; Anhwei (now Anhui province) in eastern *China*; and Shantung (now Shandong province) on the east coast of *China* at Chi-ning and Liao-ch'êng. Crops and houses were damaged by the floodwaters. During the period between 11 November and 10 December, a drought engulfed Anhwei province at Fêng-yang and An-ch'ing; Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow; and Hupeh (now Hubei province) in central *China* at Wuchang.<sup>153</sup>

In 1452 during the autumn, there was a drought in Anhwei, Chêhkiang, Hunan and Hupeh provinces in *China*.<sup>165</sup>

In 1452 during the 6<sup>th</sup> moon in the vicinity of Shanghai, *China*, a dragon was seen at the Tsau stream taking up water, lifted a boat, and transported it to the middle of a field; rain fell to the depth of several feet, soaking plants to death. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

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**1453 A.D.** In 1453 during the period between 5 August and 2 September, floods struck Honan (now Henan province) in central *China* at Loyang and Anhwei (now Anhui province) in eastern *China* at Fêng-yang. As a result, the land tax was remitted. During the period between 3 September and 1 October, floods struck Honan province at Kaifeng.<sup>153</sup>

In 1453, a severe drought engulfed Yunnan province in southwest *China* at K'un-ming and Yao-an. The drought produced a famine. During the period between 5 August and 2 September, a drought engulfed *China*.<sup>153</sup>

In 1453 during the autumn, there was a great drought and mortality in Yünnan province in *China*.<sup>165</sup>

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**1454 A.D.** As a result of the severe famine in *Mexico* during 1452-54, the Aztec king Moctezuma ordered his people to leave the city and search for food. Many parents sold their children in Totonacapan [currently Veracruz, *Mexico*] where grain was abundant. Girls fetched 400 ears of maize while boys fetched 500 ears each.<sup>86</sup> [Parents were able to buy back their child's freedom when situations improved.]

In 1454, Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou experienced flooding. [The resulting famine was so severe that] cannibalism was practiced.<sup>153</sup>

In 1454 during the 7<sup>th</sup> moon, there were floods in the vicinity of Shanghai, *China* and six neighboring fus [prefectures].<sup>166</sup>

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**1455 A.D.** In 1455, floods struck Kiangsi (now Jiangxi province) in southern *China* at Yü-lin. During the period between 16 May and 14 June, a drought engulfed *China*.<sup>153</sup>

In 1455 during the summer, there was a drought in *China*.<sup>165</sup>

In 1455 during the 7<sup>th</sup> moon, there were floods in Shanghai and Suchau fus in *China*.<sup>166</sup>

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**1456 A.D.** During the summer of 1456 in southern *France*, humidity and heat competed.<sup>79</sup>

The year 1456 produced heavy rains in southern *France*.<sup>79</sup>

In 1456, several regions of *China* were affected by flooding including:<sup>153</sup>

— During the period between 5 April and 4 May, floods struck Shantung (now Shandong province) on the east coast of *China* at Po-p'ing and Shih-p'ing. Many people drowned. Also during this time, floods struck Shantung province at Ch'ing-ch'êng and Tê-p'ing.

— During the period between 3 June and 2 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Yü-hang and Hsiao-shan.

— During the period 3-31 July, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow and Honan (now Henan province) in central *China* at Loyang and Kaifeng.

In 1456, a severe drought engulfed Hunan province in south-central *China* at An-hsiang. During the period 3-31 July, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an and Yangchow; and Anhwei (now Anhui province) in eastern *China* at Fêng-yang. During the period between 29 October and 27 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow.<sup>153</sup>

In 1456 during the summer and autumn, there was a great drought in Anhwei, Kiangsu, Chêhkiang and Hunan provinces in *China*.<sup>165</sup>

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**1457 A.D.** In 1457, Shantung (now Shandong province) on the east coast of *China* at Tsinan and Tê-p'ing experienced flooding. The resulting famine was so severe that cannibalism was practiced.<sup>153</sup>

In 1457, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow and Chia-hsing.<sup>153</sup>

In 1457, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

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**Winter of 1457 / 1458 A.D.** The winter of 1457-58 in Paris, *France* was very severe. In the year 1457, the winter was severe and long lasting from the Feast of St. Martins (11 November) to 18 February. It froze so hard that you could travel on the Oise River and several other rivers on horseback and wagon. Lastly came heavy snowfalls, which came down in such massive quantities that when it thawed, it developed into such a flood as had not been seen in living memory, and caused much damage. In *Germany*, the extreme cold froze the Danube River to a thickness that an army of 40,000 men were able to encamped on the ice.<sup>62</sup>

In 1458, the Danube River froze from shore to shore; an army of 40,000 men struck their camp on the ice.<sup>62</sup>

The winter of 1458 was so severe that an army of forty thousand men camped on the Danube River.<sup>79</sup>

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**1458 A.D.** In 1458, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Hupeh (now Hubei province) in central *China* at Hanyang and Han-ch'uan. During the same year a drought engulfed Hunan province in south-central *China* at Li-ling producing a famine. During the period between 7 October and 5 November, a severe drought engulfed Hunan province at Tz'ü-li.<sup>153</sup>

In 1458 during the summer and autumn, there was a great drought in Chêhkiang, Hunan and Hupeh provinces in *China*. As a result, the rivers dried up. The resulting famine was so severe that it led to cannibalism in Hu-kwang [Hukwang - the rice bowl of China comprising the provinces of Hunan and Hupeh].<sup>165</sup>

In 1458 during the period between 9 August and 7 September, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan. As a result, the land tax was remitted.<sup>153</sup>

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**1459 A.D.** In 1459, Chekiang (now Zhejiang province) on the east coast of *China* at Hai-yen experienced flooding. Around 10,000 persons drowned.<sup>153</sup>

In 1459, a severe drought engulfed Hunan province in south-central *China* at Yüeh-yang and Ch'ang-tê. During the period between 25 November and 24 December, a drought engulfed Hunan and Hupeh provinces leading to a famine.<sup>153</sup>

In 1459, there was a great drought in Hunan province in *China*.<sup>165</sup>

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**Winter of 1459 / 1460 A.D.** The winter of 1459 was intensely cold and similar to the winter of 1323 A.D.<sup>1</sup>

In 1459, the ice bore riding on from Lübeck, *Germany* to *Prussia*, and the *Baltic Sea* was covered with ice from *Mecklenburgh* to *Denmark*.<sup>2, 41, 42, 43</sup>

In 1459, the *Baltic Sea* was frozen. The ice was thick enough that individuals could cross between *Denmark* to Lübeck, *Germany*.<sup>28</sup>

In 1460, the *Baltic Sea* was frozen, and horse passengers crossed from *Denmark* to *Sweden*.<sup>90</sup>

In 1459, one could travel between Lübeck, *Germany* and *Prussia* on the ice.<sup>30</sup>

In *Northern Europe* in 1459, the *Baltic Sea* frozen from *Mecklenburgh* to *Denmark*.<sup>47, 93</sup>

In 1460, the Danube and the Rhine Rivers froze.<sup>38</sup>

In 1460, the Rhône River in *France* froze.<sup>58, 80</sup>

The winter of 1460 froze the Rhône River in southern *France*.<sup>79</sup>

In 1460 the Rhône River in *France* and the Danube River remained frozen for several months.<sup>61</sup>

In 1460, the Danube River is frozen for 2 months. The Rhône River in *France* also freezes.<sup>60</sup>

In 1460 the Danube River is frozen for 2 months, the Rhône River in *France* also freezes solid. Travelers on foot and horseback cross without difficulty between *Denmark* and *Sweden*.<sup>62</sup>

In 1460, the *Baltic Sea* again froze over so as to permit travel on the ice. In *Germany* deer sought the towns for refuge from wolves. Packs of wolves came into the cities and attacked the people on the streets.<sup>63</sup>

During the winter of 1459-60, both in *Northern [Europe]* and in the *Provence* the winter was very cold. The Seine River in Paris, *France* came out of its banks and caused great devastation. The vineyards in *Germany* suffered a lot.<sup>62</sup>

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**1460 A.D.** In *England*, there was excessive rain during the summer. As a result, neither grass, corn [grain], nor fruit came to maturity or were fit to use. There were also greater inundations than had been for a hundred years before, which rapidly carried down mills and buildings, destroyed meadows and pastures, and made great destruction.<sup>72</sup>

In 1460 during the period between 21 April and 19 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hsiao-shan. During the period between 16 August and 14 September, floods struck in Chekiang province at Hu-chou where the fields were damaged; in Kiangsu (now Jiangsu province) on the east coast of *China*; in Anhwei (now Anhui province) in eastern *China*; and in Kiangsi (now Jiangxi province) in southern *China*.<sup>153</sup>

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**1461 A.D.** In 1461, several regions of *China* experienced flooding including:

— Hupeh (now Hubei province) in central *China* at Sui and Huang-p'o.

— During the period between 8 June and 7 July, floods struck in Kiangsu (now Jiangsu province) on the east coast of *China*; in Anhwei (now Anhui province) in eastern *China*; and in Kiangsi (now Jiangxi province) in southern *China*.

— During the period between 6 August and 3 September, floods struck Honan (now Henan province) in central *China* at Kaifeng. Houses were damaged by the floodwaters and many people drowned. During this time, floods also struck Kiangsu and Anhwei provinces. Houses were damaged by the floodwaters. Fukien (now Fujian province) on the southeast coast of *China* at Fu-an also experienced flooding.

— During the period between 4 October and 1 November, floods struck Kiangsu province at Soochow. Around 10,000 persons drowned.

In 1461, a severe drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsing-ning.<sup>153</sup>

In 1461, there was a great drought in Hunan province in *China*.<sup>165</sup>

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**1464 A.D.** The winter of 1464 was very severe in the north [*Northern Europe*]. In Flanders [now *Belgium*] since 1408 no one had experienced a similar winter since the year 1408. It was cold from 10 December until 15 February without ceasing. One could travel across the frozen Schelde (Scheldt) River for a whole month.<sup>62</sup>

In 1464, floods struck Shansi (now Shanxi province) in northern *China* at Ching-yüeh. Dikes and fields were damaged.<sup>153</sup>

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**1465 A.D.** In 1465, flooding affected many regions of *China* including:<sup>153</sup>



— Hunan province in south-central *China* at Ching.  
 — Hopei (now Hebei province) in northern *China* at Peiping.  
 — Kiangsu (now Jiangsu province) on the east coast of *China*.  
 — Anhwei (now Anhui province) in eastern *China*.  
 — Honan (now Henan province) in central *China* at Loyang.  
 — Shansi (now Shanxi province) in northern *China* at Taiyuan.  
 — Hupeh (now Hubei province) in central *China* at Wuchang.  
 — Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang.  
 — Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow.  
 — During the period between 27 January and 24 February, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hui-yang.  
 — During the period between 22 July and 21 August, floods struck Kwangtung province at Tê-ch'ing.  
 — During the period between 19 November and 17 December, floods struck Hopei province at Pao-ting and Lu-lung. As a result, the land tax was remitted.

In 1465 during the period between 27 March and 24 April, a drought engulfed Shensi (now Shaanxi province) in central *China* at Sian and Fu-shih.<sup>153</sup>

In 1465 during the spring, there was a drought in Shensi province in *China*. The land tax was remitted.<sup>165</sup>

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**1466 A.D.** The excessive heat of summer of 1466 [in *France*] caused many infectious diseases. The harvest began in Dijon, *France* on 27 September. The price of grain doubled this year. The heat was oppressive in the area of Metz, *France*. But the wine was better than we had produced for thirty years.<sup>62</sup>

Large storms, thunderstorms with lightning, thunder, rain and wind, ruled in 1466 in various locations of *France*, especially in Soissons, where the [grape] vines were damaged.<sup>79</sup> [Soissons is located in the Picardy region of northern *France*.]

In 1466 during the period between 15 February and 15 March, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* and Anhwei (now Anhui province) in eastern *China*. Then during the period between 14 June and 12 July, a severe drought engulfed Kansu (now Gansu province) in northwest *China* at Lin-hsia. [This entry appear to be a typographical error. I suspect the real time interval is 14 June and 12 July.] During the period between 11 August and 9 September, floods struck Hopei (now Hebei province) in northern *China* at Peiping and Pao-ting; Honan (now Henan province) in central *China* at Kaifeng; and Shantung (now Shandong province) on the east coast of *China* at I-tu.<sup>153</sup>

In 1466 during the spring and summer, there was a great drought in Kiangsu and Shensi provinces in *China*. The resulting famine was so severe that it led to cannibalism.<sup>165</sup>

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**1467 A.D.** In 1467, there was a great flood that overflowed the entire district of Holland in Lincolnshire, *England*.<sup>212</sup>

In 1467, Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing experienced flooding. Around 10,000 persons drowned.<sup>153</sup>

In 1467 during the period between 6 May and 8 August, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang and Hsin-chien.<sup>153</sup>

In 1467 during the spring, there was a drought in Kiangsi province in *China*.<sup>165</sup>

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**Winter of 1468 / 1469 A.D.** In 1468, due to the extreme cold, the wine in *France* was reduced to ice, and had to be cut with an axe.<sup>38</sup>

In *France*, the wines of the Duke of Burgundy froze in the casks, in 1468. We distributed them piecemeal to the gentlemen. Many people died of exposure to the cold. Their extremities [hands, feet, etc.] were frozen.<sup>79</sup>

In 1468 in Flanders [now *Belgium*], the frost was very severe; wine cut with hatchets.<sup>47, 90, 93</sup>

In 1468, it took the axe to break apart the [frozen] wine being distributed to troops in *Flanders*.<sup>79</sup>

In 1468, in *Flanders*, rations of frozen wine were cut and distributed to soldiers with a broken axe.<sup>58, 60, 80</sup>

The winter of 1468-69 is described by Philippe de Commines when he traveled to the land of Franchemont (near Liège, *Belgium*). The largest cooling occurred between 14 and 17 November. Because of the great frost and intense cold most of the staff of the Duke (of Burgundy) had to walk to Franchemont. I saw some incredible effects of the cold. I found a gentleman whose foot was frozen, which he later could not move when it thawed. A page who had two fingers of his hand frozen. I saw a woman with her newborn child frozen to death. Three times I saw the wine, which they gave the Duke and his people broken with ax blows because the wine was frozen in the cask. This frozen wine was distributed to the people in a hat or basket. Hunger had us in great haste flee, after we spent eight days there. The severity of the cold stretched up to *Provence*, where the [grape] vines suffered greatly.<sup>62</sup>

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**1468 A.D.** In 1468, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow and Hupeh (now Hubei province) in central *China* at An-lu.<sup>153</sup>

In 1468, a drought engulfed Hupeh (now Hubei province) in central *China* at Chung-hsiang. During the period 22 May and 19 June, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping and Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang and Hsin-chien. [A drought during the period between 6 May and 8 November occurred in Fukien (now Fujian province) on the southeast coast of *China*. The date for this entry (1468) was originally recorded as the twelfth year of the T'ien-shun period, but since T'ien-shun lasted only eight years and ended in 1464, there apparently is a mistake. Here, it is entered as if T'ien-shun did last twelve years.]<sup>153</sup>

[There is evidently a mistake in the record. The entry gives the year as 1468. They appeared as the 12<sup>th</sup> year of the reign of T'ien Shun. But, the reign of Ch'êng Hwa commenced in 1465. "In the year 1468 during the summer and autumn, there was a drought in Fuhkien province in *China*."] <sup>165</sup>

In 1468 during the summer, there was a drought in Chihli, Hupeh and Kiangsi provinces in *China*. In Chihli, this was a great drought.<sup>165</sup>

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**1469 A.D.** In March 1469, there was thunder and heavy rain in northern *France*.<sup>79</sup>

In 1469, floods struck Hunan province in south-central *China* at Yüan-ling and a severe drought engulfed Hunan province at Shih-mên. During the period between 9 July and 6 August, floods struck Honan (now Henan province) in central *China* at Kaifeng.<sup>153</sup>

In 1469, there was a great drought in Hunan province in *China*.<sup>165</sup>

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**1470 A.D.** In 1470, the plague was fearful in Dublin, *Ireland*.<sup>212</sup>

In 1470, flooding affected many regions of *China* including: <sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing. Crops were damaged by the floodwater. Floods occurred in Taichow causing a famine. Floods also struck Yü-hang.

— Hupeh (now Hubei province) in central *China* at Hanyang.

— During the period 1-29 May, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Li-shui, Li-yang, Chü-jung, Lu-ho and Chiang-p'u; and Anhwei (now Anhui province) in eastern *China* at Tang-t'u and Wuhu. As a result, the land tax was remitted.

— During the period between 6 May and 8 August, floods struck Hopei (now Hebei province) in northern *China* at Peiping, Ho-chien, and Lu-lung.

— During the period between 28 July and 25 August, floods struck Kiangsu province at Nan-t'ung [uncertain name]. Houses were damaged by the floodwaters and 2,660 families were flooded.

— During the period between 25 September and 23 October, floods caused by a typhoon struck Chekiang province at Yü-yao. Over 700 people drowned.

— During the period between 24 October and 22 November, floods struck Hopei province at Pao-ting. As a result, the land tax was remitted.

In 1470 during the period between 6 May and 8 August, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Ying-shan. During the period between 26 August and 24 September, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tsinan, Liao-ch'êng, Tzū-yang, I-tu, P'êng-lai, and Yeh. During the period between 24 October and 22 November, a drought engulfed Honan (now Henan province) in central *China* at Loyang. <sup>153</sup>

In 1470 during the summer and autumn, there was a drought in Honan, Hupeh and Shantung provinces in *China*. In Hupeh, this was a great drought. As a result, the land tax was remitted. <sup>165</sup>

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**1471 A.D.** In 1471, the army of Veliki Knyaz Ioan Vasilievich [Ivan III, also called Ivan the Great] of *Russia* marched against the army of Novgorod and defeated them. [In general Novgorod was sheltered from attack by mounted troops because of its lakes and swamps. They dwelt in security during the summer because of the inundations of the land.] The year 1471 was abnormally dry. Not a drop of rain had fallen during the summer, from the month of May to the month of September, the land was dry and the heat of the sun had dried up all the swamps. The troops of the Veliki Knyaz found no impediments and could ride in every direction over the country, driving the cattle over dried ground. <sup>76</sup>

[After the defeat], a large number of people proceeded to Russa [Staraya Russa, *Russia*] in big vessels, and to the Volkhov River with their wives and children and possessions; their cattle and with their movable houses, going to the places of their residence by the Ilmen lake, or by way of the Russa lake, the breadth from shore to shore on all sides being sixty poprishche [about 40 miles]. When their numerous big vessels reached the middle of the lake, a storm with a hurricane of wind broke suddenly upon them, and tore their sails; there was terrible thunder and heavy rain with hail, and waves of mountain height, and dreadful, broke up their barges and all their big vessels in the middle of that frightful lake. There was in that hour an overwhelming terror and a raging storm, with shrieking and crying, many people clinging to each other, bitterly bewailing their peril, and in their agony tearing their clothes; mothers embracing their infants, fathers their sons, while shedding many tears and praying: "Lord save us, in the hour of our destruction and of our separation from the evils of this world." Sadness and woe to those who take to evil! This was not within sight of their friends, and they got no help from them; unless it came from on high, because of the straits of the great city and the angry spirit pervading it; the while that the big vessels were being shattered and wrecked, and all the men and women with their children were perishing in the deep waters separating from each other and tumbling about at the will of the waves which left nothing living in the waters, but all drowned and put to death. It was heard afterwards that the number of drowned in the lake was 7,000. <sup>76</sup>

In May 1471 in *Ireland*, there was a great shower of hailstones, with thunder and lightning.<sup>93</sup>

On November 30, the Rhône River in *France* flooded. It destroyed two arches of the bridge Pont d'Avignon (Pont Saint-Bénézet) and part of the city walls in Limas in southeastern *France*.<sup>61</sup>

In 1471, there was an awful pestilence in Oxford, *England*.<sup>212</sup>

In *England*, the winter was rigorous and weather stormy.<sup>72</sup>

In the northeast coast of *India*, there was a famine in Orissa.<sup>57</sup>

In 1471 A.D., there was a famine in Orissa [now Odisha on the east coast of *India*].<sup>179</sup>

In 1471 there was a famine in *India*.<sup>156</sup>

In 1471, flooding affected several regions of *China* including:<sup>153</sup>

— During the period between 20 February and 21 March, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Fu-an, Lien-chiang and Lung-yen; Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang, Wu-chin and Chinkiang. As a result, the land tax was remitted.

— During the period between 12 December 1471 and 9 January 1472, floods struck Anhwei (now Anhui province) in eastern *China* at Fêng-yang, Szū, T'ien-ch'ang, Hsü-i and Su; and Kiangsu province at Suchow, Hsiao, P'ei, Tang-shan and Fêng. As a result, the summer land tax was remitted. [P'ei is located at longitude 117.00° East and latitude 34.47° North.]

In 1471, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow. During the period between 20 February and 21 March, a drought engulfed *China*.<sup>153</sup>

In 1471 during the spring, there was a drought in Kiangsu province in *China*. As a result, the Grand Canal dried up.<sup>165</sup>

#### **1472 A.D. – 1475 A.D. Hungary, England and France. Drought**

In 1473, there was a most droughty summer and so hot that woods took fire. All rivers dried up. The Danube River could be walked over in *Hungary*. This drought continued for 3 years.<sup>72</sup>

The summer of 1473 was very hot in *France*. The heat lasted from June until December 1. There was neither cold nor frost before Candlemas [2 February 1474].<sup>79</sup>

The heat and drought in the year 1473 was so intense that the forests caught fire. All the rivers were dry. In *Hungary* one could wade across the Danube River. This drought lasted three years. In Dijon, *France*, the harvest began on 29 August. The heat around Metz, *France*, that year was so strong that on 1 May cherries were sold, and on the Feast of Saint Peters [June 29] ripe grapes were sold. The harvest was over in August. Legumes could not be harvested due to the drought.<sup>62</sup>

In *England*, there was a great drought and heat during 1473-75 after the two comets of 1472.<sup>47, 72</sup>

**1472 A.D.** In 1472, the plague swept away many of the inhabitants of Kingston-upon-Hull [now frequently referred to as Hull], *England*.<sup>212</sup>

In 1472, flooding affected several regions of *China* including:<sup>153</sup>

— Yunnan province in southwest *China* at Yao-an.

— During the period between 5 August and 2 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow and Shao-hsing. The floods were caused by a typhoon and many people drowned. During the same time, floods caused by heavy and protracted rains struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton.

— During the period between 8 August and 8 November, floods struck Kiangsi (now Jiangxi province) in southern *China* at Kao-an.

— During the period between 3 September and 1 October, floods struck Shensi (now Shaanxi province) in central *China* along the Han River. The city walls and houses were damaged by the floodwaters.

In 1472, a drought engulfed Shansi (now Shanxi province) in northern *China* at Ch'in. During the period between 9 February and 9 March, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton. During the period between 7 June and 5 July, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping. During the period between 30 December 1472 and 27 January 1473, a drought engulfed Hopei province at Hsing-t'ai, Chêng-ting and Ho-chien.<sup>153</sup>

In 1472 during the summer, there was a drought in Chihli, Kwangtung and Shansi provinces in *China*. In Chihli, this was a great drought. The land tax was remitted.<sup>165</sup>

*Also refer to the section 1472 A.D. – 1475 A.D. for information on the drought in Hungary, England and France during that timeframe.*

**1473 A.D.** In 1473 [in *Germany*] the winter was cold. But there was a seasonable spring and a hot summer. There was abundant and excellent wine.<sup>172</sup>

In 1473 and 1474, the summers were very hot [in *England*]. The whole earth seemed on fire.<sup>212</sup>

In 1473, flooding affected several regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ü and Li-shui.

— During the period between 27 May and 24 June, floods struck Kweichow (now Guizhou province) in southwestern *China*.

— During the period between 25 June and 24 July, floods due to heavy and protracted rains struck Hopei (now Hebei province) in northern *China* at Kuang-p'ing, Hsing-t'ai, Ta-ming, Chêng-ting, Pao-ting, and Ch'in-yang.

In 1473, a severe drought engulfed Hunan province in south-central *China* at Ching and Hupeh (now Hubei province) in central *China* at Chiang-ling. Also during this year, a drought engulfed Shansi (now Shanxi province) in northern *China* at Chin-ch'êng.<sup>153</sup>

In 1473, there was a drought in Hupeh and Shansi provinces in *China*. In Hupeh, this was a great drought. The land tax was remitted.<sup>165</sup>

*Also refer to the section 1472 A.D. – 1475 A.D. for information on the drought in Hungary, England and France during that timeframe.*

**1474 A.D.** In 1473 and 1474, the summers were very hot [in *England*]. The whole earth seemed on fire.<sup>212</sup>

In 1474 during the period between 18 March and 15 April, floods struck Anhwei (now Anhui province) in eastern *China* at Shou, Ssü, Ho and Huo-ch'iu. As a result, the land tax was remitted. During the period

between 8 August and 8 November, floods struck Anhwei province at Fêng-yang. As a result, the land tax was remitted.<sup>153</sup>

In 1474 during the period between 18 March and 15 April, a drought engulfed the following regions:<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Wuchang, Hanyang and Huang-kang.
- Hunan province in south-central *China* at Ch'ang-tê, Yüan-ling, Hêng-yang, Ching, Chih-chiang, Changsha and Ch'a-ling.
- Kweichow (now Guizhou province) in southwestern *China* at Li-p'ing and Chin-p'ing.

In 1474 during the spring, there was a drought in Hunan and Hupeh provinces in *China*.<sup>165</sup>

In 1474 during the 7<sup>th</sup> moon on the 17<sup>th</sup> day, a typhoon struck in the vicinity of Shanghai, *China*. A great wind and rain which tore up trees; sea overflowed, and drowned 10,000 persons.<sup>166</sup>

*Also refer to the section 1472 A.D. – 1475 A.D. for information on the drought in Hungary, England and France during that timeframe.*

**1475 A.D.** The severe cold of 1475 destroyed the olive trees of Languedoc, *France*.<sup>79</sup>

In 1475, there was an inundation in *England*. The land near the mouth of the River Humber was swept away, and several villages were destroyed.<sup>212</sup>

In 1475, floods struck Shansi (now Shanxi province) in northern *China* at Chin-ch'êng. [During the period between 4 June and 2 July 1475, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam*. Crops were damaged by the floodwaters and this caused a famine. Also during this timeframe, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Chinkiang and Fukien (now Fujian province) on the southeast coast of *China* at Lung-ch'i, Nan-ching, Chang-p'u, and Ch'ang-t'ai. As a result, the autumn land tax was remitted. The date for this entry (1475) was originally recorded as the nineteenth year of the T'ien-shun period, but since T'ien-shun lasted only eight years, there evidently was a mistake. Here, it is entered as if T'ien-shun did last nineteen years.]<sup>153</sup>

*Also refer to the section 1472 A.D. – 1475 A.D. for information on the drought in Hungary, England and France during that timeframe.*

**1476 A.D.** The Istula (Vistula River in *Poland*) flooded.<sup>47, 72, 92</sup>

Locust and a great inundation of the Istula (Vistula River in *Poland*).<sup>72</sup>

The winter of 1476 became progressively more severe; the ground was covered with snow. The cold was so great on Christmas Eve, more than four hundred men of the army of Charles the Bold, in Nancy in northeastern *France* died or had their feet frozen. The Rhine River froze. The cold continued in January. The snow, which fell in large flakes, obscured the day making it almost impossible for seeing far ahead.<sup>79</sup>

In 1476 [in *Germany*], there was a normal snowfall. It began to snow on Christmas and continued daily until St. Dorothy's [February 6] and was fiercely cold and all the water and ponds froze until St. George's [April 23<sup>rd</sup>]. The fish died. Many people froze. At Breslau [now Wrocław, *Poland*], many good-hearted citizens had baths and other rooms heated and furnished wherein many poor people preserved their lives.<sup>172</sup>

In 1476, the plague raged again in Kingston-upon-Hull, *England*.<sup>212</sup>



In 1476, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China*. During the period between 19 August and 17 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Wu-i and Taichow.<sup>153</sup>

In 1476, there was a great drought in Fuhkien province in *China*.<sup>165</sup>

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**1477 A.D.** In *England*, there was a drought with great heat; caused the plague.<sup>47, 72</sup>

In 1477, *England* was plagued by excessive heat and very irregular weather. In *Italy*, the sun's glow was unusually large; the rivers were dry and there was a famine. But *France* was a different story. The summer was not so hot because they held the harvest at Dijon, *France* on 11 October. And in the countryside at Metz, *France*, it wasn't until the Feast of Saint Stephen [reference cites this date as August 2 but the Feast of Saint Stephen the Great is celebrated on August 16] that the grapes were crushed to make wine.<sup>62</sup>

In *England*, there was excessive heat and distemperature of the air; hence so fierce and quick a pestilence. During the last fifteen years cruel civil wars did not destroy a third of the people in *England*. This pestilence though it lasted only four months, carried off endless numbers.<sup>72</sup>

In 1477, flooding affected several regions of *China* including:<sup>153</sup>

— Shantung (now Shandong province) on the east coast of *China* at Yü-t'ai. Houses were damaged by the floodwaters.

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Shao-hsing. The floods were caused by heavy and protracted rains. Houses were damaged by the floodwaters.

— During the period between 10 July and 8 August, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam*.

— During the period between 9 August and 6 September, floods struck Hopei (now Hebei province) in northern *China* at Peiping.

— During the period between 7 September and 6 October, floods struck Shantung province at Tzū-yang; Kiangsu (now Jiangsu province) on the east coast of *China*; and Anhwei (now Anhui province) in eastern *China*.

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**1478 A.D.** In 1478, the plague again raged in Kingston-upon-Hull [now frequently referred to as Hull], *England*. The plague raged so violently that there died in this town in a very short space of time 1,580 persons. All the churches, monasteries, priories, hospitals, schools, etc., were shut up and forsaken, and the streets were so little frequented that grass grew up in most parts of the town between the seams of the stones. The merchants forsook the port.<sup>212</sup>

In 1478, there was a great plague in *England*, which destroyed more people than the wars waged during the prior 15 years.<sup>212</sup>

In 1478, flooding affected many regions of *China* including:<sup>153</sup>

— Hupeh (now Hubei province) in central *China* at Chiang-ling and Hsiang-yang. As a result, the summer and autumn land tax was remitted.

— Shantung (now Shandong province) on the east coast of *China* at Tê. As a result, the summer and autumn land tax was remitted.

— Honan (now Henan province) in central *China* at Kaifeng

— Chekiang (now Zhejiang province) on the east coast of *China* at Hsiang-shan and Hsin-ch'ang.

— During the period 1-29 June, floods struck Shensi (now Shaanxi province) in central *China* at Shang. Many people drowned.

— During the period between 8 August and 8 November, floods struck Hupeh province at Chia-yü.

— During the period between 28 August and 25 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China*. The city walls and houses were damaged by the floodwaters.  
 — During the period between 24 December 1478 and 22 January 1479, floods struck Hopei (now Hebei province) in northern *China* at Peiping. Crops were damaged by the floodwaters and the land tax was remitted.

In 1478 during the period between 6 May and 8 August, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Chia-yü, T'ung-shan and Hanyang. [During the period between 6 May and 8 August, a drought engulfed Fukien (now Fujian province) on the southeast coast of *China*. The date for this entry (1478) was originally recorded as the twenty-second year of the T'ien-shun period, but since T'ien-shun lasted only eight years, there evidently was a mistake. Here, it is entered as if T'ien-shun did last twenty-two years.]<sup>153</sup>

[There is evidently a mistake in the record. The entry gives the year as 1478. They appeared as the 22<sup>nd</sup> year of the reign of T'ien Shun. But, the reign of Ch'êng Hwa commenced in 1465. "In the year 1478 during the summer, there was a drought in Fuhkien province in *China*.]"<sup>165</sup>

In 1478 during the summer, there was a great drought in Hupeh province in *China*.<sup>165</sup>

**1479 A.D.** In St. Neots (Huntingdon in Cambridgeshire in eastern *England*), there was a hailstorm, "when the stones measured 18 inches round."<sup>41, 43, 57</sup>

In *England* in 1479, there were hailstorm in Huntingdonshire; stones 14 inches round.<sup>93</sup>

In 1479, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Sung-yang. During the same year, a severe drought engulfed Chekiang province at Chin-yün. During the period between 8 May and 8 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Chia-yü.<sup>153</sup>

In 1479 during the summer, there was a great drought in Chêhkiang and Hupeh provinces in *China*.<sup>165</sup>

**1480 A.D.** The Seine River in *France* was frozen and the ice carried [the weight of] carts.<sup>62</sup>

The winter of 1480 in *France* did not begin until the day after Christmas. Then it froze very hard until 8 February. The cold was so great that the rivers froze and carts crossed the Seine, the Marne, the Yonne rivers and all their tributaries. The cold continued after the thaw of February 8 until well into the month of May. The roots of trees were killed in several places.<sup>79</sup>

The winter of 1480 was severe and due to a large flood in Paris, *France* noteworthy.<sup>62</sup>

In 1480, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Kao-yao.<sup>153</sup>

**1481 A.D.** In 1481 during the period between 29 May and 26 June, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Tsêng-ch'êng. During the period between 27 June and 26 July, floods struck Shansi (now Shanxi province) in northern *China* at Hsiao-i. Houses were damaged by the floodwaters. During the period between 8 August and 8 November, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Hu-chou. This flood caused a famine.<sup>153</sup>

**1482 A.D.** This was recorded as one of the coldest winters in Holland [now *the Netherlands*].<sup>62</sup>

In *France* in 1482 the summer weather was ideal. On 17 March strawberries were sold in the market in city of Metz, and grapes were sold outside the cathedral on 24 June. At Dijon, the [grape] harvest began on 16 September.<sup>62</sup>

In 1482, flooding affected many regions of *China* including:<sup>153</sup>

— Shansi (now Shanxi province) in northern *China* at Kao-p'ing.

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Yü-yao.

— Hunan province in south-central *China* at Hêng-yang and Shao-yang.

— Fukien (now Fujian province) on the southeast coast of *China* at Lien-chiang. Houses and granaries were damaged by the floodwaters and innumerable people and cattle drowned.

— During the period between 5 February and 6 May, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Yang-shuo. The city walls and houses were damaged by the floodwaters.

— During the period between 16 June and 15 July, floods struck Honan (now Henan province) in central *China* at Loyang and Hopei (now Hebei province) in northern *China* at Peiping.

— During the period between 16 July and 13 August, floods struck Hunan province at I-yang and Li-ling. Houses were damaged by the floodwaters.

— During the period between 14 August and 12 September, floods struck Shansi province at Chung-yang.

**1483 A.D.** There happened such a flood in Gloucestershire, *England* that all the country was overflowed by the River Severn; several persons were drowned in their beds.<sup>39</sup>

In October 1483, there was a great flood in *England*. The River Severn overflowed for 10 days, and carried away men, women, and children in their beds; and covered the tops of many mountains. The waters settled on the lands, and the event was called the “Great Waters” for a hundred years thereafter.<sup>212</sup>

In 1483, an epidemic first appeared in *England* called the “sweating sickness”. This disease was particularly violent and in 24 hours the fate of the sufferer was decided for life or death. It chiefly attacked males, in the prime of life, and more especially the higher classes.<sup>212</sup>

In 1483, the River Severn in *England* overflowed during ten days, and carried away men, women, and children, in their beds, and covered the tops of many hills; the waters settled upon the lands, and were called “the Great Waters” for 100 years after. This event occurred during the first year of King Richard III's reign.<sup>47, 90, 92</sup>

[Another account places this event in 1485] In 1485 in *England*, for a long time there were continual rains and great moisture, swelled rivers. Especially the River Severn, which was so high for 14 days that it overflowed the whole country. It drowned many people in their beds, overturned houses, carried about children swimming in their cradles, drowned beasts grazing on the hills.<sup>72</sup>

On 7 June 1483, a great storm struck Paris, *France*.<sup>79</sup>

In *France* in 1483, the summer weather was ideal because grapes were sold in the market on 13 June.<sup>62</sup>

In 1483, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Sui-ch'ang, Hsüan-p'ing and Ching-ning. During the period between 5 June and 4 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Chung-shan.<sup>153</sup>

In 1483 during the period between 5 July and 2 August, a severe drought engulfed Yunnan province in southwest *China* at Wu-ting. During the same time a drought struck Shantung (now Shandong province) on the east coast of *China* at Kuan. This led to a famine. Also during this same time, other areas of *China* experienced a drought.<sup>153</sup>

In 1483 during the summer, there was a great drought in Shantung and Yunnan provinces in *China*. The resulting famine was so severe that it led to cannibalism in Shantung.<sup>165</sup>

In 1483 during the 11<sup>th</sup> moon, at the winter solstice, there was great thunder and lightning and snow in the vicinity of Shanghai, *China*. [An early account of thunder-snow] The following year [1484], there was a famine.<sup>166</sup>

**1484 A.D.** In *France* in 1484, the summer and fall weather was ideal. In the countryside around Metz, *France* the great heat after the grape harvest drove new shoots on the vines. And as a result a second grape harvest took place on 8 October. In this region, the grapes produced two harvests in one year.<sup>62</sup>

In 1484, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Chung-hsiang. During the period between 25 May and 22 June, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping; Shensi (now Shaanxi province) in central *China* at Sian; Honan (now Henan province) in central *China* at Loyang; Shantung (now Shandong province) on the east coast of *China* at Tsinan; and Shansi (now Shanxi province) in northern *China* at Taiyuan.<sup>153</sup>

In 1484 during the summer and autumn, there was a great drought in Chihli, Honan, Hupeh, Shansi, Shantung and Shensi provinces in *China*. The resulting famine was so severe that it led to cannibalism in Shansi.<sup>165</sup>

**1485 A.D.** In 1485, the disease “sweating sickness” returned to *England*. Many thousands of people died. In London, in one week, 2 mayors and 6 aldermen died.<sup>212</sup>

In 1485, flooding affected several regions of *China* including:<sup>153</sup>

— Kiangsi (now Jiangxi province) in southern *China* at Nan-ch’ang. Houses were damaged by the floodwaters. People and cattle drowned.

— Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts’ang-wu.

— During the period between 5 February and 6 May, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ho-yüan.

— During the period between 14 May and 11 June, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Foochow, Ku-t’ien, Min-ch’ing, Lien-chiang, Lo-yüan, and Yung-t’ai. Many people drowned.

— During the period between 12 June and 11 July, floods struck Kwangtung province at Kao-yao.

In 1485, a severe drought engulfed Shensi (now Shaanxi province) in central *China*. During the period between 5 February and 6 May, a drought engulfed Hupeh (now Hubei province) in central *China* at Chün. During the period between 12 July and 9 August, a drought engulfed Shansi (now Shanxi province) in northern *China* at Taiyuan. The drought caused a famine that was so severe that cannibalism was practiced. During the period between 8 August and 8 November, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Hsin.<sup>153</sup>

In 1485 during the spring, summer and autumn, there was a great drought in Hupeh, Kiangsu, Shantung and Shensi provinces in *China*. The resulting famine was so severe that it led to cannibalism in Shantung and Shansi.<sup>165</sup>

**1486 A.D.** In *England*, there was a sore famine.<sup>57, 72, 91</sup>

In 1486, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Fêng-hua and Chien-tê.<sup>153</sup>

In 1486, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Ch'ang-chih and Chekiang (now Zhejiang province) on the east coast of *China* at Taichow and Fêng-hua. During the same year, a drought engulfed Shensi (now Shaanxi province) in central *China* at Sian, which resulted in a famine. During the period between 6 January and 4 February, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin. During the period between 5 February and 8 November, a drought engulfed Fukien (now Fujian province) on the southeast coast of *China*. During the period between 26 December 1486 and 24 January 1487, a drought struck *China*.<sup>153</sup>

In 1486 during the spring, summer and autumn, there was a great drought in Chêhkiang, Fuhkien, Shansi, and Shensi provinces in *China*. The resulting famine was so severe that it led to cannibalism in Shansi.<sup>165</sup>

**1487 A.D.** In 1487 during the period between 23 May and 20 June, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Chiang-yüeh. During the period between 20 July and 18 August, floods struck Hunan province in south-central *China* at Ching. The city walls and army camp was damaged by the floodwaters. During the period between 8 August and 8 November, floods struck Hopei (now Hebei province) in northern *China* at Pao-ting. Crops were damaged by the floodwaters.<sup>153</sup>

In 1487 a severe drought engulfed several regions of *China* including:<sup>153</sup>  
 — Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Chu-chi.  
 — Hupeh (now Hubei province) in central *China* at Wuchang.  
 — Hunan province in south-central *China* at Ch'i-yang and Ch'ang-tê.  
 — During the period between 5 February and 8 November, a severe drought engulfed *China*.  
 — During the period between 23 May and 20 June, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping.

In 1487 during the spring and summer, there was a great drought in Chihli, Fuhkien, Hunan and Hupeh provinces in *China*. The resulting famine was so severe that it led to cannibalism in Hupeh.<sup>165</sup>

In 1487 during the 7<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a storm of great wind and rain.<sup>166</sup>

**1488 A.D.** In [*England*] in 1488, there was a great snowfall and frost.<sup>72</sup>

In 1488, a severe drought engulfed several regions of *China* including:<sup>153</sup>  
 — Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua.  
 — Hupeh (now Hubei province) in central *China* at Chiang-ling.  
 — Hunan province in south-central *China* at Tz'ü-li, Hua-jung and An-hsiang.

In 1488, a drought engulfed several regions of *China* including:

— Hunan province at Yüan-ling and Ch'ang-tê.  
 — Hupeh province at Wuchang, Hanyang, Huang-p'o and An-lu.

During the period between 6 May 1488 and 5 February 1489, a severe drought engulfed Shensi (now Shaanxi province) in central *China* at Liao-yang.

In 1488 during the summer, there was a great drought in Chêhkiang, Hupeh and Shensi provinces in *China*. The resulting famine was so severe that it led to cannibalism.<sup>165</sup>

In 1488, floods due to heavy and protracted rains struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow.<sup>153</sup>

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**1489 A.D.** In 1489 during the period between 30 May and 28 June, floods struck Honan (now Henan province) in central *China* at Kaifeng and Shantung (now Shandong province) on the east coast of *China* at Ts'ao. Then during the period between 29 June and 27 July, floods due to heavy and protracted rains struck Hopei (now Hebei province) in northern *China* at Peiping and T'ung. Houses were damaged by the floodwaters. People and cattle drowned.<sup>153</sup>

In 1489, a severe drought engulfed Szechwan (now Sichuan province) in southwest *China* at Mien-chu. During the period between 6 May and 8 August, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Mien-yang.<sup>153</sup>

In 1489 during the summer, there was a great drought in Hupeh and Sze-ch'wan provinces in *China*.<sup>165</sup>

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**1490 A.D.** In 1490 during the period 20 April and 18 May, floods struck several regions. Crops were damaged by the floodwaters. Many people drowned. The regions affected were:<sup>153</sup>

— Honan (now Henan province) in central *China* at Yüan-wu, Fêng-ch'iu, Kaifeng, Chung-mou, Yü-shih, Lan-fêng, K'ao-ch'êng, and Shang-ch'iu.

— Hopei (now Hebei province) in northern *China* at Ch'ang-yüan.

— Shantung (now Shandong province) on the east coast of *China* at Ts'ao, P'u and Tung-a.

— Anhwei (now Anhui province) in eastern *China* at Su.

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**Winter of 1490 / 1491 A.D.** A cold winter struck Florence, *Italy* on 10 January. The River Amo froze. Then on 17 January freezing rain broke trees.<sup>28</sup>

On 5 January 1491, the Paglia River as well as the Tiber River froze, so that people could cross it on foot for several days. Many keepers of cattle perished because they were victims of the weather.<sup>82</sup>

In the year 1490, it was bitterly cold in *Burgundy* and the winter lasted 6 months. The winter was followed by a very great heatwave.<sup>62</sup>

The winter of 1490 was one of the harshest of which we had heard. The winter produced such a furious storm that the inhabitants of Marseille in southern *France* could not leave their houses for two months.<sup>79</sup>

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**1491 A.D.** A great fall of rain in *Ireland* all summer.<sup>39</sup>

In *Ireland*, there were great rain and floods all the summer; called the "Dismal Year."<sup>47, 57, 92</sup>

In *Ireland* in 1491, there was such a famine that it was called "The Dismal Year."<sup>91</sup>

In *England*, there was considerable scarcity.<sup>57</sup>

In *Poland*, there was a great dearth of cattle.<sup>72</sup>

In 1491, floods struck Shansi (now Shanxi province) in northern *China* at Wên-shui. Crops and houses were damaged by the floodwaters. During the same year, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Hu-chou. During the period between 7 June and 6 July, floods struck Hupeh (now Hubei province) in central *China* at Ying-shan and many people drowned.<sup>153</sup>



In 1491, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Wu-i. During the period between 7 June and 6 July, a drought engulfed Hunan province in south-central *China* at Ch'i-yang.<sup>153</sup>

In 1491 during the summer, there was a drought in Chêhkiang and Hunan provinces in *China*. In Chêhkiang, this was a great drought.<sup>165</sup>

**1492 A.D.** In 1492, flooding affected many regions of *China* including:<sup>153</sup>

- Chekiang (now Zhejiang province) on the east coast of *China* at Hsiang-shan.
- Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton and Ch'ao-an. The floods were caused by heavy and protracted rains.
- Hopei (now Hebei province) in northern *China* at Peiping. Houses were damaged by the floodwaters. Floods also struck T'ung, where houses were damaged by the floodwaters and people and cattle drowned.
- During the period between 28 March and 26 April, floods struck Shantung (now Shandong province) on the east coast of *China* at Ts'ao. Fields were damaged.
- During the period between 26 May and 24 June, floods struck Yunnan province in southwest *China* at Ta-li; Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Hu-chou and Hangchow; and Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Sung-chiang.
- During the period between 24 July and 22 August, floods struck Shantung province at Tung-a.

In 1492 during the period between 29 January and 27 February, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng. The drought led to a famine.<sup>153</sup>

In 1492 during the spring, there was a great drought in Shantung province in *China*.<sup>165</sup>

In 1492 in the vicinity of Shanghai, *China*, crops were damaged by rain.<sup>166</sup>

**1493 A.D.** The summer in *Belgium* was very warm. Grain and wines were sold at low prices in the area around Liège.<sup>62</sup>

On 12 February 1493, Columbus on his return voyage from discovering the *New World of the Americas*, encountered a very violent storm, which lasted three days. [He was approximately 660 leagues or 2,000 miles in his return voyage to Spain.] Columbus expected both caravels to founder in the severe storm. The ships separated. On the night of the 15<sup>th</sup>, the gale increased in strength and Columbus thought that Providence had decreed to put an end to his mortal existence and to bury his deeds to oblivion. But the storm passed. On the 17<sup>th</sup>, they anchored at the Island of Santa Maria, one of the *Azores*.<sup>145</sup>

In 1493, floods struck Kweichow (now Guizhou province) in southwestern *China* at Lu-shan. During the period between 13 July and 11 August, floods struck Hunan province in south-central *China* at P'ing-chiang.<sup>153</sup>

In 1493 during the period between 18 March and 15 April, a drought engulfed *China*. During the period between 6 May and 8 August, this drought grew into a severe drought.<sup>153</sup>

In 1493 during the summer, there was a great drought in *China*.<sup>165</sup>

In 1493 in the vicinity of Shanghai, *China*, crops were damaged by rain.<sup>166</sup>

**Winter of 1493 / 1494 A.D.** In the year 1493, the port of Genoa in northwestern *Italy* was frozen.<sup>38</sup> - on December 25 and 26.<sup>60, 62</sup>

The winter of 1493-94 was remarkable for the severity of the cold, which was very severe in the south [*Southern Europe*]. The lagoon and all the canals of Venice, *Italy* were frozen; so that pedestrians, wagons and horses could travel over the ice.<sup>62</sup>

The Rhône River froze in 1493 in southern *France*.<sup>79</sup>

**1494 A.D.** In *England*, great scarcity and high prices.<sup>57</sup>

In Milan, *Italy*, lightning set fire to their magazines of powder, which they had taken out to send to other places. This demolished the gates over it and the castle. The whole city shook. Many people were slain by the fall of stones and the ruin of the walls. Five hundred men were slain at their recreation on the castle green.<sup>72</sup>

During the second voyage of Christopher Columbus, on 16 July 1494, he encountered a violent hurricane at Cape Santa Cruz. Admiral Columbus remarked “that nothing but the service of God and the extension of the monarchy should induce him to expose himself to such danger”.<sup>145</sup>

On 24 August in 1494 or 1495, a hail tempest struck St. Nead’s. The hailstones were 18 inches about [circumference].<sup>72</sup>

In 1494, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing and Yü-yao. During the period between 7 March and 5 April, floods struck Shantung (now Shandong province) on the east coast of *China* at Tung-a.<sup>153</sup>

**Winter of 1494 / 1495 A.D.** During the winter of 1494-95 in southern *France* there were many storms and heavy rains. In 1495, barley got on the cob in January, and winter was as mild as spring.<sup>79</sup>

In 1494 during the winter, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

**1495 A.D.** In *India*, there was a great dearth that occurred about this date in Hindustan.<sup>57</sup>

In 1495, an Atlantic hurricane struck the *West Indies* causing a loss of life. “When the hurricane reached the harbor, it whirled the ships round as they lay at anchor, snapped their cables, and sank three of them with all who were on board.”<sup>141</sup>

Before 10 March 1496, a hurricane wrecked the four ships of Juan Aguado as he was readying to return to Spain, along with two others in the harbor of La Isabela in the *Dominican Republic*.<sup>145</sup>

The winter of 1495 produced a lot of rain, and the following summer produced many storms in southern *France*.<sup>79</sup>

In 1495, floods struck Shantung (now Shandong province) on the east coast of *China* at Tê-p’ing. The city moat overflowed.<sup>153</sup>

In 1495, many regions of *China* experienced drought.<sup>153</sup>

— During the period between 5 February and 6 May, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Chung-yang.

— During the period between 5 February and 8 August, a drought engulfed Shansi province at Ch’ang-chih.

— During the period between 26 March and 24 April, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing and Yü-yao.

— During the period between 21 July and 19 August, a severe drought engulfed Shansi province; Kansu (now Gansu province) in northwest *China*; and Shensi (now Shaanxi province) in central *China*.

In 1495 during the spring and autumn, there was a great drought in Shansi province in *China*.<sup>165</sup>

**1496 A.D.** In 1496, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Lan-ch'i.<sup>153</sup>

In 1496, there was a famine throughout the four neighboring fus [prefectures] adjacent to Shanghai, *China*.<sup>166</sup>

[In 1496], in the 8<sup>th</sup> year of the reign of Emperor Hyau-Tsong, a famine raged through several of the western provinces of *China* to such an extent, that parents were known to eat their own children. While at the same time a grievous pestilence, a calamity scarcely known in *China*, raged and laid waste to the eastern provinces.<sup>186</sup>

**1497 A.D.** There was an “intolerable famine throughout all *Ireland* – many perished.”<sup>57, 91</sup>

In 1497, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling. The city walls and fields were damaged by the floodwaters. The floods caused a famine. During the same year, floods struck Yunnan province in southwest *China* at Yung-p'ing. Several hundred families were flooded. Also during the year, a drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-chin.<sup>153</sup>

In 1497, there was a drought in Shansi province in *China*.<sup>165</sup>

**1498 A.D.** In *England*, there was a very great drought.<sup>47, 72</sup>

In *England*, this was a very droughty year and hay was very dear.<sup>72</sup>

In 1498 in *England*, the summer was hot, very dry and the food was very expensive. In *France*, it was so hot that the peasants had to douse their fields [with water]. The pressing of the grapes was finished in mid-September and the wine fell out very well. The harvest of Dijon, *France* did not take place until 26 September. The price of grain was high in *France*.<sup>62</sup>

In 1498, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Yü-yao. These floods produced a famine. During the same year, floods struck Shansi (now Shanxi province) in northern *China* at Chin-ch'êng.<sup>153</sup>

In 1498, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Taichow and Ch'ü; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsing-ning. Also during the year, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at I-ch'un and Ch'ing-chiang. During the period between 17 August and 15 September, a severe drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam*. This drought produced a famine.<sup>153</sup>

In 1498 during the summer and autumn, there was a great drought in Chêhkiang, Kiangsi, Kwangsi and Kwangtung provinces in *China*.<sup>165</sup>

**Winter of 1498 / 1499 A.D.** The frosts of the winter appeared in Hainaut in western *Belgium* in a very unusual form. On Christmas night there was a very heavy rain mixed with hail, the cold immediately formed a smooth ice flow [freezing rain]. This was followed by so much snow, "that all, as the chronicler

says, flowed together and with each other a mixed ice, hard as stone, formed." As the trees could not bear such a burden, "the branches broke with a crash." The branches that resisted caused by the wind a noise "like the rattle of a harness." This strange frost lasted twelve days, and when the thaw came, enormous pieces of ice fell from the church towers and damaged the ship and the chapels of the churches. The harvest of the apple and pear trees in the following autumn was very abundant, but there was a lack of food altogether, so that horses and cattle died of starvation. The farmers who had filled their barns with straw the previous year, had to remove it to give it to the animals to eat.<sup>62</sup>

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**1499 A.D.** In 1499, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ü; Hupeh (now Hubei province) in central *China* at Hsien-ning; Honan (now Henan province) in central *China* at Loyang; and Shantung (now Shandong province) on the east coast of *China* at Ts'ao and Shan. During the period between 6 May 1499 and 5 February 1500, a drought engulfed Fukien (now Fujian province) on the southeast coast of *China*.<sup>153</sup>

In 1499 during the summer, autumn and winter, there was a drought in Fuhkien province in *China*. The land tax was remitted.<sup>165</sup>

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**1500 A.D.** [As a result of the warm summer], the harvest at Dijon, *France* occurred [early] on 14 September. On 19 August, they drank more wine at Liège in east-central *Belgium*.<sup>62</sup>

In 1500, there was a great tempest in Rome, *Italy*, which did much damage to buildings.<sup>72</sup>

In 1500, there was a dreadful plague in London, *England*, which obligated King Henry VII and his Court to remove to Calais.<sup>212</sup>

In July 1500, an Atlantic hurricane struck the *Bahamas* causing a loss of life. Two caravels with all their crew were swallowed up by the storm.<sup>141</sup>

In 1500, a drought engulfed Yunnan province in southwest *China* at Mêng-tzū. During the period between 28 May and 25 June, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Yü-yao.<sup>153</sup>

In 1500 during the spring and summer, there was a drought in Chêhkiang and Yünnan provinces in *China*. In Yünnan, this was a great drought.<sup>165</sup>

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**1501 A.D.** In *Germany* on 14 August, the Albis (Elbe) River overflowed.<sup>47, 72, 92</sup>

In 1501, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 6 May and 8 August, floods struck Hopei (now Hebei province) in northern *China* at Lu-lung; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton and Ch'ung-shan.

— During the period between 15 July and 13 August, floods struck Shansi (now Shanxi province) in northern *China* at Taiyuan. Houses and crops were damaged by the floodwaters.

— During the period between 8 August and 8 November, floods struck Yunnan province in southwest *China* at Pao-shan and T'êng-ch'ung. Houses were damaged by the floodwaters. People and cattle drowned.

In 1501, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China* and Yunnan province in southwest *China* at Mêng-tzū.<sup>153</sup>

In 1501, there was a great drought in Fuhkien province in *China*.<sup>165</sup>

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**1502 A.D.** In Holland [now *the Netherlands*] the winter was severe and in Paris, *France*, the winter brought on a flood.<sup>62</sup>

The summer of 1502 in southern *France* was hot and dry.<sup>79</sup>

There was a drought in southern *France* in 1502.<sup>79</sup>

A fleet of thirty-two vessels at Santo Domingo, *Dominican Republic* was to sail back to Spain. Christopher Columbus arrived and asked for shelter from the coming hurricane. Ovando denied his request. Columbus asked them to detain the fleet from returning to Spain because of the signs of an impending hurricane. Ovando did not believe him, and the sailors laughed at his prediction. Bovadilla, Roldan, and their party, were embarked; Guarionex was on board the *Capitana*, and 100,000 castellanos for the King, and another 100,000 castellanos belonging to the passengers, and the large lump of gold, which had been Garay's dish. The fleet sailed on 1 July 1502; and within twenty-four hours, twenty sail including the *Capitana*, with all on board, perished!<sup>145</sup> [During the time of Ferdinand and Isabella, the marc was a unit of weight equal to one-half pound. A marc of gold was equal to 50 castellanos. 100,000 castellanos would be equal to 1,000 pounds of gold. Today's spot price of gold is \$1260 per ounce. In present currency, the value of the lost gold in this storm would exceed \$40 million.]

Christopher Columbus arrived at St. Domingo in Hispaniola [now the *Dominican Republic*] towards the end of June 1502. The Admiral had the good fortune to get in a little creek in the island, where he weathered a very terrible storm, in which Bovadilla, his great enemy, and fourteen ships laden [loaded] with treasure, and bound for Spain, perished.<sup>227</sup> [The enemies of Columbus having given the Court of Spain an ill opinion of him, it appears they employed Americus Vesputius, a Florentine, in the year 1497, to enlarge the discoveries of Columbus. The America's were named after this lesser explorer.]

On 11-12 July 1502, a hurricane struck offshore the *Dominican Republic* causing approximately 500 deaths.<sup>141</sup>

On 16 September 1502 at *Honduras*, "a boat sent to the shore was, in returning, swallowed up by a sudden swelling of the sea, with all on board."<sup>141</sup>

In 1502, floods due to heavy and protracted rains struck Chekiang (now Zhejiang province) on the east coast of *China* at Yü-yao. In the same year, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea.<sup>153</sup>

In 1502, there was a drought in Kwangtung province in *China*.<sup>165</sup>

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**1503 A.D.** In *England*, there was a great drought in summer.<sup>47, 72</sup>

The Po River in *Italy* was frozen and an army crossed the ice.<sup>62</sup>

The winter of 1503 in *Italy* was severe. The Po River froze and carried the weight of the army of Pope Julius II on the ice.<sup>62</sup>

In 1503, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow. During the period between 25 May and 23 June, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Peiping.<sup>153</sup>

In 1503 during the summer, there was a great drought in Chêhkiang and Chihli provinces in *China*.<sup>165</sup>

In 1503, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton. During the period between 20 September and 19 October, floods struck Fukien (now Fujian province) on the southeast coast of *China*. Houses were damaged by the floodwaters.<sup>153</sup>

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**1504 A.D.** A drought occurred during the spring; the waters dried up in Lyon, *France*. It was followed by a plague. In *Italy* (which apparently also suffered from the drought), they made a religious procession for rain and immediately following the procession the rains came on June 15.<sup>61</sup>

The summer of 1504 in southern *France* was very hot.<sup>79</sup>

In *Italy* in 1504, the winter was mild like springtime.<sup>62</sup>

In 1504, a hurricane struck the north coast of *Colombia* causing 175 deaths.<sup>141</sup>

In *Burgundy* in the year 1504, the summer was full of wonderfully warmth and without rain, disease and fever. At several places the dryness of the weather caused lamentable accidents by fire. A terrible drought raged during the summer in *England*. They began the harvest [early] in Dijon, *France* on 14 September.<sup>62</sup>

In 1504, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Tientsin; the northeast portion of Kiangsu (now Jiangsu province) on the east coast of *China*; the eastern portion of Chekiang (now Zhejiang province) on the east coast of *China*; and Shantung (now Shandong province) on the east coast of *China* at I-tu. During the period between 5 February and 8 August, a drought engulfed Shansi (now Shanxi province) in northern *China* at Yü-tz'ü, T'ai-ku and Yung-chi. During the period between 8 October and 6 November, a drought engulfed Yunnan province in southwest *China* at Wu-ting.<sup>153</sup>

In 1504 during the spring, summer and autumn, there was a drought in Chihli, Shansi and Shantung provinces in *China*. The resulting famine was so severe that people in Shansi devoured the bark of trees.<sup>165</sup>

In 1504 during the period between 15 April and 13 May, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hai-fêng, Hui-yang, Chin-hsi [uncertain name] and Yang-an [uncertain name]. Many people drowned. During the period between 12 June and 11 July, floods struck Kwangtung province at Ch'iung-shan. Crops were damaged by the floodwaters and this flood caused a famine.<sup>153</sup>

In 1504 during the 4<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a hailstorm, which killed men, cattle and the wheat crop.<sup>166</sup>

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**1505 A.D.** In 1505 because of a great famine in *Hungary*, parents killed and ate their own children.<sup>96</sup>

During the famine in *Hungary* in 1505 starving parents who butchered and ate their children were not punished.<sup>155</sup>

In 1505, floods struck Hunan province in south-central *China* at I-yang; and Hupeh (now Hubei province) in central *China* at Ên-shih. Houses were damaged by the floodwaters. During the period between 6 May and 8 August, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ho-yüan. Houses were damaged.<sup>153</sup>



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**Winter of 1505 / 1506 A.D.** In 1506 in southern *France*, the winter was as mild as spring.<sup>79</sup>

The winter of 1505-06 in southern *France* was very moderate. There were live roses in January, as well as other flowers normally seen in the month of May. Barley got into spikes at the same time and the wheat grew in proportion.<sup>79</sup>

On 15 to 26 January 1506, there were tempests and hurricanes [in *England*]<sup>72</sup>

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**1506 A.D.** In 1506, a Fleet of 13 vessels were sailing from Lisbon, Portugal to India via the Cape of Good Hope, South Africa. One of the ships commanded by Tristão da Cunha encountered a violent storm that separated his ship from the Fleet and drove it so far south that the crew experienced severely cold weather. They discovered an isolated island that bears his name, *Tristan da Cunha*, located midway between Africa and South America in the south Atlantic Ocean. [This island is now part of the overseas British territories.]<sup>105</sup>

[In *England*], there was a terrible storm of thunder and lightning.<sup>72</sup>

In 1506 in the city of Chester, *England*, in three days, 91 people died of sweating sickness. Only four of who were women.<sup>212</sup>

In 1506, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Huang-kang. During the period between 6 May and 8 August, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Yü-yao and Shang-yü. Also during the period between 6 May and 8 August, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Kao-an. During the period between 31 July and 28 August, floods struck Liaoning province located in the southern part of *China*'s northeast at Liao-yang; Kiangsu (now Jiangsu province) on the east coast of *China*; and Anhwei (now Anhui province) in eastern *China*.<sup>153</sup>

In 1506 during the summer, there was a drought in Chêhkiang, Hupeh and Kiangsi provinces in *China*. In Chêhkiang and Hupeh, this was a great drought.<sup>165</sup>

In 1506, a typhoon struck in the vicinity of Shanghai, *China*. There was an overflow of the sea, with great wind and rain.<sup>166</sup>

In 1506, in the vicinity of Shanghai, *China*, there was a famine.<sup>166</sup>

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**Winter of 1506 / 1507 A.D.** This winter was extremely severe in the south [*Southern Europe*]. At Marseille, *France*, three-feet of snow fell on the day of Epiphany (January 6<sup>th</sup>). The fruit trees died off.<sup>62</sup>

During the winter of 1506-07 in southern *France*, there was severe cold, and large snowfalls.<sup>79</sup>

The chill of 1506-07 completely froze the port of Marseilles, *France* and destroyed a large number of men and animals. On the Feast of the Epiphany [January 6<sup>th</sup>], 3.2 feet (974 millimeters) of snow fell on Marseilles. The mass of snow, fortunately protected trees and seeds from the cold.<sup>79</sup>

In 1507 A.D., the port of Marseilles in *France* froze in its full extent. Three feet (0.9 meters) of snow fell at Marseilles on the day of Epiphany (January 6<sup>th</sup>).<sup>38, 60, 62</sup>

In 1506, there was a great frost in *England*. The frozen River Thames at London bore the weight of carriages throughout January.<sup>212</sup>

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**1507 A.D.** In 1507, there was a plague of sweating sickness in Chester, *England*.<sup>212</sup>

In 1507, Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing experienced flooding. Around 10,000 persons drowned. Hunan province in south-central *China* at I-chang also experienced flooding.<sup>153</sup>

In 1507, a severe drought engulfed Shensi (now Shaanxi province) in central *China*. During the period between 6 May and 8 August, a drought engulfed Hunan province in south-central *China* at Hêng-yang.<sup>153</sup>

In 1507 during the summer, there was a drought in Hunan and Shensi provinces in *China*. In Shensi, this was a great drought.<sup>165</sup>

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**1508 A.D.** In *France*, there was a great flood called the “Flood of St. Onne”, which affected Vivarais, Velay and others.<sup>61</sup> [Vivarais is located in the Ardèche region of southeast *France*. Velay is located in south-central *France*.]

[In *England*], it was a tempestuous year [a year full of tempests].<sup>72</sup>

In 1508, there was a very plentiful harvest [in *England*].<sup>212</sup>

On 12-14 August 1508, an Atlantic hurricane struck the *Dominican Republic* causing a loss of life. “Many men were lost in this city and in the greater part of this island.” The storm destroyed the entire population of Buenaventura [the date given is 3 August].<sup>141</sup>

On 3 August 1508, all the thatched houses in Santo Domingo, *Dominican Republic*, and several of those built with stone, every house in Bonaventura, and twenty sail of vessels, were destroyed by a hurricane. At first the gale blew from the north, and then shifted suddenly to the south.<sup>145</sup>

In *Germany*, there was terrible hailstorm that destroyed trees, corn [grain], and [grape] vines, chiefly in the Duchies of Württemberg, Hohenberg, and Rottenburg on the Nickar [Neckar River]. The hailstones were so large and tempestuous, that it broke windows and tiles of houses. At Stutgard [Stuttgart, *Germany*], a tempest arose and so great a flood of waters from the clouds that it filled the town. The city was in danger of perishing. Some men and oxen were lost and a part of the wall [of the city] were broken.<sup>72</sup> [Württemberg, Hohenberg, Rottenburg, and Stuttgart are located in southern *Germany*.]

In 1508, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui, Shao-hsing, Chin-hua, Taichow and Hu-chou; Kiangsi (now Jiangxi province) in southern *China* at Tê-an; and Hupeh (now Hubei province) in central *China* at Hanyang, Wuchang, Hsiang-yang and Huang-kang.<sup>153</sup>

In 1508, there was a great drought in Chêhkiang and Hupeh provinces in *China*.<sup>165</sup>

In 1508, several regions of *China* experienced flooding including:<sup>153</sup>

— Shantung (now Shandong province) on the east coast of *China* at Shan. Crops were damaged by the floodwaters. Houses were largely damaged.

— Chekiang (now Zhejiang province) on the east coast of *China* at Yü-hang.

— During the period between 30 May and 27 June, floods struck Hupeh (now Hubei province) in central *China* at P’u-ch’i.

— During the period between 28 June and 27 July, floods struck Shansi (now Shanxi province) in northern *China* at K'o-lan and T'ai-ku. The city walls were damaged by the floodwaters and over 1,000 persons drowned.

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**1509 A.D.** There was a drought in southern *France* in 1509.<sup>79</sup>

In 1509, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Hu-chou and Yü-yao. During the period between 6 May and 8 August, floods struck Kiangsi (now Jiangxi province) in southern *China*.<sup>153</sup>

In 1509, drought engulfed several regions of *China* including:<sup>153</sup>

- Hunan province in south-central *China* at Yüeh-yang, Hêng-yang, Shao-yang and Lin-hsiang.
- Hupeh (now Hubei province) in central *China* at Wuchang, Hanyang, Chiang-ling and Huang-kang.
- Kiangsi (now Jiangxi province) in southern *China* at Hsing-kuo. This drought was severe.
- Kiangsi province at I-ch'un and Ch'ing-chiang. This drought led to a famine.
- During the period between 19 May and 16 June, a severe drought engulfed Hupeh province at Wuchang.

In 1509 during the summer, there was a drought in Hunan, Hupeh and Kiangsi provinces in *China*. At Hu-Kwang [Hukwang - the rice bowl of China comprising the provinces of Hunan and Hupeh], this was a great drought.<sup>165</sup>

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**1510 A.D.** In *England*, there was excessive heat.<sup>47, 72</sup>

In *Italy*, there was a hailstorm “which destroyed all the fish, birds, and beasts of the country.”<sup>41, 43, 56, 57, 93</sup> Some of the hailstones weighed one hundred pounds.<sup>40</sup>

The year 1510 in southern *France* was humid and rain.<sup>79</sup>

There was a severe hailstorm in *France* in 1510. A black cloud came over the face of the heavens, and darkened the air like night. In the midst of people's terror and astonishment, the most violent lightning and thunder burst from it, and hail began to fall. This increased in a most dreadful manner, and with a strong and suffocating smell, like burning brimstone. The hailstones were more like pebbles, their color bluish and their hardness like flint, till they softened to the wet. Some of these hailstones weighed a hundred pounds. This storm killed almost all the cattle, fowls and fish in the county and a vast number of the people.<sup>192</sup>

In Gulick and Juliers (now Jülich), there was such an extraordinary thunder and lightning storm. It struck all with a panic. A thunderbolt set fire to a magazine, which did great damage.<sup>72</sup> [The territory of the Duchy of Jülich lies in present-day *Germany* (part of North Rhine-Westphalia) and in the present-day *Netherlands* (part of the Limburg province). Gulick is the Dutch word for Juliers.]

In 1510, several regions of *China* experienced flooding including:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow. Houses were damaged by the floodwaters and many people drowned.
- Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui and Hu-chou.
- Hunan province in south-central *China* at Yüan-ling.
- During the period between 6 June and 5 July, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Chiang-yüeh. Occupants drowned. [This date was originally recorded as the twenty-third of the Hung-chih period, but since Hung-chih had only eighteen years and ended in the year 1505, there apparently is a mistake. Here it is recorded as if Hung-chih did last twenty-three years.]

In 1510, a drought engulfed Szechwan (now Sichuan province) in southwest *China* at Li-fan. During the period between 6 June and 5 July, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Hêng-shui. During the period between 6 July and 4 August, a drought engulfed Hopei province at Peiping.<sup>153</sup>

In 1510 during the summer, there was a drought in Sze-ch'wan and Chihli provinces in *China*. In Chihli, this was a great drought.<sup>165</sup>

The year 1510 produced an extremely cold winter in the vicinity of Shanghai, *China*. Bamboo, cedar and orange trees were killed. For several years afterwards, there were no oranges in the markets. There was ice several feet thick, for a month in the river.<sup>166</sup>

**Winter of 1510 / 1511 A.D.** In Holland [now *the Netherlands*] this winter was recorded as severe. In *Italy*, the cold was very intense, and the snow was plentiful.<sup>62</sup>

**1511 A.D.** In *Ireland*, there was a great inundation, which produced considerable destruction.<sup>47, 92</sup>

In 1511, a severe drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Hsing-kuo. Also in the same year, floods struck Hupeh (now Hubei province) in central *China* at Ying-shan. During the period between 27 May and 24 June, floods struck Hupeh province at P'u-ch'i. Houses were damaged by the floodwaters. During the period between 25 June and 24 July, floods struck Shansi (now Shanxi province) in northern *China* at Chao-ch'êng.<sup>153</sup>

In 1511, there was a great drought in Hupeh province in *China*.<sup>165</sup>

In 1511 during the summer, wheat had many branches and heads. Then during the 6<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a great wind that damaged the fields; the people were scattered, and there was a famine and pestilence of which countless numbers died.<sup>166</sup>

**1512 A.D.** In Bologna, *Italy* the snow fell so thick one could not see through it. This snow lasted until May.<sup>62</sup>

In 1512, the grapevines froze to death during the summer in the countryside of Metz, *France*. The summer produced sinister cold.<sup>62</sup>

In 1512, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Ch'ang-tzŭ.<sup>153</sup>

In 1512, there was a great drought in Shansi province in *China*.<sup>165</sup>

In 1512, several regions of *China* experienced flooding including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing. Many people drowned.

— Yunnan province in southwest *China* at K'un-yang. Over 100 houses were damaged by the floodwaters and innumerable people drowned.

— During the period between 8 December 1512 and 6 January 1513, the Li River flooded in Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam*.

In 1512 during the 6<sup>th</sup> moon, a dragon was seen to the southeast of Whangpu [Huangpu River, *China*]. It scorched the [rice] paddy and destroyed houses in its course. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

**1513 A.D.** A dearth, scarcity of corn [grain], famine, rainy seasons and severe cold winters had afflicted *Italy* for two years and people were forced to eat uncommon and unwholesome food, and then in 1513, a contagious epidemic struck.<sup>72</sup>

In 1513, there was a famine [in *England*].<sup>72</sup>

In 1513 a severe drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang. Also during the year, a drought engulfed Fukien (now Fujian province) on the southeast coast of *China*. Then during the period between 6 April and 4 May, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at T'ai-shan. During the period between 30 August and 28 September, floods struck Shansi (now Shanxi province) in northern *China* at Ch'in-yüan. Fields were damaged by the floodwaters.<sup>153</sup>

In 1513, there was a drought in Kiangsi and Fuhkien provinces in *China*. In Kiangsi, this was a great drought.<sup>165</sup>

**Winter of 1513 / 1314 A.D.** In the year 1513, the Meuse River froze over its whole course, carts travel from Liège, *Belgium* to Maastricht in southern *Netherlands* on the ice.<sup>62</sup>

The winter of 1513-14 in Flanders [now *Belgium*] was very severe. The loaded wagons traveled on the frozen rivers from Gorcum in western *Netherlands* to Cologne in west-central *Germany* on the ice.<sup>62</sup>

London, *England* experienced cold weather in January 1314, and the River Thames froze.<sup>28</sup>

**1514 A.D.** On 27 November 1514, there was a great flood at Burton-on-Trent in Staffordshire, *England*.<sup>212</sup>

In 1514, a drought engulfed Hupeh (now Hubei province) in central *China* at Tsao-yang.<sup>153</sup>

In 1514, there was a drought in Hunan province in *China*.<sup>165</sup>

**Winter of 1514 / 1315 A.D.** In 1515, the frost in *England* was so intense that throughout January in London, carriages crossed over the River Thames on the ice from Lambeth to Westminster.<sup>212</sup>

In *England* in 1515, the River Thames was frozen so hard that carriages of all sorts passed between Westminster and Lambeth upon the ice.<sup>29, 47, 90, 93</sup>

**1515 A.D.** On January 1, there was a most frightful and destructive storm in *Denmark*, which rooted up whole forests of trees, destroyed a great many houses, and blew down the steeple of the great church at Copenhagen. Many persons were killed.<sup>1, 40, 41, 43, 56</sup>

“All *Germany* like a sea, and Cracovia [Kraków in southern *Poland*] flooded.”<sup>47, 72, 92</sup>

There was a fearful flood in Cracovia [Kraków in southern *Poland*], which drowned many people. There was such a great flood in *Germany* that the country suffered much loss and looked like an island.<sup>72</sup>

In July 1515, an Atlantic hurricane struck *Puerto Rico* causing the death of many Indians.<sup>141</sup>

In 1515 during the period between 12 June and 10 July, a severe drought engulfed *China*.<sup>153</sup>

In 1515 during the summer, there was a great drought and dust storms in *China*.<sup>165</sup>

In 1515, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow. During the period between 11 July and 9 August, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at T'ai-shan. During the period between 10 August and 7 September, floods caused by heavy and protracted rains struck Kwangtung province at Ch'ao-an. Many people drowned.<sup>153</sup>

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**1516 A.D.** In *England*, the years 1516 and 1517 were hot and dry.<sup>47, 72</sup>

In 1516, several regions of *China* experienced flooding including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Yü-yao.

— During the period 2-30 May, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsin-hui.

— During the period 2-30 May, floods struck Hupeh (now Hubei province) in central *China* at I-ch'êng, Hsiang-yang, and Ên-shih. At Ên-shih, the city walls and houses were damaged.

— During the period between 28 August and 25 September, floods struck Hupeh province at Han-ch'uan, Ying-ch'êng and Chiang-ling; and Hunan province in south-central *China* at Hua-jung.

— During the period between 8 August and 8 November, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu and Po-pai.

In 1516, a severe drought engulfed Hunan province in south-central *China* at Ching. During the period between 31 May and 29 June, a severe drought engulfed several regions of *China*. During the period between 29 July and 27 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tê-p'ing.<sup>153</sup>

In 1516 during the summer and autumn, there was a drought in Hunan and Shantung provinces in *China*. In Hunan, this was a great drought.<sup>165</sup>

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**1517 A.D.** Severe winter struck *England* on January 12. The River Thames froze. Three feet (0.9 meters) of snow fell on the streets of Valence in southeastern *France* on January 15.<sup>28</sup>

In *England* in 1517, there was a great frost.<sup>72</sup>

In *England*, the years 1516 and 1517 were hot and dry.<sup>47, 72</sup>

The summer in 1517 was very hot and produced a very abundant harvest in *England*. In Dijon, *France* the grape harvest began [late] on 26 September. The harvest was plentiful in *France*.<sup>62</sup>

In *England*, it was a very droughty and frosty winter, a very hot summer, and a very early and plentiful harvest. Wheat fell from 10s. a bushel to 10d. There was a great murrain of kine [cattle]. The cattle were so mortally infectious, that dogs and ravens feeding on their flesh were poisoned and swelled to death. None dare eat the beef.<sup>72</sup>

In 1517, the fatal "sweating sickness" was very violent in London, *England*. The disease was mortal in three hours. Oxford was depopulated, and half of the inhabitants died in most of the capital towns of *England*. The sickness was very terrible at Chester.<sup>212</sup>

In 1517, a severe drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Yü-lin and Hsing-yeh. During the same year, floods struck Hupeh (now Hubei province) in central *China* at Wuchang, Hanyang, Chiang-ling and An-lu. At An-lu, fields and houses were damaged by the floodwaters and many people drowned.<sup>153</sup>



In 1517, there was a great drought in Kwangsi province in *China*.<sup>165</sup>

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**1518 A.D.** [In *England*], the winter was very dry and cold.<sup>62</sup>

[In *England*], on May 10, there was a tempest of wind and weather.<sup>72</sup>

The year 1518 in southern *France* was humid and rain.<sup>79</sup>

In 1518, several regions of *China* experienced flooding including:<sup>153</sup>

— Kiangsi (now Jiangxi province) in southern *China*.

— Shantung (now Shandong province) on the east coast of *China* at Chang-ch'iu.

— Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou, Hsüan-p'ing, Ching-ning, T'ai-shun, Taichow, Yü-yao and Shang-yü.

— Hupeh (now Hubei province) in central *China* at Wuchang, Hanyang and Huang-kang.

— During the period between 5 September and 4 October, floods struck Yunnan province in southwest *China* at Shun-ning.

In 1518 during the period between 8 August and 8 November, a severe drought engulfed Hunan province in south-central *China* at Yüan-ling.<sup>153</sup>

In 1518 during the autumn, there was a great drought in Hupeh province in *China*.<sup>165</sup>

In 1518, six prefectures [in the vicinity of Shanghai, *China*] suffered from a flood.<sup>166</sup>

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**1519 A.D.** In 1519, an Atlantic hurricane struck near *Jamaica* causing a loss of life. Eighteen men from a caravel survived the hurricane.<sup>141</sup>

In 1519, several regions of *China* experienced flooding including:<sup>153</sup>

— Shensi (now Shaanxi province) in central *China* at Mien.

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Hu-chou, Yü-yao and Hsiao-shan.

— During the period between 27 June and 25 July, floods struck Hunan province in south-central *China* at An-jên. Fields were damaged by the floodwaters and 89 people drowned.

In 1519 during the 8<sup>th</sup> moon, there was a great flood at Shanghai, *China* and nine dragons fighting at sea. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

In 1519, there was a great drought over five fus [prefectures] in the vicinity of Shanghai, *China*.<sup>166</sup>

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**1520 A.D.** In *England*, on 18 June, there was a most terrible storm of wind and weather.<sup>72</sup>

In 1520, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ü and Szechwan (now Sichuan province) in southwest *China* at Chiang-ching. During the period between 17 April and 16 May, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ing-yüan. During the period between 6 May and 8 August, floods struck Hupeh (now Hubei province) in central *China* at Wuchang.<sup>153</sup>

In 1520, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Yü-hang. This drought led to a famine.<sup>153</sup>

In 1520, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

In 1520 during the 8<sup>th</sup> moon in the vicinity of Shanghai, *China*, a great wind and rain destroyed the crops and led to a dearth.<sup>166</sup>

**1521 A.D.** In Holland [now *the Netherlands*] on the 1<sup>st</sup> of November, there was “a dire inundation of the sea, and 100,000 drowned.”<sup>47, 72, 92</sup>

In 1521, there was an inundation in Holland [now *the Netherlands*].<sup>43</sup>

In 1521, there was a great dearth and mortality in *England*. There was a great inundation of the sea, which drove back the rivers so that they overflowed their banks. This overwhelmed 72 villages and drowned over 100,000 people and very many cattle.<sup>72</sup>

In *England* in 1521, there was famine and mortality.<sup>72, 91</sup> “Wheat sold in London for 20s. a Quarter [quarter ton].<sup>57</sup>

In *India*, there was a very general famine in Sind [Sindh, now southeastern *Pakistan*].<sup>57</sup>

In 1521 A.D., there was a famine in Sindh [now a province in *Pakistan*].<sup>179</sup>

In 1521, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

In 1521 during the autumn and winter, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

**Winter of 1521 / 1522 A.D.** During the period between 29 December 1521 and 27 January 1522, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow.<sup>153</sup>

**1522 A.D.** The winter was severe [in *Europe*].<sup>62</sup>

In *France*, there was a great flood at Vivarais.<sup>61</sup>

In *France* in 1522, they began the harvest at Dijon on 5 September.<sup>62</sup>

In *Ireland* in 1522, there was a great famine.<sup>57, 91</sup>

In 1522 at Limerick, *Ireland*, Many thousands perished from the plague.<sup>212</sup>

In 1522 during the period between 26 April and 24 May, a severe drought engulfed several regions of *China*.<sup>153</sup>

[In 1522], at the beginning of the reign of Emperor Shi-Tsong, the famine and poverty was raging in *China*. Many parents in order to survive forced their daughters into prostitution. Two young maids, to avoid the disgrace, drowned themselves. The emperor erected a fine monument for them giving them the title of “*The two illustrious virgins*”.<sup>186</sup>

In 1522, there was a drought in *China*.<sup>165</sup>

In 1522, several regions of *China* experienced flooding including:<sup>153</sup>  
— Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Hu-chou, Chu-chi and Lung-ch’üan.

- Kiangsi (now Jiangxi province) in southern *China* at Yang-shuo. Many people drowned.
- During the period between 25 May and 23 June, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ch'üan. Fields were damaged by the floodwaters. During the same time, floods struck Kiangsi province. This resulted in a famine.
- During the period between 6 May and 8 August, floods struck Hunan province in south-central *China* at Hêng-yang and Changsha.
- During the period between 23 July and 20 August, a typhoon and storm struck *China*. Houses were damaged and people and cattle drowned. During this period of time, floods caused by heavy and protracted rains struck Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking. Several hundred families were flooded. Also during this time, floods struck Kwangsi province at Ts'ang-wu. Over 10,000 houses flooded.

**1523 A.D.** The heat during the month of August in 1523 in *Italy* was excessive. The harvest began in Dijon, *France* on 26 August.<sup>62</sup>

[In *England*], rainy summer and harvest then frost.<sup>72</sup>

In *England* in 1523, there was a severe famine.<sup>57, 91</sup>

In 1523, an Atlantic hurricane struck off the west coast of Florida in the *United States*. Two ships and their crews were lost.<sup>141</sup>

In *Turkey* from 1523-26, the rivers were greatly swollen, and pestilential diseases were prevalent.<sup>47, 92</sup>

In 1523, a drought engulfed many regions of *China* including:<sup>153</sup>

- Hupeh (now Hubei province) in central *China* at Wuchang. This drought was severe.
- During the period between 6 May and 8 August, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam*.
- During the period between 13 June and 12 July, a severe drought engulfed several regions of *China*.
- During the period between 8 August and 8 November, a drought engulfed Yunnan province in southwest *China* at T'êng-ch'ung.
- During the period between 9 October and 6 November, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tsinan; Honan (now Henan province) in central *China* at Loyang; Hupeh province at Wuchang and Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang.

In 1523 during the summer, there was a great drought in Chihli, Honan, Hunan, Hupeh, Kiangsi, Kwangsi, Shantung and Yünnan provinces in *China*.<sup>165</sup>

In 1523, floods struck Hunan province in south-central *China* at Yüeh-yang. During the period between 9 September and 7 October, floods struck Honan (now Henan province) in central *China* at Loyang. During the period between 8 November 1523 and 5 February 1524, floods struck Hunan province at Hêng-yang.<sup>153</sup>

In 1523, there was a great drought in the vicinity of Shanghai, *China*.<sup>166</sup>

In 1523 during the 6<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a storm with great rain, hail and lightning. Again during the 7<sup>th</sup> moon, there was another destructive storm of wind and rain. Then during the 8<sup>th</sup> moon, there were floods over four fus [prefectures].<sup>166</sup>

**Winter of 1523 / 1524 A.D.** In the year 1523 in *England*, the frost was “most severe”.<sup>47, 72, 93</sup>

In the year 1523 in *France*, the winter produced very severe winter storms.<sup>61</sup>

During the winter of 1523-24, the cold was felt in the autumn. [In *France*], the winter was severe and the snow began to fall on 2 November. Due to the cold; the corn and vegetables froze in the fields. The lack of food continued until the next year's crops. By mid-August 1524, wheat and rye were still blooming and the other cereals were just as advanced. This made the food throughout 1524 very dear." In *England* this winter began with heavy rain and strong winds and then a frost; so many people died from the cold, while others lost their toes.<sup>62</sup>

In *England* after long and great rains and winds, which had happened that season, followed so severe a frost that many died of the cold. Some lost toes or fingers, and many lost their nails.<sup>72</sup>

**1524 A.D.** In Naples, *Italy*, there was a terrible inundation.<sup>47, 72, 92</sup>

In 1524, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ch'êng, Shao-hsing, and Shang-yü; and Yunnan province in southwest *China* at Yüan-chiang and Yüan-mou. Then during the period between 8 August and 8 November, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hui-yang. Houses, fields and crops were damaged by the floodwaters and many people drowned.<sup>153</sup>

In 1524, there was a great drought in Chêhkiang and Yünnan provinces in *China*.<sup>165</sup>

**1525 A.D.** In 1525, there was pestilence in *Ireland*.<sup>212</sup>

Near the end of October 1525, a hurricane struck western *Cuba* causing approximately 72 deaths.<sup>141</sup>

In 1525, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. During the period between 17 September and 15 October, the Yellow River flooded.<sup>153</sup>

**1526 A.D.** In *England*, there was so great a death in London, that the terms were adjourned.<sup>72</sup>

In June 1526, an Atlantic hurricane struck North Carolina in the *United States*. A Spanish brigantine was lost off Wilmington, North Carolina.<sup>141</sup>

In October 1526, a violent hurricane did great damage at Española [Hispaniola now the island of the *Dominican Republic* and *Haiti*]. The rivers overflowed their banks. No such storm had been seen in that island of many years.<sup>145</sup>

In 1526, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ü, Wên-chou, Taichow, Chu-chi, Hsin-ch'ang, Chin-yün and Sung-yang; and 13 districts of Kiangsi (now Jiangxi province) in southern *China*. During the period between 6 May and 8 August, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China* at Foochow.<sup>153</sup>

In 1526 during the summer, there was a great drought in Chêhkiang, Fuhkien and Kiangsi provinces in *China*.<sup>165</sup>

In 1526, several regions of *China* experienced flooding including:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow.
- Shantung (now Shandong province) on the east coast of *China* at Tzū-yang and Chi-ning.
- The Han River in Hupeh (now Hubei province) in central *China*.
- Shansi (now Shanxi province) in northern *China* at Wan-ch'üan.

- During the period between 13 March and 11 April, floods struck Kiangsi (now Jiangxi province) in southern *China* at Jung. [Jung is located at longitude 110.34° East and latitude 22.54° North.]
- During the period between 8 August and 6 September, floods struck Kiangsu province at Fêng, P'ei and Suchow. [P'ei is located at longitude 117.00° East and latitude 34.47° North.]
- During the period between 8 August and 6 September, floods struck Shantung province at Hui-min. Crops were damaged by the floodwaters.

[In 1526, a meteor falls at Yung-chun in Fuhkien (now Fujian province) on the southeast coast of *China*, where it exploded and killed a number of people.]<sup>165</sup>

**1527 A.D.** In *England*, there was a great flood.<sup>47, 72, 92</sup>

In *England*, during the 18<sup>th</sup> year of Henry VIII, “In November [1526], December, and January [1527] fell such abundance of reine that thereof ensued great flouds, which destroyed corne-fields, pastures and beasts. Then was it drie until the 12<sup>th</sup> April; and from that time, it rained every day and night, till the 3<sup>rd</sup> June: whereby corne failed sore in the yeare falling.”<sup>47</sup>

In 1527 in *England* from 1 November [1526] to 1 February [1527], there were continual rains; fearful floods; terrible destruction of corn [grain], cattle, and pastures. Then there was a drought to 12 April. Then daily rains till 3 June. Hence there was a scarcity of corn [grain] in *England* and a dearth.<sup>72</sup>

In *England* in 1527 during the 19<sup>th</sup> year of King Henry VIII reign – “Such scarcitie of bread was at London and throughout *England* that many dyed for want thereof. The King sent to the citie, of his owne provision, 600 quarters; the bread carts then coming from Stratford [where nearly all the bakings were probably on account proximity to Epping Forest] towards London, were met at the Mile End by a great number of citizens so that the maior and sheriffs were forced to goe and rescue the same, and see them brought to the market appointed, wheat being then at 15s. the quarter [quarter ton]. But shortly after the merchants of the Stiliard [steelyard] brought from Danske [Danzig] such store of wheat and rye, that it was better cheape at London than in any other part of the Realme.”<sup>57</sup> [The merchants of the steelyard were a famous guild of foreign merchants in England, connected with the Hanseatic League.]

In October 1527, a hurricane struck *Cuba* causing between 60 and 70 deaths.<sup>141</sup>

On November 1527, a hurricane struck the upper coast of Texas in the *United States*. [Various accounts give differing fatality figures of 200, 191 and 162. The causalities were caused by the loss of the Spanish fleet.]<sup>141</sup>

In Rome, *Italy* on the 2<sup>nd</sup> of December, there was a great hailstorm.<sup>57, 72, 93</sup>

In 1527, several regions of *China* experienced flooding including:<sup>153</sup>

- Chekiang (now Zhejiang province) on the east coast of *China* at Hsiao-shan and Yü-yao. Crops were damaged by the floodwaters.
- Kiangsi (now Jiangxi province) in southern *China* at Kao-an and Ch'ing-chiang.
- During the period between 30 May and 27 June, floods struck Yunnan province in southwest *China* at Shuang-pai.
- During the period between 8 August and 8 November, floods struck Yunnan province at Ching-tung. Fields and houses were damaged by the floodwaters.

In 1527, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui.<sup>153</sup>

In 1527, there was a great drought in Chêhkiang province in *China*.<sup>165</sup>

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**1528 A.D.** In *England*, the last winter was wholly rainy and southerly. The spring was the same with very great and destructive inundations. There was a great famine in Venice, *Italy*.<sup>72</sup>

In 1528 at Nottingham, *England*, it rained almost incessantly in deluges during the spring. This prevented the corn [grain] from being sown. As a result there was an extensive crop failure during harvest. Grain was imported largely from *Germany*.<sup>212</sup>

In *England*, there was a drought from the 1<sup>st</sup> February to 12<sup>th</sup> April, and all July and August.<sup>47, 72</sup>

[In *England*], it rained from 12 April to 3 June. Then drought to September.<sup>72</sup>

In 1528 and 1529, “sweating sickness” again plagued *England*.<sup>212</sup>

In 1528 in Paris, *France*, the frost destroyed the wheat and vegetables.<sup>79</sup>

In Augsburg in Bavaria in southwestern *Germany* on 19<sup>th</sup> July, there was a great hailstorm.<sup>57, 72, 93</sup>

In Venice, *Italy* in 1528, there was a famine.<sup>57, 72, 91</sup>

In 1528, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Mien-yang, Hanyang, Pao-k’ang and Hsiang-yang. During the period between 6 May and 16 June, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tsinan; Honan (now Henan province) in central *China* at Loyang; Shansi (now Shanxi province) in northern *China* at Taiyuan; and Shensi (now Shaanxi province) in central *China* at Sian. During the period between 6 May and 8 November, a severe drought engulfed Szechwan (now Sichuan province) in southwest *China*.<sup>153</sup>

In 1528 during the summer, there was a great drought in Chihli, Honan, Hunan, Hupeh, Shansi, Shantung, Shensi and Sze-ch’wan provinces in *China*. The resulting famine was so severe that it led to cannibalism in Hupeh and Shensi.<sup>165</sup>

In 1528, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui and Yunnan province in southwest *China* at Lu-fêng. During the period between 18 May and 16 June, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Yang-chiang. During the period between 16 July and 14 August, floods struck Shansi (now Shanxi province) in northern *China* at Yang-kao.<sup>153</sup>

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**1529 A.D.** In northwestern *Switzerland* on June 13 or 14, there was a great flood of the Rhine River at Basle [Basel]. In *England* on October 2, there was a great flood of the River Thames.<sup>47, 72, 92</sup>

In the year 1529, the winter was one of the most extraordinary that one has ever seen. Not only because there was no frost, but also because in the month of March the weather was as warm as during the Feast of Saint John [24 June]. As a result the greater part of the rye in ears matured and was sold in Paris, *France* even before the new almonds of April. But the weather changed, and on 4 April a very strong cold struck. For a while it was feared that all the fruits of the country would be lost. Fortunately, rains soon came and beat back the effects of the frost so the harvest sustained no damage.<sup>62</sup>

The winter of 1529 had no frost, and heat of March was equalled the temperatures normally observed at the end of June. In March, most of the rye had ears and in Paris, *France* new almonds were sold before



the month of April. But on April 4<sup>th</sup>, there came a very severe frost. So severe it was thought that all the crops were lost. Fortunately the rain came and knocked away the effects of the cold.<sup>79</sup>

The year 1529 in southern *France* was humid and rain.<sup>79</sup>

In 1528 and 1529, “sweating sickness” again plagued *England*.<sup>212</sup>

In 1529, several regions of *China* experienced flooding including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Wên-chou, Chu-chi, Ch’ü, Hsin-ch’ang, Chin-yün, Sui-ch’ang, Hsüan-p’ing and Hangchow.

— Kiangsi (now Jiangxi province) in southern *China* at P’o-yang and Shang-jao.

— Yunnan province in southwest *China* at Ch’êng-chiang. Houses and crops were damaged by the floodwaters.

— Kweichow (now Guizhou province) in southwestern *China* at P’ing-chou.<sup>153</sup>

In 1529, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. During the period between 10 March and 7 April, a drought engulfed several regions of *China*.<sup>153</sup>

In 1529 during the spring, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

**1530 A.D.** In *France*, the heat was extraordinary during the summer.<sup>61</sup>

On 31 August 1530, an Atlantic hurricane struck *Puerto Rico*. Uncounted number of deaths by drowning occurred.<sup>141</sup>

In 1530, the inhabitants of San Juan [*Puerto Rico* was often called San Juan] were in great distress. The storms which had followed the hurricanes had made the rivers overflow their banks, and crops, trees, and herds had been washed away; so that the works at the gold mines, and other undertakings, were suspended.<sup>145</sup>

A great sea flood (St. Felix's Flood) occurred on November 4 in Holland [now *the Netherlands*]. 400,000 people drowned.<sup>28</sup>

In Holland [now *the Netherlands*], there was a great flood in November.<sup>72, 92</sup>

In 1530, there was a general inundation by the failure of the dikes in Holland [now *the Netherlands*]; the number of drowned said to have been 400,000.<sup>90</sup>

In November 1530, a flood from the sea ravaged Calais (*France*), Antwerp (*Belgium*), Cluse, Gravesend (*England*), Mardyck (*France*), Dunkirk (*France*), Newport (Newport, *England*) and almost all the Zealand (*Denmark*).<sup>79</sup>

In *England*, on November 4<sup>th</sup> and 5<sup>th</sup> there was great wind, which blew down houses and trees, then a high tide, which drowned the marshes of Essex, Kent and Thanet, and drowned much cattle.<sup>72</sup>

In *England*, there was a great flood all the year. In Rome, *Italy* on 8 October, there was a great flood.<sup>47, 72, 92</sup>

The fate of Rome, *Italy* caused by the Tiber River overflowing its banks in 1530 was compared to the carnage cause the inundation of the sea in 1521 that killed 100,000 people.<sup>72</sup>

In 1530, several regions of *China* experienced flooding including: <sup>153</sup>

— During the period between 29 January and 27 February, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu. One hundred families were flooded.

— During the period between 25 June and 23 July, floods struck Shantung (now Shandong province) on the east coast of *China* at Ts'ao.

— During the period between 24 July and 22 August, floods struck Shantung province at Hui-min.

— During the period between 23 August and 20 September, floods struck Hupeh (now Hubei province) in central *China* at Huang-kang.

— During the period between 21 September and 20 October, floods struck Yunnan province in southwest *China*.

**1531 A.D.** In *England* on the 16<sup>th</sup> of December, there was a great hailstorm. <sup>57, 72, 93</sup>

In Lyon, *France* there was drought and famine – 8,000 poor foreigners, besides those of the city, were rescued from May 19 to July 9 because of the unbearable heat that prevented any work. <sup>61</sup>

For the preceding two or three years the weather in *England* has been wholly moist, rainy and southerly. And as a result in 1531 pestilence set in. <sup>72</sup>

In 1531, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Yü-yao. <sup>153</sup>

In 1531, there was a great drought in the vicinity of Shanghai, *China*, which included Suchau. <sup>166</sup>

**1532 A.D.** In Holland [now *the Netherlands*], there were great floods. <sup>47, 72, 92</sup>

In 1532, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. During the period between 6 May and 8 August, floods struck Shensi (now Shaanxi province) in central *China* at Nan-ch'êng. Fields and houses were damaged by the floodwaters. During the same time period, floods also struck Hupeh (now Hubei province) in central *China* at Chiang-ling and Hunan province in south-central *China* at Yüeh-yang and Yüan-ling. <sup>153</sup>

In 1532, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-fên and Kansu (now Gansu province) in northwest *China* at Ch'ing-yang. During the period between 3 June and 2 July, a drought engulfed Hupeh (now Hubei province) in central *China* at Chiang-ling. <sup>153</sup>

In 1532 during the spring and summer, there was a great drought in Hupeh, Shansi and Shensi provinces in *China*. <sup>165</sup>

**1533 A.D.** In 1533, several Atlantic hurricanes struck *Puerto Rico*. “So many slaves were killed in the destruction of the twenty-sixth of July, August 23 and August 31”. <sup>141</sup>

In 1533 during the time period between 24 April and 23 May, floods struck Kiangsi (now Jiangxi province) in southern *China*. During the period between 8 August and 8 November, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Hsüan-i [uncertain name]. <sup>153</sup>

In 1533, a severe drought engulfed Shensi (now Shaanxi province) in central *China*; Kansu (now Gansu province) in northwest *China*; and *Mongolia*. During the same year, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Chi-an and Shansi (now Shanxi province) in northern *China* at

I-ch'êng and I-shih. During the period between 24 February and 25 March, a drought engulfed many regions of *China*.<sup>153</sup>

In 1533 during the spring, there was a drought in Shansi province in *China*. At Moukden, this was a great drought.<sup>165</sup>

**1534 A.D.** In *Poland*, there were extensive floods.<sup>47, 72, 92</sup>

In 1534, there was a great flood in *Poland*. The flood began on 26 April. The winter produced very heavy snowfalls. In the spring, this was followed by heavy rainstorms that lasted for days, continuously day and night. On 8 May and three days after, heavy rain began falling in Poland and it seemed like there was so much water that it would cover the earth to the mountains. So the greatest flood in Polish history began. The oldest inhabitants could not remember such a flood. Fields, lakes, gardens, houses and forests were all underwater. In Kraków, Poland, the water moved entire houses to the riverbanks. The great bridge between Kraków and Kazimierz was damaged and broken into three sections and then finally taken away by the waves to the suburb Grzegotki. The waters of the Vistula River finally began to recede and the river was back in its banks on 22 July. In the city of Kazimierz, the water destroyed several houses between the Monastery of Saint Catherine and Skalka. The Dunajec River near the cities Nowy Targ and Sandomierz destroyed all the stonewalls, churches and windmills. In the Village of Szramowice, the water destroyed the church and seven houses. In village of Trzemeśny, a church and many small lakes were destroyed. On 29 June, the San River flooded causing great destruction. Some villages were completely destroyed along with all their cattle, wheat, hay, windmills and wooden houses. On 15 August and the week after, rain again fell in Poland. By 24 August, the flooding was so great that the Vistula River again left its banks.<sup>64</sup> [Kazimierz was a historical district of Kraków. Nowy Targ is located in southern Poland. Sandomierz is located in southeastern Poland. Szramowice is now Sromowce Niżne and is located in southern Poland. Trzemeśny is now Trzemeśnia and is located in southern Poland]

In 1534, there was a great frost in *England*. It lasted from November through February. The River Thames was frozen for some miles below Gravesend. Goods were carried by land across Kent and Essex to London.<sup>212</sup>

In 1534, several regions of *China* experienced flooding including:<sup>153</sup>

— The Yellow River at Shansi (now Shanxi province) in northern *China*. People and cattle drowned and the fields were damaged by the floodwaters.

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Hu-chou, Fêng-hua, Chu-chi, Hsin-ch'ang and Ch'un-an.

— Kweichow (now Guizhou province) in southwestern *China* at Huang-p'ing.

— During the period between 12 June and 10 July, floods struck Kansu (now Gansu province) in northwest *China* at Ch'ing-yang and Ning; Shansi province at Fên-yang; and Shensi (now Shaanxi province) in central *China* at Ching-yang. Innumerable people and cattle drowned.

In 1534, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Wuchang.<sup>153</sup>

In 1534, there was a great drought in Hupeh province in *China*.<sup>165</sup>

**1535 A.D.** In Zurich in central *Switzerland* on the 15<sup>th</sup> of July, there was a great hailstorm.<sup>57, 72, 93</sup>

In 1535, it never stopped raining for two months in *France*.<sup>79</sup>

In 1535 during the period 1-29 June, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Nan-p'ing. During the same time period, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Wu-ming and Ts'ang-wu. At Wu-ming, people drowned. At Ts'ang-wu, 1,000 houses flooded and fields damaged.<sup>153</sup>

In 1535, a drought prevailed along the Sui River in Honan (now Henan province) in central *China*; Anhwei (now Anhui province) in eastern *China*; and Kiangsu (now Jiangsu province) on the east coast of *China*. During the same year, a severe drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Ch'ing-chiang; Honan province and Anhwei province.<sup>153</sup>

In 1535, there was a great drought in Anhwei, Hupeh, Kiangsi and Kiangsu provinces in *China*. The rivers dried up.<sup>165</sup>

**1536 A.D.** The year 1536 produced many storms and tempests. Twenty-four ships were destroyed by one of these hurricanes on the coast of Provence, *France*.<sup>79</sup>

The summer drought of 1536 dried up all sources [of water – springs, creeks, small rivers and lakes] in Provence, *France*.<sup>79</sup>

[Due to the warm summer], the harvest began in Dijon, *France* [early] on 8 September.<sup>62</sup>

In 1536, several regions of *China* experienced flooding including:<sup>153</sup>

— Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow. Over 29,000 people drowned.

— Hunan province in south-central *China* at Shih-mên.

— During the period between 18 June and 17 July, floods struck Shansi (now Shanxi province) in northern *China* at Lin-chin. Fields were damaged by the floodwaters and people and cattle drowned.

In 1536, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Ch'ing-chiang and Fukien (now Fujian province) on the southeast coast of *China*. This drought led to a famine. During the same year, a severe drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton, Kao-yao, Nan-hsiung and Ch'ü-chiang.<sup>153</sup>

In 1536, there was a drought in Fuhkien and Kwangtung provinces in *China*. In Kwangtung, this was a great drought.<sup>165</sup>

**1537 A.D.** In 1537, an Atlantic hurricane struck *Puerto Rico* and many slaves were drowned.<sup>141</sup>

In 1537, a hurricane struck northwest *Cuba* and 2 ships were lost.<sup>141</sup>

In 1537, several regions of *China* experienced flooding including:<sup>153</sup>

— Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hai-fêng. Thousands drowned.

— During the period between 9 May and 7 June, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh and Ch'üan. At P'ing-yüeh, houses and fields were damaged by the floodwaters. At Ch'üan, the city walls and crops were damaged.

— During the period between 8 June and 6 July, floods struck Kwangtung province at Kao-yao and Kwangsi province at Kung-ch'êng. At Kung-ch'êng, crops were damaged by the floodwaters.

— During the period between 6 May and 8 August, floods struck Hupeh (now Hubei province) in central *China* at Yang-hsin and Kwangsi province at Ts'ang-wu. At Ts'ang-wu, all the houses were flooded. During the same time period, floods struck Liaoning province located in the southern part of *China*'s

northeast at K'ai-yüan and Hsing-ch'êng. Houses and crops were damaged by the floodwaters and people and cattle drowned.

In 1537, a drought engulfed Fukien (now Fujian province) on the southeast coast of *China*. This drought led to a famine.<sup>153</sup>

In 1537, there was a drought in Fuhkien province in *China*.<sup>165</sup>

**Winter of 1537 / 1538 A.D.** In Rome, *Italy* on the 12<sup>th</sup> of December 1537, there was a great hailstorm.<sup>57, 72, 93</sup>

In 1537 in *England*, the frost was very severe during December and January.<sup>47, 72, 93</sup>

In 1538 in *England*, the River Thames froze.<sup>62</sup>

During the winter of 1537-38, in *England* in December and January there was severe cold, and the River Thames froze.<sup>62</sup>

In 1537 in *England*, the summer was exceeding rainy. In December and January a great frost. The River Thames was frozen over.<sup>72</sup>

**1538 A.D.** The summer of 1538 was scorching hot in *Italy*. The rivers dried up, and the air was filled with fiery meteors, so people felt earthquakes. In the Kingdom of Naples, *Italy*, the [Tyrrhenian Sea] floor in a region of about eight miles (13 kilometers) was drained. In Dijon, *France*, the grape harvest took place on 20 September.<sup>62</sup>

In 1538, the sea by the Kingdom of Naples [the southern part of the *Italian* peninsula], was dry for eight miles together.<sup>72</sup>

In 1538 and 1539, there was a drought [in *England*]. It was excessively hot and the rivers dried up in the summer.<sup>212</sup>

In 1538, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Hanyang. During the period 6-27 May, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China*; Shensi (now Shaanxi province) in central *China* at Sian; Fukien (now Fujian province) on the southeast coast of *China* at Foochow; and Hupeh (now Hubei province) in central *China* at Wuchang.<sup>153</sup>

In 1538 during the summer, there was a great drought in Chihli, Fuhkien, Hupeh, Shantung and Shensi provinces in *China*.<sup>165</sup>

In 1538 during the period between 26 June and 25 July, floods struck Kiangsi (now Jiangxi province) in southern *China* and Hupeh (now Hubei province) in central *China* at Lo-t'ien. At Lo-t'ien, people drowned. During the period between 8 August and 8 November, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Wu-ming. Houses were flooded.<sup>153</sup>

**1539 A.D.** [In *Europe*], In December and January, it was so warm that the gardens were covered with flowers.<sup>62</sup>

In 1538 and 1539, there was a drought [in *England*]. It was excessively hot and the rivers dried up in the summer.<sup>212</sup>

In 1539, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ü, Chien-tê, Shao-hsing and Chin-hua. During the period between 18 May and 15 June, floods struck Kweichow (now Guizhou province) in southwestern *China* at Szü-nan. Then during the period between 16 June and 14 July, a drought engulfed Chekiang province Hangchow. During the period between 15 July and 13 August, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Hsiang-yang and Ku-ch'êng.<sup>153</sup>

In 1539 during the spring, summer and autumn, there was a great drought in Chêhkiang and Hupeh provinces in *China*. The wells and rivers dried up.<sup>165</sup>

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**1540 A.D.** [In *England*] on March 2, there was a tempest.<sup>72</sup>

In *England*, there was great heat and drought.<sup>47, 72</sup>

In 1540, there was a drought [in *England*]. After a calamitous year, there was an exceedingly early spring, which produced fine weather. The heat lasted from February through 19 September. During this time it rained only 6 times.<sup>212</sup>

In 1540, there was an early harvest [in *England*]. Cherries were ripe by the end of May. Grapes were ripe in July. The middle of the harvest was on 25 June. This year was remarkable for the abundance of corn [grain] and fruit.<sup>212</sup>

In *England* in the summer of 1540, there was an excessive drought. Wells, brooks and rivers were dried up. The River Thames was so low that the salt water flowed above London Bridge. During the end of summer there came a great mortality over the whole Nation because of an epidemic of pestilential ague and blood flux. But in other places, it was the hottest and healthiest year in the memory of man.<sup>72</sup>

[In *Europe*] in 1540, the summer was much hotter and drier than in a large number of preceding years. In *England*, the drought was also excessive, and the wells, springs, rivers were dried up. The River Thames was so dry that the salty seawater moved upstream above the bridge at London. The drought in summer in *Germany* was so great that they suffered from a lack of the necessaries of life [food, drink]. In *Belgium*, the grain and grape harvest was over at the beginning of August. But in Dijon, *France* the grape harvest did not occur until 4 October. The price of corn [grain] in *France* went down to half. In *Italy*, after a drought of five months, a deadly heat wave occurred and the forests erupted in flames. The glaciers of the Alps melted.<sup>62</sup>

The summer of 1540 was unusually hot in *France*.<sup>79</sup>

In 1540 A.D., the summer in *France* produced fine weather and heat that lasted from the month of February to the 19<sup>th</sup> of September. During all this period, it rained all but 6 times. At the end of May ripe cherries were eaten, and grapes in July; the 25<sup>th</sup> of June was the midst of [grain] harvests; and at the beginning of September, the vintage was at its height.<sup>175</sup>

In 1540, the island of *Sardinia* [in the Mediterranean Sea off the west-central coast of Italy] was desolated by a famine.<sup>57, 91</sup>

From 1540 to 1543, there was a general famine in the Sind [now *Pakistan*].<sup>57</sup>

In 1540, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

In 1540, several regions of *China* experienced flooding including:<sup>153</sup>



— During the period between 6 May and 4 June, floods due to heavy and protracted rains struck Hunan province in south-central *China* at Ching. During the same period of time, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ma-p'ing and Hupeh (now Hubei province) in central *China* at Huang-p'o.

— During the period between 4 July and 1 August, floods struck Szechwan (now Sichuan province) in southwest *China* at P'êng, Ch'ung-ning, Hsin-fan, K'ai-chiang and Chin-t'ang. Innumerable houses damaged by the floodwaters. Innumerable people and cattle drowned.

— During the period 1-29 September, floods struck Shansi (now Shanxi province) in northern *China* at Lin. Houses and city walls were damaged by the floodwaters.

In 1540, a drought engulfed Kweichow (now Guizhou province) in southwestern *China* at Shih-ch'ien. During the period between 6 May 1540 and 5 February 1541, a drought engulfed many regions of *China*.<sup>153</sup>

In 1540 during the summer and winter, there was a drought in Hupeh and Kweichow provinces in *China*.<sup>165</sup>

In 1540 during the 7<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a roaring of the sea; a northeast wind; several myriads [a very great number] were drowned; it was a year of dearth; men and crops perished.<sup>166</sup>

**1541 A.D.** In *France*, it was extraordinarily hot.<sup>61</sup>

In 1541, there was a remarkable drought in *England*. At Nottingham, almost all the small rivers dried up, and the River Trent was diminished to a staggering brook. The River Thames was so low that seawater, even at ebb, extended beyond London Bridge. Many cattle died for want of water, especially at Nottinghamshire, and many thousands of people died from grievous diarrhea and dysentery.<sup>212</sup>

In Abassine on 4 and 12 April, there was a tempest of thunder, hail and north wind.<sup>72</sup>

In 1541, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow. Innumerable people drowned. In the same year, a drought engulfed Kweichow (now Guizhou province) in southwestern *China* at Shih-ch'ien and Hopei (now Hebei province) in northern *China* at Peiping. At Peiping, the drought was accompanied by a plague of locusts. During the period between 26 April and 24 May, a drought engulfed Hupeh (now Hubei province) in central *China* at An-lu.<sup>153</sup>

In 1541, there was a drought in Chihli and Kweichow provinces in *China*. At Chihli, the drought was accompanied by a plague of locusts.<sup>165</sup>

In 1541 during the 6<sup>th</sup> moon, freshet [floods] drowned several tens of thousands of people in the vicinity of Shanghai, *China*. During the 7<sup>th</sup> moon, in five prefectures the sea overflowed.<sup>166</sup>

**1542 A.D.** In northern *Italy*, many harvests were done at Padua in May [very early because of the warm weather].<sup>62</sup>

On 14 June 1542, there was a terrible tempest at Buda [Budapest, *Hungary*].<sup>72</sup>

In 1542, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. During the same year, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Lo-yüan and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ên-ch'i. During the period between 15 May and 12 June, floods struck Kiangsi (now Jiangxi

province) in southern *China* at Chi-an. The city walls and 50% of the houses were damaged by the floodwaters.<sup>153</sup>

In 1542, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

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**1543 A.D.** A great flood occurred on the Mississippi River in the *United States* on April 20. The river was 40 leagues (120 miles) wide.<sup>28</sup>

[In *England*], there was a famine.<sup>72</sup>

Explorer Hernando Desoto encountered a flood on the river near Memphis, Tennessee that extended over 40 days and likely extended to the lower reaches of the river. Chronicled by Garcilaso de la Vega.<sup>31</sup>

In *France* on September 6, there was a great flood, greater than any known in the memory of man (except for the Great Flood of Noah). The flood affected towns, cities and countryside and did incalculable damage to Vivarais and Dauphine.<sup>61</sup> [Vivarais now called Ardèche is a department in south-central *France*. Dauphine was a former province in southeastern *France*.]

In 1543, floods struck Shansi (now Shanxi province) in northern *China* at Hsiang-ling. During the period between 4 April and 3 May, floods struck Hunan province in south-central *China* at Lei-yang. During the period between 6 May and 5 August, a drought engulfed Hunan province at Ch'ên. During the period between 8 August and 8 November, floods struck Yunnan province in southwest *China* at T'êng-ch'ung.<sup>153</sup>

In 1543 during the summer and autumn, there was a drought in Hunan and Kwangtung provinces in *China*. In Kwangtung, this was a great drought.<sup>165</sup>

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**Winter of 1543 / 1544 A.D.** During the winter of 1543-44 in *France*, the cold froze the hogsheads of wine. It had to be cut with an axe.<sup>79</sup> [A hogsheads is a large barrels/casks that hold liquid measures, usually alcoholic, approximately 239 litres (63 gallons).]

In *France*, the weather was so cold that the Provence wines ordained for the Army were frozen and cut with hatchets and carried away by the soldiers in baskets. In *England*, wood, flesh [meat], and fish were very dear this winter. This is because the last summer was intemperate and rainy causing a great death of cattle. This winter the plague was in London, and the Terms were adjourned. A most rigorous frosty winter.<sup>72</sup>

Due to the extreme cold, the wine in barrels in *France* was reduced to ice, and had to be cut with an axe.<sup>38, 60</sup>

In 1544, it was so cold in Paris, *France*, that wine froze, and it was sold in pieces by the pound.<sup>58, 80</sup>

In 1544, the cold was so severe in Holland [now *the Netherlands*] that wine was cut in blocks and sold by weight.<sup>63</sup>

In 1544, "The cold was so extraordinary that the wine froze in the casks. It had to be smashed with axes and was sold in pieces by the pound."<sup>62</sup>

The winter of 1544 was remarkably severe all over *Europe*. In Flanders [now *Belgium*], wine froze in casks, and was sold in blocks by the pound weight.<sup>70</sup>

In *Flanders*, the wine in casks frozen into solid lumps.<sup>47, 90, 93</sup>

In *England*, there was a great frost.<sup>47, 72, 93</sup>

**1544 A.D.** In southern *France* in November, the Rhône River produced flood disasters affecting Avignon, Arles, and Tarascon.<sup>61</sup>

In 1544, the Rhône River in southern *France* overflowed its banks on November 11. The waters knocked down a quarter mile (390 meters) of ramparts [city walls] of Avignon [now part of southeastern *France*] and the floodwaters covered the plain for eight days.<sup>79</sup>

In 1544, there was a plague at Canterbury, *England*.<sup>212</sup>

In 1544, floods struck Ningsia (now Ningxia province) in northwest *China* on the Loess Plateau at Ling-wu; and Shansi (now Shanxi province) in northern *China* at Fên-yang and Hsiao-i. Houses and fields were damaged by the floodwaters. During the period between 20 July and 17 August, floods struck Shansi (now Shanxi province) in northern *China* at Li-ch'êng. Houses were damaged by the floodwaters and people and cattle drowned.<sup>153</sup>

In 1544, a drought engulfed many regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Shao-hsing, and Ch'ü. This drought was severe.

— Fukien (now Fujian province) on the southeast coast of *China*. This drought was severe and led to a famine.

— 13 districts of Kiangsi (now Jiangxi province) in southern *China*. This drought led to a famine.

— During the period between 21 May and 19 June, a severe drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsing-ning.

— During the period between 17 September and 15 October, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Hanyang, Mien-yang, Huang-kang and Huang-mei; and Hunan province in south-central *China* at Li and Shih-mên.

— During the period between 17 September and 15 October, a drought engulfed Hupeh at Chung-hsiang.

In 1544 during the summer and autumn, there was a great drought in Chêhkiang, Kiangsi and Hupeh provinces in *China*.<sup>165</sup>

**1545 A.D.** In *England*, a wonderful dearth and extreme prices.<sup>57, 91</sup>

On 20 August 1545, an Atlantic hurricane struck the *Dominican Republic* killing a large number of people.<sup>141</sup>

On 25 July 1545, a tempest and hurricane struck Derbyshire, *England*.<sup>72</sup>

In 1545, a vessel was wrecked by a “norther” in *Mexico*.<sup>141</sup>

In 1545, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Wuchang. The drought occurred with an earthquake. During the same year, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China*. This drought led to a famine. During the same year, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Taichow, Hu-chou, and Shao-hsing.<sup>153</sup>

In 1545, there was a great drought in Chêhkiang and Hupeh provinces in *China*. This led to a great

mortality in Fuhkien.<sup>165</sup>

In 1545 during the period between 5 February and 6 May, floods struck Kiangsi (now Jiangxi province) in southern *China* at Ch'ing-chiang. Crops were damaged by the floodwaters.<sup>153</sup>

In 1545, there was a great drought in the vicinity of Shanghai, *China*.<sup>166</sup>

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**1546 A.D.** In Mechlin in north-central *Belgium* in August, there was a great hailstorm.<sup>57, 72</sup>

In Malines, Flanders [now *Belgium*] in August, there was a great hailstorm.<sup>93</sup>

In 1546 during the period between 8 August and 8 November, floods struck Yunnan province in southwest *China* at Ching-tung.<sup>153</sup>

In 1546, there was an even greater drought in the vicinity of Shanghai, *China*. Rice was very dear.<sup>166</sup>

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**1547 A.D.** In 1547, there was an intense frost in *England*, especially London.<sup>212</sup>

In 1547, the city of Mechlin [Mechelen, *Belgium*] was destroyed by lightning, which fell among 800 barrels of gunpowder.<sup>295</sup>

On 12 August in Tuscany, *Italy*, there was a great flood.<sup>47, 72, 92</sup>

[Emperor Maximilian waged war against the Venetians in *Italy*. There was scarcity of corn [grain]. The weather was southerly and tempestuous. A great swarm of locusts ate all up and made the whole country barren. Then an infectious contagion seized man.<sup>72</sup>]

In 1547, a severe drought engulfed Hunan province in south-central *China* at Yüan-ling. Then during the period between 6 May and 8 August, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Kao-yao. During the period between 15 August and 13 September, floods struck Fukien (now Fujian province) on the southeast coast of *China*. Houses were damaged by the floodwaters. During the period between 8 August and 8 November, floods struck Hupeh (now Hubei province) in central *China* at Ku-ch'êng.<sup>153</sup>

In 1547, there was a great drought in Hupeh province in *China*.<sup>165</sup>

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**1548 A.D.** In *Northern Europe*, oxen drawn sledges traveled on the frozen sea from Rostock, *Germany* to *Denmark*.<sup>47, 90, 93</sup>

In 1548, the winter was so severe that all the rivers in southern *France* froze. On 12, 13 and 14 November, the Rhône River floods again in Avignon and Arles.<sup>61</sup>

The cold reigned from 1548 throughout *Europe*.<sup>79</sup>

On 4 August, there was a great hailstorm at Louvain. There was another hailstorm on 5 September.<sup>72</sup>

In Louvain in central *Belgium* on the 5<sup>th</sup> of September, there was a great hailstorm.<sup>57, 72, 93</sup>

The ice on most rivers in *Europe* is thick enough to bear heavy-laden wagons.<sup>62</sup>

The winter of 1548 was very severe all over *France* and all the rivers were frozen so that they could carry the weight of the heaviest wagon on the ice.<sup>62</sup>

The year 1548 was very rainy and accompanied by great floods in *France*.<sup>79</sup>

[In *England*], it rained all summer.<sup>72</sup>

In 1548, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chin-yün and Hupeh (now Hubei province) in central *China* at Pao-k'ang. During the period between 5 July 1548 and 3 April 1549, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ch'üan. Houses and fields were damaged by the floodwaters.<sup>153</sup>

**1549 A.D.** In *England* on 13<sup>th</sup> of June, there was a flood from the severest rain.<sup>47, 72, 92</sup>

[There was a non-weather related famine in *England*. Because of the rebellion in *England*, the harvest was neglected. Hay and corn [grain] rotted on the ground unharvested, hence a dearth.<sup>72</sup>]

In 1549 in *England*, there was a famine from neglect of agriculture.<sup>72, 91</sup>

In 1549, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Hu-chou. During the period between 24 July and 22 August, floods struck Kansu (now Gansu province) in northwest *China* at Ch'ing-yang. At Ch'ing-yang, houses were damaged by the floodwaters and over 10,000 persons drowned.<sup>153</sup>

**1550 A.D.** On 18 December in *England*, "The Thames flowed thrice in nine hours."<sup>47, 72, 92</sup>

In 1550, there was a very great dearth in *England*. Wheat was sold for 16s. per bushel, which had sold at 10d. a little before. In *Scotland*, great rivers in the middle of winter were dry, and in the summer so greatly flooded which carried downriver and drowned several villages and many feeding cattle from their pastures into the sea. Several whales came up the River Forth. Many hailstorms with hailstones the size of pigeon eggs. The hailstones destroyed the corn [grain].<sup>72</sup>

In 1550, there was a general [universal] dearth.<sup>72</sup>

In 1550, "sweating sickness" again reappeared in *England*. At Chester and York, it was accompanied by so great a dearth that wheat was 15 shillings per bushel.<sup>212</sup>

In 1550, an Atlantic hurricane struck off the Florida Keys in the *United States*. A Spanish ship *Vitacion*, 200 ton, was lost during a hurricane near Havana, *Cuba*.<sup>141</sup>

In 1550, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. Then during the period between 11 September and 9 October, floods struck Yunnan province in southwest *China* at Pao-shan. Houses were damaged by the floodwaters and hundreds of people and cattle drowned.<sup>153</sup>

In 1550, there was a great drought in Chêhkiang province in *China*.<sup>165</sup>

**1551 A.D.** On 10 January and 20 February at Marpurg [or Marburg in central *Germany*], there were great floods.<sup>47, 72, 92</sup>

In 1551, floody as at Marpurg, February 20 and January 10.<sup>72</sup>

A great multitude of people and cattle were drowned by a terrible tempest. The clouds suddenly dissolving and the waters pouring down with such strange and stupendous violence, that the massive walls of many cities, divers [numerous] vineyards, and fair houses were totally destroyed and ruined.<sup>72</sup>

In 1551, "sweating sickness" again reappeared in *England*. It began at Shrewsbury in April, reaching Nottingham in July, and ending in the north in September.<sup>212</sup>

In 1551, there was a flood in *Wales*. "In the night a mighty great wind, and so high a flood that many cattle were drowned upon Saltney [a small town in Flintshire, *Wales*]"<sup>212</sup>

In 1551, an Atlantic hurricane struck in the *Gulf of Honduras*. A ship with many persons were all drowned.<sup>141</sup>

In 1551, a severe drought engulfed Hunan province in south-central *China* at Yüan-ling. In the same year, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui and Hupeh (now Hubei province) in central *China* at I-ch'êng and Kuang-hua. During the period 2-30 August, floods struck Hupeh province at Chün.<sup>153</sup>

In 1551, there was a drought in Hupeh province in *China*.<sup>165</sup>

**1552 A.D.** [During the winter of] 1551-52 on 13 January, the sea broke in at Sandwich [in Kent, *England*], and overflowed all the marshes thereabout, and drowned much cattle.<sup>225</sup>

On 12 & 13 January, there was a tempest of rain, snow, hail, rain, thunder and lightning. In Holland [now *the Netherlands*] on 12 January there was a great flood.<sup>72</sup>

The winter of 1552 was warm and dry in *Italy*.<sup>62</sup>

In 1552, there was a remarkable fall of red rain [in *England*]. "A heavy fall of rain, which lay on the grass as red as wine."<sup>212</sup>

The dry heat of 1552 in northern *France* consumed all the plants in June.<sup>79</sup>

On Friday 17 May 1552 between four and five o'clock in the afternoon, there was a particularly bad storm in Dordrecht, western *Netherlands*, which made the people flee in terror to their homes. For more than half an hour, giant hailstones fell. All the gardens were destroyed. Some hailstones weighed half a pound. On some stones "horns" and "crowns" were seen.<sup>172</sup>

In Budissina (Bautzen in eastern *Germany*) on 13 August, there was a great flood.<sup>47, 72, 92</sup>

In *Italy*, the summer of 1552 was dry and burning hot. The drought lasted for five consecutive years. In *France*, the harvest began at Dijon on 13 September.<sup>62</sup>

In 1552, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang. This drought led to a famine. Then during the period between 21 July and 19 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Mêng-yin and An-ch'iu. During the period between 20 August and 17 September, floods struck Shantung province at Ts'ao and Shan; and Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow, Huai-an and P'ei. [P'ei is located at longitude 118.03° East and latitude 34.30° North.]<sup>153</sup>



In 1552, there was a drought in Kiangsi province in *China*.<sup>165</sup>

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**Winter of 1552 / 1553 A.D.** The winter of 1552-53 is recorded as a harsh winter in Holland [now *the Netherlands*].<sup>62</sup>

During this winter, there was extreme cold in the north. For example, Captain Willoughby looked for the way to the Chinese seas through the northern sea. The ice stranded him during the winter near Arzina, a port in *Lapland*. In the following year (1554) the captain and his entire crew were found frozen to death [by Russian fisherman].<sup>62</sup>

This was the winter of the famous siege of the city of Metz by King Charles V of *France* and the retreat of the French Imperial Army after a heroic defense of the inhabitants of the city. The French Imperial soldiers suffered much from extreme winter cold. After the retreat, they were found in large numbers stiff and rigid in the trenches. The soldiers were sitting on large stones, their legs up to the knees stuck in frozen mud. With most you had to remove the legs, for they were dead and frozen.<sup>62</sup>

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**1553 A.D.** In *Germany* and Holland [now *the Netherlands*] on 19<sup>th</sup> January, there were great floods on the Rhine River.”<sup>47, 72, 92</sup>

In 1553 in *France*, there was burning heat all the month of June.<sup>79</sup>

[In *England*], there was a terrible storm of thunder and lightning.<sup>72</sup>

In 1553, an hurricane struck Texas in the *United States*. Sixteen ships of the New Spanish Fleet were struck by the hurricane and never heard from again.<sup>141</sup>

In 1553, a hurricane struck the west coast of Florida in the *United States* causing approximately 700 deaths.<sup>141</sup>

In 1553, a severe drought engulfed Shensi (now Shaanxi province) in central *China*.<sup>153</sup>

In 1553, there was a great drought in Shensi province in *China*.<sup>165</sup>

In 1553, several regions of *China* experienced flooding including:<sup>153</sup>

— Shansi (now Shanxi province) in northern *China* at Hsing. The city walls were damaged by the floodwaters.

— During the period between 6 May and 8 August, floods struck Hopei (now Hebei province) in northern *China* at Pao-ting. Innumerable people and cattle drowned.

— During the period between 11 June and 10 July, floods due to heavy and protracted rains struck Hupeh (now Hubei province) in central *China* at Ma-ch'êng and Huang-kang. Thousands of people drowned.

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**Winter of 1553 / 1554 A.D.** At the end of the year in 1553, heavy snowfalls in Velay, Gévaudan and Vivarais, *France*.<sup>61</sup> [Gévaudan is located in south central France.]

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**1554 A.D.** In *Ireland*, there were perpetual rain all winter; great floods.<sup>47, 92</sup>

In *Ireland*, there were perpetual rain, hail, a tempest.<sup>93</sup>

In November 1554, a hurricane struck *Cuba*. The admiral's ship was sunk. A small caravel was also sunk with all but two people drowning.<sup>141</sup>

In 1554, an Atlantic hurricane struck the *Mona Passage* [a strait that separates the islands of Hispaniola and Puerto Rico]. A Spanish ship was wrecked by this hurricane.<sup>141</sup>

In 1554, a hurricane struck offshore the southern coast of Texas in the *United States*. “Three ships from the New Spain fleet, the *Santa Maria de Yciar*, *Espiritu Santo*, and the *San Esteban*, were lost in a storm off what would later become Padre Island, Texas. A few survivors managed to escape in a small boat.”<sup>141</sup>

Around 1554, an Atlantic hurricane struck *Bermuda*. Of the other ships that had sailed with them (the *San Miguel*), weeks before, the leading ship from Veracruz sank in that hurricane that caught up with them in *Bermuda*. Twenty-five survived.”<sup>141</sup>

In 1554, a severe drought engulfed Hunan province in south-central *China* at P’ing-chiang and Hupeh (now Hubei province) in central *China* at Huang-p’o and Ch’i-shui.<sup>153</sup>

In 1554, there was a great drought in Hupeh province in *China*.<sup>165</sup>

In 1554, several regions of *China* experienced flooding including:<sup>153</sup>

— Shansi (now Shanxi province) in northern *China* at Ching-yüeh. The city walls and houses were damaged by the floodwaters.

— Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou.

— Hupeh (now Hubei province) in central *China* at Wuchang, Mien-yang and Kung-an.

— During the period between 5 February and 8 August, floods struck Hopei (now Hebei province) in northern *China* at Ta-ming.

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**1555 A.D.** In London, *England* on the 1<sup>st</sup> of September, there was a great hailstorm.<sup>57, 72, 93</sup>

In *England* on 21 September, there were great floods on the River Thames.<sup>47, 72, 92</sup>

On 30 September 1555, there was a notable inundation of the River Thames [in London, *England*]. It was caused by a great wind and rain.<sup>225</sup>

In *England*, the year 1555 was a very wet, rainy, floody year. There was great scarcity. A fatal hot burning fever took hold in *England*. On the bare rocks on the seaside of Suffolk, grew of their own accord, a plentiful crop of peasons [type of bean]. These were ripe in August. They grew where grass never grew before. These greatly relieved the poor, who carried them away in great quantities. As they gathered them, still more were coming on and others in blossom. From the wetness and coldness of the season in 1555, several types of epidemics appeared in Paris, *France*.<sup>72</sup>

A plague infested Loughborough in Leicestershire, *England* beginning in 1555. It infested the city from Midsummer of 1555 to Midsummer of 1559. The plague went by several names including: Swat, New Acquaintance, Stoupe, Knave, and Know thy Master.<sup>212</sup>

[In *Western Europe*] the year 1555 was mostly excessively rainy.<sup>72</sup>

In 1555, an Atlantic hurricane struck the *Bahama Channel*. The ship *Capitana* of the New Spanish Fleet was lost in the storm. [The Old Bahama Channel is a strait off the northern coast of Cuba and the Sabana-Camagüey Archipelago and south of the Great Bahama Bank. It is approximately 100 miles (161 kilometers) long and 15 miles (24 kilometers) wide.]<sup>141</sup>

In 1555, floods struck Shansi (now Shanxi province) in northern *China* at Jung-ho and Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. At Jung-ho, the crops were damaged by the floodwaters.<sup>153</sup>

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**1556 A.D.** Lyon, *France* experienced a drought. The rain stopped for four and a half months, from March 26 until August 10.<sup>61</sup>

The summer of 1556 was hot in southern *France*.<sup>79</sup>

In 1556 in *Italy*, the heat was excessive. In *France* the sources of water dried up. The grape harvest took place in Dijon, *France* on 5 September. Corn [grain] was in short supply this year.<sup>62</sup>

[In *Western Europe* in 1556, there was a great famine not caused by weather. After a great scarcity of corn [grain], not from famine but because the rich corn-mongers had bought and hoarded it up, until it spoiled. This forced the poor to eat ox and swine dung. In *the Netherlands*, a sudden and terrible plague broke out between Delph [Delft] and The Hague, which spread over the whole country in June.<sup>72</sup>]

In *England* in 1556 and 1557, there was a great scarcity of corn [grain] from the past great rains. All the corn was choked and blasted, the harvest was excessively wet and rainy. Wheat sold for 55s. per Quarter [quarter ton], but a good and plentiful crop at harvest brought it to 4s. or 5s.<sup>72</sup>

In *England* from 1556 to 1558, there was a famine from great rains, bad and inconstant seasons, heat and long south winds.<sup>57, 72, 91</sup>

In 1556, there was a drought [in *England*]. The drought was so great that the springs dried up and wheat rose from 8 shillings to 53 shillings per quarter [quarter ton]. At Chester, *England* the wheat was 16 shillings per bushel and barley was 12 shillings and very dear [scarce].<sup>212</sup>

In 1556 at Nottingham, *England* and throughout *England*, there was a plague and a dreadful famine.<sup>212</sup>

In 1556, there was a famine in the Delhi District in *India*.<sup>156</sup>

— During the first year of the reign of Akbar, there was a great scarcity in Hindustan. “In some districts, and especially in the provinces of Delhi, it reached a most alarming height. Though men could find money, they could not get sight of corn [grain]. People were driven to the extremity of eating one another, and some formed themselves into parties to carry off the corpses for their food.”

In 1556 A.D., during the first year of Akbar’s [Akbar the Great] reign, there was a famine in Delhi and its neighborhood in *India*.<sup>179</sup>

[In *England*] on 29 December, there was a terrible storm of thunder and lightning.<sup>72</sup>

In 1556 during the period between 9 May and 6 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch’ang. Innumerable people drowned. The land tax was remitted. Then during the period between 7 June and 6 July, a drought engulfed Yunnan province in southwest *China* at Shun-ning. During the period between 7 July and 4 August, a drought engulfed Yunnan province at Ching-tung.<sup>153</sup>

In 1556 during the spring and summer, there was a drought in Yunnan province in *China*.<sup>165</sup>

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**1557 A.D.** In *France* on 10 September, there were floods near the district of Languedoc.<sup>47, 72, 92</sup>

This year in *France*, there was a great flood in the south of Languedoc, with so dreadful a tempest, that people imagined it was the last day. The rapid descent of the waters about Nismes [Nîmes], removed divers [diverse] heaps and mountains of ground, and rent and tore up many other places. By which was discovered much gold and silver coins, plate, and other valuable vessels supposed to be hid in the Gothic Invasion.<sup>72</sup>

[In *England*] in September there were excessive rains, which were fatal to priests.<sup>72</sup>

In 1557, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at P'ing-yao. Also in the same year, floods struck Hopei (now Hebei province) in northern *China* at Lai-yüan and Shansi province at Chin-ch'êng. Houses were damaged by the floodwaters.

In 1557, there was a great drought in Shansi province in *China*.<sup>165</sup>

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**1558 A.D.** In *England*, there was drought the whole year and hot.<sup>47, 72</sup>

In 1558 in *England*, the River Thames went dry.<sup>72</sup>

Within a mile of Nottingham, *England* was a grievous tempest with thunder, which as it came through two towns, beat down the churches and all the houses, cast the bells to the outside of the churchyard, and twisted the sheets of lead like a pair of gloves and threw them 400 feet into the field. The water and mud of the River Trent between them was taken up, carried a quarter of a mile, and thrown in the trees. Trees were torn up by the roots. Hailstones that were 15 inches about fell down. A child was taken out of a woman's arms and carried up into the air, then let fall, had its arm broken and died. Six men were killed. Yet had neither flesh nor skin hurt. Now another great scarcity of corn [grain] from want of workers to harvest it. Corn sold for 14s. per Quarter [quarter ton]. In *England*, there was a cold winter with a North wind, a southerly rainy spring, and an excessively hot summer. At harvest time, dysenteries broke out in *France* and Paris. In *Europe*, all the spring, summer and at harvest time was hot and dry.<sup>72</sup>

On 7 July 1558, there was a great thunderstorm [and possible tornado] within a mile of Nottingham, *England*. As it passed through two towns, it beat down all the houses and churches. The bells were cast to the outside of the churchyards, and some of the webs of lead were thrown 400 feet [122 meters] into the field like writhen leather. The water with the mud in the bottom was taken from the River Trent and carried a quarter mile [0.4 kilometers] and cast against trees. The trees were torn up by the roots and cast 12 score yards [720 feet, 220 meters] off. A child was taken from a man's hand, and carried 2 spears length high and then let fall 200 feet [61 meters] off. The child died from the fall. Five or six men were slain during the storm during which hailstones fell measuring 15 inches [38 centimeters] in circumference. The hamlets of Sneinton and Gedling had all its houses and both their churches blown down.<sup>212</sup>

In 1558, there were many tempests. On 9 January, a tempest struck Dover, *England*. On 18 June, a tempest struck Calais, *France* and last for 5 days. On July 11, a tempest struck Nottingham, *England* with wind and hail. On 15 July, a tempest struck *France*.<sup>72</sup>

In July 1558, a storm of hail in Northamptonshire, *England*, when the stones measured 15 inches in circumference.<sup>43</sup>

In March 1558, there was a most destructive hurricane in *England*.<sup>72</sup>

In 1558, there was a great mortality in *England*. At Nottingham much corn [grain] was lost in the fields for want of laborers. Many churches were shut up because the clergy were dead. East and West Retford

suffered severely. In the small hamlet of West Retford between July and October, 82 people died.<sup>212</sup>

In 1558, the spring, summer and fall were hot and dry in a large part of *Europe*. The grape harvest in Dijon, *France* began on 30 September.<sup>62</sup>

In 1558, floods struck Yunnan province in southwest *China* at Yung-p'ing and T'êng-ch'ung. Houses and fields were damaged by the floodwaters and several hundred families were flooded. During the period between 16 June and 14 July, floods struck Liaoning province located in the southern part of *China's* northeast at Liao-yang. During the period between 6 May and 8 November, a drought engulfed Shansi (now Shanxi province) in northern *China* at P'ing-lu. [P'ing-lu is located at longitude 111.00° East and latitude 34.51° North.]<sup>153</sup>

In 1558 during the summer and autumn, there was a drought of long duration in Shansi province in *China*.<sup>165</sup>

**1559 A.D.** On 20 August 1559, a hurricane struck offshore western Florida in the *United States* causing greater than 500 fatalities.<sup>141</sup>

The grape harvest in Dijon, *France* took place on 4 September, which is 20 days earlier than average.<sup>62</sup>

In *England* on 5 September 1559, there was a terrible tempest of wind and thunder.<sup>72</sup>

In 1559, a hurricane struck off the northwest Florida coast of the *United States*. Six Spanish ships were lost in the hurricane.<sup>141</sup>

On 19 September 1559, a hurricane struck off the coast of Florida in the *United States*. There was a great loss of life by a tempest from the north. There was a great loss of seamen, and passengers (less than 1,500).<sup>141</sup>

In 1559, a severe drought engulfed Yunnan province in southwest *China* at Hsiang-yün. During the period between 6 May and 8 August, a drought engulfed Shansi (now Shanxi province) in northern *China* at P'ing-lu. [P'ing-lu is located at longitude 111.00° East and latitude 34.51° North.] Then during the period between 6 June and 4 July, floods struck Hupeh (now Hubei province) in central *China* at Hsiang-yang. Hsiang-yang again experienced flooding during 1-29 October.<sup>153</sup>

In 1559, there was a great drought in Yünnan province in *China*. As a result, the land tax was remitted.<sup>165</sup>

In 1559 during the 5<sup>th</sup> moon, there was a flood in the vicinity of Shanghai, *China*.<sup>166</sup>

**1560 A.D.** In *England* on 17 December 1560, there was an irregular tide when the River Thames flowed three times in 9 hours.<sup>72</sup>

[In *England*], there was a terrible storm of thunder and lightning.<sup>72</sup>

In 1560, Lake Constance in *Switzerland* experienced a great flood.<sup>175</sup>

In 1560, many regions of *China* experienced flooding including:<sup>153</sup>

- Honan (now Henan province) in central *China* at Yen-shih. Crops were damaged by the floodwaters.
- Yunnan province in southwest *China* at Yung-pei.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Nanking.

— During the period between 25 April and 24 May, floods struck Hupeh (now Hubei province) in central *China* at Hsiang-yang, I-ch'êng and Ch'i-shui; Hunan province in south-central *China* at Hui-t'ung and Ching; and Kiangsu province at Pao-ying.

— During the period between 23 July and 20 August, floods struck Hupeh province at Chiang-ling and Wuchang; and Hunan province at Yüeh-yang.

— During the period between 21 August and 19 September, floods struck Hunan province at Han-shou.

— During the period between 20 September and 18 October, floods struck Hupeh province at Huang-kang.

In 1560 during the 7<sup>th</sup> moon in the vicinity of Shanghai, *China*, it rained day and night from the 6<sup>th</sup> to the 11<sup>th</sup>. The floods carried away houses.<sup>166</sup>

In 1560 during the period between 8 August and 8 November, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea.<sup>153</sup>

In 1560 during the spring, summer and autumn, there was a great drought in Kwangtung and Shantung provinces in *China*.<sup>165</sup>

**1561 A.D.** In Brussels, *Belgium* on the 21<sup>st</sup> of April, there were great floods.<sup>47, 92</sup> [Another source places this event on 23 April.<sup>72</sup>]

In 1561, there was another great scarcity of corn [grain] in *England*.<sup>72</sup>

In February 1561 on St. Matthias day, there was a great storm of thunder and lightning in London, *England*.<sup>212</sup>

In June 1561, a thunderstorm struck London, *England*. St. Paul's Cathedral was struck by lightning and the steeple burned.<sup>212</sup>

In London, *England* in 1561, "the spire of the Cathedral Church of Saint Paul's being 520 foot from the ground, and 260 from the square steeple, where it was placed, and was made of wooden materials, but covered with lead, was with lightning burnt down, together with the roofs of that large church, and that within the space of five hours; the roofs were afterwards reedified, but not the spire."<sup>92</sup>

The winter of 1561 in northern *France* was one of the toughest.<sup>79</sup>

In 1561, several regions of *China* experienced flooding including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Hu-chou and Ch'ü. These floods resulted in a famine.

— Yunnan province in southwest *China* at Chan-i.

— During the period between 14 May and 12 June, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Sung-chiang; and Chekiang province at Hu-chou and Chia-hsing. Crops were damaged by the floodwaters.

In 1561 during the period between 14 February and 15 March, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping.<sup>153</sup>

In 1561 during the spring, there was a drought in Chihli province in *China*.<sup>165</sup>

**1562 A.D.** In 1562 [in *England*], wheat was very dear [scarce]. It sold for 17 shillings a bushel.<sup>212</sup>



Paradin, in *Annales de Bourgogne*, bk. 1, p. 149, speaks of a miraculous ice stone that fell in April 1562 in the Beaujolais region of central *France*.<sup>79</sup>

In 1562, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou. During the period 1-30 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang.<sup>153</sup>

In 1562, a drought engulfed Hupeh (now Hubei province) in central *China* at Chiang-ling. During the period between 5 February and 8 November, a drought engulfed Shansi (now Shanxi province) in northern *China* at P'ing-lu. [P'ing-lu is located at longitude 111.00° East and latitude 34.51° North.] During the period between 6 May and 8 August, a severe drought engulfed Honan (now Henan province) in central *China* at Yen-shih.<sup>153</sup>

In 1562 during the spring and summer, there was a drought in Honan, Hupeh and Shansi provinces in *China*. In Honan, this was a great drought.<sup>165</sup>

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**Winter of 1562 / 1563 A.D.** In the winter of 1563, the River Scheldt froze near Antwerp, *Belgium* and the River Thames froze in London, *England*.<sup>62</sup>

The winter of 1562-63 was severe in Flanders [now *Belgium*]. In Antwerp, *Belgium* it began to freeze in mid-December. From the Feast of St. Stephen (26 December) to 5 January there was ice [on the River Scheldt]. In London, *England*, it began on 21 December to freeze with such vehemence that by 1 January, people were crossing the River Thames on the ice; and the people amused themselves on the ice as on the mainland; but the frost was short-lived. The thaw began on 2 January, and on the 5<sup>th</sup> there was no ice on the river to be seen.<sup>62</sup>

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**1563 A.D.** In Leicester in Leicestershire, east Midlands, *England*, there was storm.<sup>40</sup>

During the night of 9 January 1563, a great tempest of wind and thunder at Leicester, *England*, which did great damage.<sup>72</sup>

In 1563, there were several great tempest of wind, thunder and lightning that struck [*England*]. These occurred on 9 January, in July, and on December 1-12.<sup>72</sup>

In 1563, a hurricane struck near Cape Canaveral, Florida in the *United States* causing 284 deaths.<sup>141</sup>

From August to October 1563, five vessels went missing at the latitude of Bermuda in the *Atlantic Ocean*. [This loss was likely attributed to storms/hurricanes.]<sup>141</sup>

In *England*, from the 1<sup>st</sup> to the 12<sup>th</sup> of December, there was greater thunder and lightning than any alive remembered.<sup>72</sup>

In 1563 in London, *England*, famine and pestilence, said to have taken off 20,000 people.<sup>57, 91</sup>

In 1563, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ing-t'ien. During the period between 20 June and 19 July, a drought engulfed *China*. During the period between 8 August and 8 November, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Hsiao-kan.<sup>153</sup>

In 1563 during the summer and autumn, there was a great drought in Hupeh province in *China*.<sup>165</sup>

In 1563, in the vicinity of Shanghai, *China*, there was a famine. As a result [of starvation], the people scattered. Attacks were made on granaries. The leader of the riots was beheaded.<sup>166</sup>

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**1564 A.D.** In Louvain, *Belgium* on the 24<sup>th</sup> of January, there was a great hailstorm.<sup>57, 72, 93</sup>

In Essex, *England* on the 17<sup>th</sup> of July, there was a great hailstorm.<sup>57, 72, 93</sup>

In Northamptonshire, *England*, there was a hailstorm “when the stones measured 15 inches in circumference.”<sup>57, 93</sup>

A storm of hail in Northamptonshire, *England*, when the stones measured fifteen inches in circumference in July 1558.<sup>40, 41, 56</sup> [This event most likely occurred in 1564.]

In *England* on the 20<sup>th</sup> of September, the River Thames greatly overflowed.<sup>47, 72, 92</sup>

In *England* on the 20<sup>th</sup> of September, was a great flood in the River Thames. Marshes overflowed, and cattle drowned.<sup>72</sup>

In *England* on the 26<sup>th</sup> of December, there was a great hailstorm.<sup>57</sup>

[In *England*], there was a terrible storm of thunder and lightning.<sup>72</sup>

In 1564, the plague was very violent in Leicester, *England*. It was so severe that the assizes [court] had to be held at Loughborough instead. It was also severe in Canterbury.<sup>212</sup>

In 1564, floods struck Chekiang (now Zhejiang province) on the east coast of *China* and Kiangsi (now Jiangxi province) in southern *China* at Nan-ch’ang. During the same year, a drought engulfed Shansi (now Shanxi province) in northern *China* at Jung-ho and Yunnan province in southwest *China* at Ch’u-hsiung. During the period between 10 May and 8 June, a severe drought engulfed *China*.<sup>153</sup>

In 1564 during the spring and summer, there was a drought of long duration in Shansi and Yunnan provinces in *China*.<sup>165</sup>

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**Winter of 1564 / 1565 A.D.** In *England* on the 21st of December, began a frost, which continued so extremely that on New Year’s Eve people went over and along the Thames on the ice from London Bridge to Westminster. Some played football as boldly there as if it had been on the dry land; diverse of the court shot daily at pricks set up on the Thames; and the people, both men and women, went on the Thames in greater numbers than in any street of the city of London. On the 31st day of January, at night, it began to thaw, and on the fifth day was no ice to be seen between London Bridge and Lambeth, which sudden thaw caused great floods and high waters, that bare down bridges and houses, and drowned many people.<sup>29</sup>

In *England*, on 1 December 1564 began a frost, which froze the River Thames so as people went over on the ice. Boys and men played on it. On 3 January, it thawed and resulted in a very great flood.<sup>72</sup>

In 1564, there was a great frost in London, *England* at Christmas. “Surface of river Thames solid as a rock. The population left the streets to walk the whole distance from Westminster to London Bridge on the ice, the Queen Elizabeth was daily on the river. The frost broke up suddenly into fearful inundations, bearing down houses, bridges, and vessels, to destruction. At Chester the river Dee frozen over, so that people played football thereon.”<sup>212</sup>

In *England*, there was frost from 21 December 1564 to 14 February 1565 with one remission.<sup>72</sup>

In *England* beginning on 21 December 1564, there were diversions on the frozen River Thames.<sup>47, 90</sup>

In *England*, there were fairs on the frozen River Thames in 1564.<sup>90</sup>

In *England* in 1564, there were diversions on the frozen Thames.<sup>93</sup>

In *England*, the frost lasted six weeks.<sup>29</sup>

In 1565, the Rhône River froze across its full width in Arles, *France*.<sup>38, 60</sup>

In 1565, the Rhône River in France froze.<sup>58, 80</sup>

In 1565 in the *Netherlands*, the Scheldt River frozen so as to bear laden wagons.<sup>47, 90, 93</sup>

In 1564 in *France*, the river remained frozen allowing carts to cross over the ice for two whole months. The cold killed the olive trees.<sup>79</sup>

In 1565, the Seine River in *France* froze since the start of January. Loaded carts travel on the ice on the River Meuse. The Scheldt River froze and the Rhône River at Arles, *France* was frozen across its full width. The ice on the River Thames in London, *England* supports pedestrian traffic.<sup>62</sup>

In Paris, *France*, the winter lasted from 20 December 1564 to 24 March 1565. In Liège, *Belgium* the frost lasted from 14 November 1564 to April 1565. On the river goods were sold from small stalls on the ice. In December, the River Thames in *England* was frozen so far that one could walk over it. In *Provence*, the Rhône River at Arles was frozen to its full width and the olive trees were damaged.<sup>62</sup>

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**1565 A.D.** In Louvain, *France*, there was a great inundation from the sea; wind.<sup>47, 92</sup>

On 2 February, there was a flood at Louvain; wind blew the Sea in.<sup>72</sup>

In *England* on 20 May 1565, there was a hailstorm that extended into several counties including Dorset, Surrey and Monmouth.<sup>93</sup> [Dorset is located in southwest *England* on the English Channel. Surrey is located in southeastern *England*. Monmouth is a town in southeast *Wales* situated close to the border with England.]

On 16 July 1565 from nine at night to three in the morning, there was a great tempest of thunder, lightning and hail, in many place [in *England*]. In the morning of 24 December, there was a hurricane and west winds. The River Thames and the Sea were both blown in. Great damage done by both.<sup>72</sup>

In 1565 throughout the *British Isles*, there was an extended famine.<sup>57, 90, 91</sup> 2,000,000*l.* was said to have been expended in importation of grain.<sup>57</sup>

In 1565, there was a famine in *Britain*.<sup>212</sup>

In 1565 [in *Germany*], there was a severe winter, then a lot of fog, leading to many diseases of the eyes, followed by a poor summer. As a result there were crop failures and famines.<sup>172</sup>

On 22 September 1565, an Atlantic hurricane struck Florida and the eastern coast of the *United States*. Many French vessels were lost at sea during the storm. Of the original 600 soldiers and sailors, 529 survivors could be accounted for.<sup>141</sup>

In 1565, several regions of *China* experienced flooding including:<sup>153</sup>

- Chekiang (now Zhejiang province) on the east coast of *China* at Chu-chi.
- Hupeh (now Hubei province) in central *China* at Chiang-ling.
- Hunan province in south-central *China* at Yüeh-yang, Changsha and Han-shou.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Pao-ying.
- During the period between 27 July and 25 August, floods struck Kiangsu province at Suchow and P'ei. As a result, the canals were damaged. [P'ei is located at longitude 117.00° East and latitude 34.47° North.]

In 1565, a drought engulfed Shansi (now Shanxi province) in northern *China* at Fên-ch'êng and a severe drought engulfed Hupeh (now Hubei province) in central *China* at Tzū-kuei.<sup>153</sup>

In 1565, there was a drought in Hunan and Shansi provinces in *China*.<sup>165</sup>

**1566 A.D.** In *England*, there was a drought all summer and during harvest.<sup>47, 72</sup>

In Chelmsford, (Essex) *England*, there was a hailstorm that destroyed 500 acres of grain.<sup>41, 57, 93</sup> That destroyed 500 acres of corn.<sup>40</sup>

In 1566 in *England*, the spring had great and almost continuous rains, with most frightful floods. The summer and harvest were droughty and clear. There was not one drop of rain the whole harvest. At Commora [Comora or Komárom in northern *Hungary* on the border with Slovakia] broke out the Hungarian Fever [typhus] in the Emperor Maximilian's Army, just before he broke up the Campaign against the Turks. The excessive spring rains had made them two months later in taking the field. It increased at Gewer and when his soldiers were disbanded, they carried the contagion along with them and dispersed it all over *Europe*, especially over *Germany*, *Burgundy*, *Italy*, Bohemia [now western *Czech Republic*], and Flanders [now *Belgium*]; but chiefly in Vienna, *Austria*, through which most of them past in their return home. They infected all houses there where they laid, and died so fast themselves, that the streets were covered with dead bodies. This increased the infection.<sup>72</sup>

The rains of 1566 were stormy in southern *France*.<sup>79</sup>

On 26 December 1566 in *England*, there was a great hailstorm.<sup>72, 93</sup>

In 1566, floods struck Hupeh (now Hubei province) in central *China* at Chün, Kuang-hua, Chiang-ling, Huang-mei and Wuchang; and Shansi (now Shanxi province) in northern *China* at Liao. During the period between 8 August 1566 and 5 February 1567, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China*.<sup>153</sup>

In 1566 during the autumn and winter, there was a great drought in Fuhkien province in *China*.<sup>165</sup>

In 1566 during the 7<sup>th</sup> moon, a typhoon struck in the vicinity of Shanghai, *China*. A great wind and rain leveled houses and one monumental gate.<sup>166</sup>

**1567 A.D.** The arsenal of Venice, *Italy* was struck by lightning, which caused a fire among the pitch, tar, and other combustibles. This produced a terrible explosion. Soon after there was a great dearth.<sup>72</sup>

In 1567, off the coast of *Dominica*, six ships carrying 3 million pesos were wrecked in a storm [hurricane]. The island natives killed all the survivors.<sup>141</sup>

In 1567, a tempest and hurricane struck Paris, France.<sup>72</sup>

In 1567, there was frost in *England*.<sup>72</sup>

In 1567, there was a most severe winter in *England*. There was a great scarcity of hay. It sold for 5*d.* a stone at Peak and Yorkshire. The following summer, there was an excessive drought and a great death of cattle.<sup>72</sup> [The Peak District is located in north-central *England*]

In 1567, a drought engulfed Yunnan province in southwest *China* at Hsiang-yün. During the same year, floods struck Yunnan province at Sung-ming. Houses were damaged by the floodwaters and people and cattle drowned. During the period between 7 June and 5 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lien. During the period between 5 August and 2 September, floods struck Hupeh (now Hubei province) in central *China* at Ku-ch'êng.<sup>153</sup>

In 1567, there was a drought in Yünnan province in *China*.<sup>165</sup>

**1568 A.D.** [In *England*] all spring there were continual rains.<sup>72</sup>

In *England*, the summer was excessively hot, with a dearth of cattle.<sup>47</sup>

In *England* in 1568, there was an excessive drought and hot, with death of cattle.<sup>72</sup>

At Rome, *Italy*, this year were such floods of the Tiber River, that they carried off and washed away, even to the foundation, a great part of the city, leaving very little behind. Besides the inestimable loss of the city and its great riches, and of innumerable cattle and 1,500 people drowned in it.<sup>72</sup>

On the 18<sup>th</sup> of March there was a most dismal and destructive hurricane in *England* and Holland [now *the Netherlands*]. On 1 November 1568 the Sea swelled excessively overflowing some banks, and broke down others, by a prodigious and unheard of deluge. It covered some islands of *Zealand*, a great part of the sea coast of *Holland*, and almost all *Friesland*. It was a foot higher than the deluge of 1528 (which swallowed up 72 villages). Here was an incomparable loss of estates, but especially of men. In *Friesland* alone 20,000 people were drowned. Their bodies with the carcasses of cattle, household goods, etc. floated all over the fields, and sea being indistinguishable. People that had climbed to the tops of high hills and trees, when the flood just started were saved by boats. In *Italy*, it was excessively hot and moist with a south wind.<sup>72</sup>

In 1568, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Sui-ch'ang, Taichow and Wên-chou.<sup>153</sup>

In 1568, several regions of *China* experienced a drought including:<sup>153</sup>

— Shansi (now Shanxi province) in northern *China* at Lin-fên, Fên-ch'êng, An-tsê, and Shuo. This drought was severe.

— Shensi (now Shaanxi province) in central *China* at P'u-ch'êng and Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang and Lin-ch'uan. These droughts led to a famine.

— During the period between 25 June and 23 July, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow; Fukien (now Fujian province) on the southeast coast of *China* at Foochow; Szechwan (now Sichuan province) in southwest *China* at Chengtu; Shensi province

at Sian; Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an; and Anhwei (now Anhui province) in eastern *China* at Fêng-yang.

— During the period between 23 August and 19 September, a drought engulfed Chekiang province at Chin-hua.

In 1568 during the summer and autumn, there was a great drought in Anhwei, Chêhkiang, Fuhkien, Kiangsi, Kiangsu, Shansi, Shensi and Sze-ch'wan provinces in *China*.<sup>165</sup>

In 1568, there was a famine over two fus [prefectures] in the vicinity of Shanghai, *China*.<sup>166</sup>

**Winter of 1568 / 1569 A.D.** From the 11<sup>th</sup> to the 21<sup>st</sup> of December 1568, the Rhône River in *Western Europe* was passable on the ice. The ice was sufficiently thick to support the weight of carts.<sup>38, 60, 62</sup>

In 1568, the Rhône River in *France* froze.<sup>58, 80</sup>

On 11 December 1568, the carts cross the Rhône River in southern *France* and the ice held until the 21<sup>st</sup>.<sup>79</sup>

It was reported that the winter in 1568 in Châtellerault in western *France*, was remarkable because of the snow and ice. On 19 December 1568, unusually cold weather forced the Duke of Anjou, to break off his siege of Loudon in western *France*.<sup>62</sup>

**1569 A.D.** In *England* and *France*, there were great floods.<sup>47, 92</sup>

On 13 January 1569, there was a great flood at Louvain, *France* with lightning. On June 7, there was a great flood at Tocester [Towcester], *England* with hail and rain.<sup>72</sup>

[In *England*] on 13 July, there was a terrible storm of thunder and lightning with hail.<sup>72</sup>

[In *England*] from 1568-1573, the years were mostly rainy, terrible, and tempestuous bad weather.<sup>72</sup>

On 30 October 1569, a great gale [tornado] struck Ashley in Northamptonshire, *England*. “A great gale, only sixty yards broad, and only lasting seven minutes, but destroying everything in its path.”<sup>212</sup>

On 30 October 1569, a formidable hurricane [tornado] struck Ashley in Northamptonshire, *England*. It was 60 yards in breadth and spent itself in about 7 minutes. It was first observed assaulting a milkmaid, taking her pail and hat from off her head, and carrying her pail many scores of yards from her, where it lay undiscovered some days. Next it struck a yard in Westthorp [Westhorpe?] where it blew a wagon body off its axle, breaking the wheels and axle in pieces and blowing three of the wheels, so shattered, over a wall. Another wagon was driven into the side of a house. It blew the roof off the parsonage house.<sup>233</sup>

In *Italy*, there was a great dearth of corn [grain] from excessive rains and mildew.<sup>72</sup>

In 1569, many regions of *China* experienced flooding including:<sup>153</sup>

— Honan (now Henan province) in central *China* at Chi.

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Li-shui, Taichow and Hsin-ch'ang.

— Hupeh (now Hubei province) in central *China* at Chiang-ling, Hsiang-yang and Chung-hsiang.

— Hunan province in south-central *China* at Yüeh-yang.



- During the period between 16 May and 13 June, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an and Yangchow. The floods resulted in a famine.
- During the period between 14 June and 13 July, floods struck Shantung (now Shandong province) on the east coast of *China* at Kuan-t'ao. Innumerable people and cattle drowned.
- During the period between 12 August and 10 September, floods struck Shantung province. Innumerable people and cattle drowned.

In 1569 during the 10<sup>th</sup> moon, on an early winter night, there was a storm of thunder and lightning in the vicinity of Shanghai, *China*. Pear and peach trees flowered, grain sprung up and maiden-hair [Ginkgo] trees fruited.<sup>166</sup>

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**1570 A.D.** [During the winter of] 1569-70, on 10 March 1570, a great storm from the North generated high tides [in *England*] and also dropped significant snowfall and cold temperatures. “Septentrionis maxima Sævitia: Nivis flocci magni, ingens frigus. Maxime tumefcebat æstus Maris die & nocte, nam excurrerat in Agros late”. [translation from Latin as written in Middle English: The greatest fury from the North: A great mass of snow and growing coldness. Very greatly swell the tide day and night, for they [tide water] were running widely in the fields.]<sup>225</sup>

The entire year of 1570 in northern *France* produced a suffocating heat.<sup>79</sup>

The rains of 1570 caused the rivers to overflow their banks in several parts of the kingdom of *France*. On the night of December 2, the Rhône River at Lyon suddenly rose and overflowed its banks. No one living remembers such a sudden and substantial flood.<sup>79</sup>

In *England* on the 5<sup>th</sup> of October, there was an inundation from the sea.<sup>47, 72, 92</sup>

On the night of 5 October 1570, a great hurricane struck *England*. Near Rye in East Sussex in southern *England*, the Sea broke in with a great flood, drowned a great marsh with herds of sheep, corn, etc. In Essex, Suffolk, and Norfolk were great losses. One by a tempest, wherein sheep, corn, cattle, houses, bridges, etc. were lost and carried down.<sup>72</sup>

On 5 and 15 October, there were tempest, hurricanes and rain in *England*.<sup>72</sup>

In 1570, there was a flood in *Great Britain*. There was a dreadful hurricane that destroyed the Port in Liverpool, *England*.<sup>212</sup>

[In *England*] from 1568-1573, the years were mostly rainy, terrible, and tempestuous bad weather.<sup>72</sup>

In Holland [now *the Netherlands*] there was an inundation. A strong northwest wind occurring during the high tides drove the sea with such violence against the dikes that several of them were broken down. The waters rushed in on every side, and rolling forward with resistless fury, swept away houses, trees, men and cattle, in one universal ruin. Entire villages were destroyed. The number of lives lost in Friesland alone was estimated at 20,000; and was very extensive in other provinces. “The damage to property incalculable.” The Spaniards (then at war with *the Netherlands*) imputed the flood, which occurred on All Saints’ Day, to a vengeance of God upon the heresy of the land; the Netherlanders looked upon it as an omen portending some violent commotions.<sup>47, 92</sup>

On 1 November, there was a flood of the Sea in *Holland*.<sup>72</sup>

On 1 November 1570, there was a dreadful flood at Antwerp, *Belgium* and on all the coast of Holland [*the Netherlands*] that made infinite spoil.<sup>225</sup>

On 1 November 1570 on All Saints Day, a great storm devastated large parts of the North Sea coast from *France* to *Denmark*. This great flood caused between 100,000-400,000 casualties due to drowning.<sup>7</sup>

In *Holland* 400,000 people drowned in 1570 A.D.<sup>5, 40</sup>

The storm called the All Saints Floods occurred on 11-12 November 1570 [All Saints' Day is celebrated on 1 November in Western Christianity]. This storm affected most of the North Sea between *Britain* and *Denmark*, and adjoining land areas. Presumably *the Netherland* was hit hardest. The cities Amsterdam, Muiden, Rotterdam and Dordrecht were all flooded. Somewhere between 100,000 and 400,000 persons were reported to have drowned. This represents an exceptionally high number of casualties, which should be seen in relation to the much smaller total population at that time.<sup>32</sup>

A terrible storm broke out in Antwerp, *Belgium* in 1570. In the village of Saint-Marceau in the Ardenne region in northern *France*, there were the most impetuous, terrible, horrible winds that were ever heard.<sup>79</sup>

Between September 1570 and January 1571, four ships were lost in a storm [hurricane] between Veracruz, *Mexico* and *Spain*.<sup>141</sup>

In 1570, several regions of *China* experienced flooding including:<sup>153</sup>

— Shansi (now Shanxi province) in northern *China* at Li-ch'êng. Houses were damaged by the floodwaters and people and cattle drowned.

— During the period between 6 May and 8 August, floods struck Shansi province at Chin-ch'êng and Lin-chin. Houses were damaged by the floodwaters.

— During the period between 3 July and 1 August, floods struck Shensi (now Shaanxi province) in central *China* at Ch'ing-chien. Several hundred families were flooded. During the same time, floods also struck Hua-yin in Shensi province, where many people drowned.

— During the period between 8 August and 8 November, floods struck Shansi province at Jung-ho. Crops were damaged by the floodwaters and people and cattle drowned.

— During the period between 30 September and 28 October, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at P'ei. As a result, the canals were damaged. [P'ei is located at longitude 118.03° East and latitude 34.30° North.]

In 1570 during the 6<sup>th</sup> moon, a typhoon struck in the vicinity of Shanghai, *China*. The sea rose with a great southeast wind, occasioning destruction of dwellings and loss of life, inundating the land with salt water. A small species of crab appeared after the inundation of the sea in great numbers devastating the crops.<sup>166</sup>

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**Winter of 1570 / 1571 A.D.** From the end of November 1570 to the end of February 1571, the winter was so severe, that all the rivers, even those of Languedoc and Provence in *France*, were so completely frozen, that they were passable on the ice with laden carts.<sup>38, 60, 62</sup>

In 1570 to 1571, the Rhône River in *France* froze. The [grape] vines and fruit trees in *France* were killed by the cold.<sup>58, 80</sup>

The winter of 1570-71 froze the rivers in *France* for three months. The fruit trees were destroyed down to the roots.<sup>79</sup>

[In *Western Europe*], the winter lasted from the end of November 1570 to end of February 1571. The winter was so severe that rivers were frozen for three months so that wagons could drive over ice. The cold destroyed the fruit trees, even in the Languedoc, *France*, down to the root. The frost began in

Flanders [now *Belgium*], the eve of the Feast of St. Nicholas (December 5), and lasted until 10 March. Up to the very last days of winters, the Maas (Meuse) River, the Waal River and the Rhine River were still frozen.<sup>62</sup>

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**1571 A.D.** In Flanders [now *Belgium*], *France* and *Germany* in August, there were great floods.<sup>47, 92</sup>

On 17 and 18 July 1571, a strong storm struck [*Germany*] causing damage to buildings.<sup>172</sup>

From 15 to 23 August 1571, there was a very great flood in Flanders [now *Belgium*]. On 5 February, there was a great flood at Louvain, *France*. On 17 December, there was a flood on the Rhine in *Germany*.<sup>72</sup>

In 1571, the year was extremely intemperate in *England* with south winds, rain and fog. During this year and the several that followed, there was a great scarcity and dearth of salt, so that all fish and flesh [meat] were eaten unseasoned.<sup>72</sup>

In *England*, a southerly, rainy, cloudy, ugly harvest.<sup>72</sup>

[In *England*] from 1568-1573, the years were mostly rainy, terrible, and tempestuous bad weather.<sup>72</sup>

[In *England*], there was a terrible storm of thunder and lightning.<sup>72</sup>

On 5 October 1571, a tremendous gale and flood struck *England*. Between Hummerston [Humberston] and Grimsby in Lincolnshire, twenty thousand cattle and sheep perished. Houses were blown down and bridges were washed away. Many ships were wrecked. The city of Bourne was flooded to the midway of the church's height. Boats rowed over St. Neot's Church walls. In Bedfordshire many trees were blown down. The gale was violent in Staffordshire, Oxfordshire, Buckinghamshire, Kent, Essex, etc., where great damage was done. The tides of the River Humber flooded all the streets at Kingston-on-Hull to such a considerable height that the inhabitants were obligated to take refuge in their upper rooms.<sup>212</sup>

In 1571, the *San Ignacio*, 300 tons, and *Santa Maria de la Limpia Concepcion*, 340 tons were lost off the Florida coast of the *United States* during a storm [hurricane]. There were only a few survivors.<sup>141</sup>

In 1571, floods struck Hunan province in south-central *China* at Yüan-ling, Ch'ang-tê, An-hsiang and Hua-jung. During the period between 24 May and 21 June, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ü-chiang and Ying-tê.<sup>153</sup>

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**Winter of 1571 / 1572 A.D.** In *England*, the winter had much moister, with either continual rains, wind or snow, to the middle of February, then came an intense cold with a continual north wind, and thick dark air to the Equinox [around March 20/21].<sup>72</sup>

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**1572 A.D.** In *England* in 1572, spring, summer and even into harvest were very moist and watery, with a south wind.<sup>72</sup>

[In *England*] from 1568-1573, the years were mostly rainy, terrible, and tempestuous bad weather.<sup>72</sup>

In 1572, many regions of *China* experienced flooding including:<sup>153</sup>

- Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ing-t'ien.
- Kiangsi (now Jiangxi province) in southern *China* at Kiukiang and P'êng-tsê.
- Hupeh (now Hubei province) in central *China* at Chiang-ling and Sung-tzū.

— During the period between 6 May and 8 August, floods struck Honan (now Henan province) in central *China* at Hsin-yeh.

— During the period between 8 August and 6 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow, Tang-shan, Huai-an and Yangchow.

In 1572, a severe drought engulfed Shensi (now Shaanxi province) in central *China* at Fu-shih. This drought led to a famine.<sup>153</sup>

In 1572, there was a great drought in Shensi province in *China*. The resulting famine was so severe that it led to cannibalism.<sup>165</sup>

**Winter of 1572 / 1573 A.D.** In *England*, there was a hard frost from 2<sup>nd</sup> November to 5<sup>th</sup> January and also a late spring.<sup>47, 72, 93</sup>

In *England* the winter was extremely cold. Heavy snowfall fell on the Feast of the Second Epiphany in November.<sup>62</sup>

In *England* from 2 November to the Epiphany [6 January], there was a hard frost, great and deep snow, with several rains which froze as they fell [freezing rain], and therefore broke boughs of trees with the weight of the ice. The winds were north and west until after the Feast of the Ascension [generally in May or June]. There was a very late spring.<sup>72</sup>

During the winter of 1572-73 in *England*, there was excessive rains and south wind. The weather continued daily to get worse and worse to the beginning of January.<sup>72</sup>

On 2 February, *Switzerland* was so cold that Lake Constance froze for 60 days.<sup>28</sup> [Lake Constance is situated in *Germany*, *Switzerland* and *Austria* near the Alps.]

In 1572, the winter was very severe in Flanders [now *Belgium*]. The Maas (Meuse) River flooded and came out of its banks from the melting snows towards the end of February.<sup>62</sup>

**1573 A.D.** On 7 June 1573, there was a tempest and hurricane at Tocester [Towcester, Northamptonshire, *England*].<sup>72</sup>

On 7 June 1573, there was a sudden inundation of the riveret at Towcester, in south Northamptonshire, *England*.<sup>195</sup>

In Holland [now *the Netherlands*] on the 1<sup>st</sup> of September, there was an inundation from the sea.<sup>47, 72, 92</sup>

[In *England*] from 1568-1573, the years were mostly rainy, terrible, and tempestuous bad weather.<sup>72</sup>

In 1573 and 1574 [in *England*], there was a famine.<sup>72</sup>

In 1573, floods struck Shansi (now Shanxi province) in northern *China* at Lin-chin and Yunnan province in southwest *China* at Yüan-chiang and Sung-ming. During the period between 31 May and 28 June, floods struck Hupeh (now Hubei province) in central *China* at Yün and Yün-hsi. The city walls and innumerable houses were damaged by the floodwaters. Also during this time period, floods struck Shensi (now Shaanxi province) in central *China* at Sian.<sup>153</sup>

In 1573, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui and a severe drought engulfed Hupeh (now Hubei province) in central *China* at Hsien-ning and Kuang-chi.

During the period between 29 July and 26 August, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China*.<sup>153</sup>

In 1573 during the summer, there was a drought in Chêhkiang, Hunan and Shantung provinces in *China*. In Shantung and Hunan, this was a great drought.<sup>165</sup>

[In 1573], in the 10<sup>th</sup> year of the reign of Emperor Shin-Tsong, there was a dreadful famine in the province of Shansi, *China*. Many people died of hunger. Sixty great pits were dug in different places, each of which held 1,000 dead bodies. They were called Van-jin-keng.<sup>186</sup>

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**Winter of 1573 / 1574 A.D.** The winter of 1573 [in *Europe*] was so warm that the trees were covered with leaves in January and in February the birds made nests in the trees.<sup>62</sup>

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**1574 A.D.** In Leyden in northern *Netherlands*, a violent equinoctial gale broke through the dikes. By this means the city, then besieged by the Spaniards, was saved.<sup>47,92</sup> [An equinoctial gale is a gale or storm happening at or near the time of the equinox.]

In *Ireland* in 1574, there was a shower of hail, which swept away good strong houses, and smothered whole flocks and herds.<sup>93</sup>

In 1574, four ships sank during a bad storm [hurricane] in the *Gulf of Mexico*. Five perished from one vessel. The loss on the other vessels was unknown. These ships were part of New Spanish Fleet that left Spain on 29 June 1574. Other researchers noted there was a violent hurricane on 27 August 1574 between *Jamaica* and *Cuba*.<sup>141</sup>

In 1573 and 1574 [in *England*], there was a famine.<sup>72</sup>

In 1574, there was a great dearth in *England* without scarcity. At 4 o'clock in the afternoon of 4 September, there was a terrible storm of rain in London. In October and November, there was a great dearth there and some small plague. During the night of 18 November, a hurricane came out of the south. After harvest, the price of corn [grain] fell a little, but bay salt was dearer than ever was known. The spring was like summer and the summer was like spring. The whole harvest was like a bad winter, most rainy, cold and southerly. Most of the year, there was neither wind nor thunder.<sup>72</sup>

In 1574, there was a plague at Chester, *England*.<sup>212</sup>

In 1574, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua, Li-shui, Chia-hsing and Wên-chou. Houses were damaged by the floodwaters. During the period between 15 September and 14 October, floods struck Fukien (now Fujian province) on the southeast coast of *China*. Houses were damaged and innumerable people and cattle drowned.<sup>153</sup>

[In 1574], in the 11<sup>th</sup> year of the reign of Emperor Shin-Tsong, there was a grievous frost in *China*, which congealed [froze] the greatest rivers. A famine soon followed.<sup>186</sup>

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**Winter of 1574 / 1575 A.D.** The winter of 1575 in *France* was one of the most rigorous.<sup>79</sup>

In 1575 in northern *France* the weather was greatly inconsistency and produced an inequality of air.<sup>79</sup>

*Europe* experienced a cold winter beginning in November. The Rhine River froze and there was snow until April.<sup>28</sup>

[Another account places this event in the winter of 1573-74.] During the winter of 1573-74 in northern *France*, excessive cold as we had never seen before, burst at the beginning of November 1573, and continued with the same excess until March.<sup>79</sup>

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**1575 A.D.** In *England* on 30 July, there was a tempest of thunder, lightning and hail, which killed several people and many cattle. Each hailstone was 6 or 7 inches about. Otherwise, it was a good year.<sup>72</sup>

In 1575, there was pestilence at Dublin, *Ireland* and a plague at Stamford, *England*.<sup>212</sup>

In 1575 in London, *England*, the tide in the River Thames ebbed and flowed twice within an hour.<sup>212</sup>

In 1575 in Oxford, *England*, the “sweating sickness” again struck. In July, it killed 510 men at Oxford, but no women.<sup>212</sup>

In 1575, several regions of *China* experienced flooding including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Yü-yao and Shang-yü.

— During the period between 8 June and 7 July, floods struck Fukien (now Fujian province) on the southeast coast of *China*.

— During the period between 6 August and 3 September, floods struck Shansi (now Shanxi province) in northern *China* at Shuo.

— During the period between 2 November and 1 December, floods struck Yunnan province in southwest *China* at Ch’ü-ching. Crops were damaged by the floodwaters.

In 1575, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ch’ü, Li-shui, Chin-hua and Hai-yen. During the same year, a severe drought also engulfed Honan (now Henan province) in central *China* at Ch’ing-yang leading to a famine.<sup>153</sup>

In 1575, there was a great drought in Chêhkiang and Kwangsi provinces in *China*.<sup>165</sup>

In 1575, there was in summer a poisonous heat [sunstroke] that killed many ploughmen and oxen in the vicinity of Shanghai, *China*. Then during the 12<sup>th</sup> moon, there was a great northwest wind that leveled houses, tore up trees, and made [clay roof] tiles fly. It lasted a day and a night.<sup>166</sup>

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**1576 A.D.** There was a great silence of grasshoppers over all *Italy* this moist rainy summer.<sup>72</sup>

In 1576 during the period between 5 February and 8 August, a drought engulfed Yunnan province in southwest *China* at Lu-hsi.<sup>153</sup>

In 1576 during the spring and summer, there was a drought in Yünnan province in *China*.<sup>165</sup>

In 1576 during the 3<sup>rd</sup> moon, a typhoon struck in the vicinity of Shanghai, *China*. A great wind; the sea overflowed the dikes, salting the fields, destroying houses and drowning people.<sup>166</sup>

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**1577 A.D.** In *England* on 17 March at Richmond in Yorkshire, there was a strange tempest, which overturned trees, cottages, barns, haystacks, and the church, with most frightful sights in the air. Another in Bliburrow [Bilsborrow] in Suffolk on 4 August between 9 and 10 in the forenoon. It rent [destroyed] the church and beat down the people in it. They were almost all smothered.<sup>72</sup>

On 4 August 1577, a violent thunderstorm struck *England*. It struck Bongay [Bungay] in the county of Suffolk with such violent rain, fearful flashes of lightning and terrible cracks of thunder that it struck fear into the hearts of those gathered in a church. A fearful flash of fire passed between two people (John



Fuller and Adam Walker) as they were kneeling upon their knees, wringing the necks of them both at one instant clean backwards killing them. The storm struck a church in Bliborough [Bilborough] where the lightning drave [drove] down about 20 people. A man and a boy died, and the others were scorched.<sup>212</sup>

In 1577, pestilence struck Oxford, *England*. “During the Assizes, while the Court sat on the trial of a Popish bookseller, accused of circulating offensive pamphlets, a sudden sickness seized nearly the whole of the persons present, and within forty hours upwards of 300 died, among whom was the Lord Chief Baron of the Exchequer, the High Sheriff of the county, several justices of the Peace, and the chief of the Jurors.”<sup>212</sup>

On 4 August 1577, pestilence struck Bliborough [Bilborough] in Suffolk, *England*.<sup>212</sup>

In 1577, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow. Fields and houses were damaged by the floodwaters. During the period between 5 February and 8 August, a drought engulfed Yunnan province in southwest *China* at Chien-shui.<sup>153</sup>

In 1577 during the spring and summer, there was a drought in Yunnan province in *China* that led to a great mortality.<sup>165</sup>

In 1577 during the 5<sup>th</sup> and 6<sup>th</sup> moons (in the middle of summer) there was a rain as cold as winter in the vicinity of Shanghai, *China*. It damaged the crops.<sup>166</sup>

**1578 A.D.** In Brassil [*Brazil*] on the 7<sup>th</sup> of April, there was a great hailstorm.<sup>57, 72, 93</sup>

In 1578 in *Belgium*, the weather was unusually hot. The drought lasted from May to September. In Dijon, *France*, the grape harvest began on 22 September.<sup>62</sup>

On 17 March 1578, a tempest struck Yorkshire, *England*. On 4 August, a tempest and hurricane struck Suffolk, *England*.<sup>72</sup>

[In *England*], terrible rains, floods and tempests.<sup>72</sup>

The summer of 1578 in northern *France* was very wet and produced a searing heat.<sup>79</sup>

In 1578 during the period between 5 June and 4 July, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Foochow. As a result, 80% of the crops were damaged. During the period between 5 July and 2 August, floods struck Hupeh (now Hubei province) in central *China* at Chung-hsiang and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Wu-ming. Then during the period between 8 August and 8 November, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China* at Foochow.<sup>153</sup>

In 1578 during the autumn, there was a great drought in Fuhkien province in *China*.<sup>165</sup>

**Winter of 1578 / 1579 A.D.** During the winter of 1578-79, the Rhône River in southern *France* overflowed its banks and remained in the fields from October until February.<sup>79</sup>

In *England*, there was a “most hard” frost.<sup>47, 93</sup>

In *England* in 1579, there was a most hard frost from 4-10 February.<sup>72</sup>

In *England* on 4 February, it began to snow and continued to the 8<sup>th</sup> and was very deep. The north wind drove the snow into drifts, in which people and many cattle were lost. There was frost on 10 February, then a thaw with continued rains a long time after. Hence such high waters and great floods as drowned marshes and low grounds. The River Thames so flooded Westminster Hall that fishes were left in it. On 24 April, there was another great and deep snow.<sup>72</sup>

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**1579 A.D.** In *England*, there was frost on 10 February, then a thaw with continued rains a long time after. Hence such high waters and great floods as drowned marshes and low grounds. The River Thames so flooded Westminster Hall that fishes were left in it. In September and November, great winds and raging floods carried down corn [grain], cottages, drowning pastures and cattle in many places in *England*. Tempest in Hessen [Hesse] and Thuringia in central *Germany* did great damage; for hail as big as hen's eggs broke down the corn [grain] and [grape] vines; and floods did great harm to the grounds, people and cattle.<sup>72</sup>

[In *England*], terrible rains, floods and tempests.<sup>72</sup>

In 1579, plague struck Yarmouth [Great Yarmouth], *England* causing much havoc.<sup>212</sup>

The year 1579 was so poorly regulated, especially on the side of Paris, *France*, that most grapes froze in clusters from excessive cold at the time of harvest.<sup>79</sup>

Between August and November 1579, a storm [hurricane] sunk the Spanish Armada's 600-ton *Almirante*.<sup>141</sup>

In *England* in September and October, there was a great inundation from the Sea by winds.<sup>47, 92</sup> On 10 February there was a great flood on the River Thames. On 27 May, there was a great flood caused by rain. On 14 October there was a great flood caused by the Sea.<sup>72</sup>

In 1579 during the period between 27 January and 24 February, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China*. During the period between 24 June and 23 July, a drought engulfed Shansi (now Shanxi province) in northern *China* at An-tsê.<sup>153</sup>

In 1579 during the spring and summer, there was a drought in Fuhkien and Shansi provinces in *China*. In Fuhkien, this was a great drought.<sup>165</sup>

In 1579, several regions of *China* experienced flooding including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing. The floods resulted in a famine.

— Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsin-hui. The floods were caused by heavy and protracted rains.

— Kweichow (now Guizhou province) in southwestern *China* at Wu-ch'uan.

— During the period between 25 May and 23 June, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Pei-liu. The city walls and houses were damaged by the floodwaters and over 20 people drowned.

— During the period between 24 July and 21 August, floods struck Shansi (now Shanxi province) in northern *China* at Chao-ch'êng. The city walls were damaged by the floodwaters.

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**1580 A.D.** Around 1580, there was an inundation caused by the discharge of a flood of water from Pendle Hill in Lancashire, *England*.<sup>212</sup>

During the winter of 1580, there was a very intense frost [in *England*].<sup>212</sup>

The summer of 1580 was hot in southern *France*.<sup>79</sup>

The years 1580 and 1581 in southern *France* were marked by storms and floods.<sup>79</sup>

Thunderstorms or rainstorms desolated Provence, *France* in 1580.<sup>79</sup>

**1581 A.D.** In 1581, *Persia* was desolated by famine and plague.<sup>72,91</sup> [*Persia* during this period of time, under the Safavid dynasty was at its height, and controlled all of modern *Iran*, *Azerbaijan* and *Armenia*, most of *Iraq*, *Georgia*, *Afghanistan*, and the *Caucasus*, as well as parts of *Pakistan*, *Turkmenistan* and *Turkey*.]

The summer of 1581 was hot in southern *France*.<sup>79</sup>

The years 1580 and 1581 in southern *France* were marked by storms and floods.<sup>79</sup>

Thunderstorms or rainstorms desolated Provence, *France* in 1581.<sup>79</sup>

On 1 November 1581 in Kent, *England*, and the marshes of Essex, there was a sore plague of strange mice, suddenly covering the earth, and gnawing the grass roots. This poisoned all the field herbage for it raised the plague of murrain among cattle grazing on it. No wit, nor art of man could destroy the mice, till another strange flight of owls came and killed them all.<sup>72</sup>

On 21 December 1581, the river went dry at Alrewas, Staffordshire, *England*. The water of the River Trent dried up, and suddenly fallen so ebb, that a vicar went over into the hall meadow in a low pair of shoes, about 4 o'clock in the afternoon; and so it was never in the remembrance of any man then living at that time in the droughtiest year that any man had known, and the same water in the morning before was bankfull [from bank to bank], which was very strange.<sup>212</sup>

In 1581, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Taichow. This drought was accompanied by a plague of locust. Also during the same year, floods struck Chekiang province at Chia-hsing and Hu-chou. During the period between 30 July and 28 August, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Fu-an.<sup>153</sup>

In 1581, there was a drought in Chêhkiang province in *China*. The drought was accompanied by a plague of locusts.<sup>165</sup>

### **1582 A.D. – 1589 A.D. Ireland. Famine**

[There was a great famine in *Ireland* that was caused not by the weather but by the actions of man. During the war in Ireland between Earl of Desmond and Queen Elizabeth I, the English used scorched earth warfare on *Ireland* and its people. This resulted in a very great famine. In April 1582, the provost marshal of Munster, Sir Warham St. Leger, estimated that 30,000 people had died of famine in the previous six months. People continued to die of famine and plague long after the war had ended, and it is estimated that by 1589 one third of the province's population had died.

Hollinshed wrote “whosoever did travel from one end of Munster to the other, even from Waterford to the head of Smerwick, which is about six score miles, he should not meet any man, woman or child, nor yet see any beasts; but the very wolves, the foxes, and other like ravening beast.”

The Gaelic Annals of the Four Masters described how “the whole tract of country from Waterford to Lothra, and from Cnamhchoill to the county of Kilkenny, was suffered to remain one surface of weeds and

waste... *At this period it was commonly said, that the lowing of a cow, or the whistle of the ploughboy, could scarcely be heard from Dun-Caoimh to Cashel in Munster.*”

The English poet Edmund Spenser, who was an eyewitness to the distress of the time, says that the famine slew far more than the sword, and that the survivors were unable to walk. They were so weak that they could only crawled out of the woods and glens. He wrote in the *View of the Present State of Ireland*: “*In those late wars in Munster; for notwithstanding that the same was a most rich and plentiful country, full of corn and cattle, that you would have thought they could have been able to stand long, yet ere one year and a half they were brought to such wretchedness, as that any stony heart would have rued the same. Out of every corner of the wood and glens they came creeping forth upon their hands, for their legs could not bear them; they looked Anatomies [of] death, they spoke like ghosts, crying out of their graves; they did eat of the carrions, happy where they could find them, yea, and one another soon after, in so much as the very carcasses they spared not to scrape out of their graves; and if they found a plot of water-cresses or shamrocks, there they flocked as to a feast for the time, yet not able long to continue therewithal; that in a short space there were none almost left, and a most populous and plentiful country suddenly left void of man or beast.*”<sup>84</sup>

There was a famine not necessarily weather related. In *Ireland* in 1586, there was an extreme famine, which was caused by the wars of Desmond. Human flesh said to have been eaten. Also in *England*.<sup>57, 91</sup>

During 1588 and 1589 in *Ireland*, there was a great famine period, “when one did eate another for hunger.”<sup>57, 91</sup>

**1582 A.D.** In *England* on 12 August rose a great tempest in Norfolk of thunder lightning, whirlwind, rain and hailstones like spur rowels, two or three inches about. It laid corn [grain] flat on the ground, tore up and shivered in pieces or twisted like a withy [a long flexible stem used in thatching]. Many trees and houses were blown down. Churches were damaged. This storm did inexpressible damage to shipping.<sup>72</sup>

[In *England*] on 29 December, there was a terrible storm of thunder and lightning.<sup>72</sup>

In 1582, many regions of *China* experienced flooding including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Ch’ü.

— Kiangsi (now Jiangxi province) in southern *China* at Kao-an.

— Hupeh (now Hubei province) in central *China* at Chung-hsiang and Ch’ien-chiang.

— During the period between 22 May and 19 June, floods struck Kweichow (now Guizhou province) in southwestern *China* at P’u-ting.

— During the period between 19 July and 17 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Sung-chiang.

— During the period between 19 July and 17 August, floods also struck Kiangsu province at Wu-chiang, Ch’ang-shou, Ch’ung-ming and Chia-ting. Thousands of houses were damaged by the floodwaters and thousands of people and cattle drowned.

In 1582, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Wên-hsi; Shensi (now Shaanxi province) in central *China* at Sian and Lin-ch’ing [uncertain name]; and Hupeh (now Hubei province) in central *China* at An-lu.<sup>153</sup>

In 1582, there was a great drought in Hupeh, Shansi and Shensi provinces in *China*. The resulting famine was so severe that it led to cannibalism in Shensi.<sup>165</sup>

*Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.*

**1583 A.D.** In *England*, the summer was excessively hot and dry.<sup>47, 72</sup>

The summer of 1583 was hot and dry in *England*. In *Dijon, France*, the grape harvest was early on 13 September.<sup>62</sup>

The summer of 1583 was hot in southern *France*.<sup>79</sup>

In 1583, floodwaters of Rhône River knocked over the ramparts [city walls] of Arles in southern *France* and the Camargue [river delta] flooded.<sup>79</sup>

In *England*, this summer was excessively dry and hot near the end of the season.<sup>72</sup>

In 1583, a drought engulfed Shansi (now Shanxi province) in northern *China*. Then during the period between 20 June and 18 July, floods struck Szechwan (now Sichuan province) in southwest *China* at Hsüan-han. Over 200 families were flooded.<sup>153</sup>

In 1583, there was a drought in Shansi province in *China*. The rivers dried up.<sup>165</sup>

In 1583 during the 7<sup>th</sup> moon on the 13<sup>th</sup> day, a storm struck in the vicinity of Shanghai, *China*. The dikes gave way in a storm of wind and rain of twenty-four hours duration. Innumerable men and animals were destroyed. Also the crops were lost as a consequence. This was followed by famine. During the 10<sup>th</sup> moon on the 13<sup>th</sup> day, there was a storm with a violent northwest wind; vessels capsized in the river.<sup>166</sup>

*Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.*

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**1584 A.D.** In *England*, there was a great hailstorm, “stones 8 or 9 inches about.”<sup>57, 72, 93</sup>

On 24 July 1584, on the Feast day of St. James, in *Chester, England*, there was a storm of thunder, lightning, hail, and rain, which raged from noon till midnight. The streets were flooded and the cellars filled with water. Great harm was done to the mills. Much hay and corn [grain] was destroyed. Many glass windows were broken by the hailstones; being five inches [13 centimeters] in compass [circumference]. “Many men and cattle were slain by the Light’s bolt [lightning bolt] in divers’ [diverse] places.”<sup>212</sup>

The winter of 1584 was severe in *Germany*.<sup>62</sup>

In 1584, a powerful cyclone struck Backerganj, *Bangladesh* causing 200,000 deaths.<sup>98</sup>

In 1584, a severe drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts’ang-wu. Then during the period between 8 June and 7 July, floods struck Kweichow (now Guizhou province) in southwestern *China* at Tu-chün.<sup>153</sup>

In 1584 during the autumn, there was a great drought in Kwangsi province in *China*. As a result, the land tax was remitted.<sup>165</sup>

*Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.*

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**1585 A.D.** In *Europe*, the winter was so mild that the grain remained in the ears all the way to Easter.<sup>62</sup>

In 1585, there was a scarcity of wheat in *England*. On May 6<sup>th</sup> at *Chester, England*, wheat sold for 24 shillings per bushel; barley for 14 shillings. On September 2<sup>nd</sup>, there was a great fall in prices. Wheat fell

to 9 shillings and barley to 4 shillings.<sup>212</sup>

In 1585, a plague struck Boston in Lincolnshire, *England*.<sup>212</sup>

In 1585, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing. During the same time period, floods caused by heavy and protracted rains struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ung-shan and as a result, thousands of people and cattle drowned.<sup>153</sup>

In 1585, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-fên. During the period between 6 May and 8 August, a drought engulfed Shansi province at Kuang-ling.<sup>153</sup>

In 1585 during the summer, there was a great drought in Shensi province in *China*. As a result, the land tax was remitted.<sup>165</sup>

*Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.*

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**1586 A.D.** In the year 1586 in *England*, in the 26<sup>th</sup> year of Queen Elizabeth about January, Her Majesty observing the general dearth of grain and other food, caused partly through the unseasonableness of the weather during the past year and partly through the uncharitable greediness of the grain masters, but especially through the unlawful transporting grain to foreign lands; by the advice of Her most Honorable Privy Council, published a Proclamation and a Book of Orders to be taken by the Justices for relief of the poor [commencement of the poor law] notwithstanding all which the excessive prices of grain still increased: so that wheat in meal was sold at London for 8s. the bushel, and in some other parts of the Realm above that price.<sup>57</sup>

[In *England*] in 1586, there was a famine until the harvest in 1587. Dearth in *England* and *Hungary*.<sup>72</sup>

On 29 November 1586, a violent gale struck Beecles [Beccles] in Suffolk, *England*. On the same day, there was a severe frost and the river became hard frozen.<sup>212</sup>

In 1586, a plague struck Chesterfield and Derby, *England*.<sup>212</sup>

[It rained locust in Thracia [*Thrace*] and ducks and geese in *Croatia*. The locust fell in such multitudes, that they drowned all grains and greens. But the fowls came seasonably to feed many.]<sup>72</sup>

In 1586, the loss of two 120-ton Spanish ships was attributed to a hurricane in the *Bahama Channel*. Six or seven other ships were lost, including the *San Juan*, 120-ton. [The Old Bahama Channel is a strait off the northern coast of Cuba and the Sabana-Camagüey Archipelago and south of the Great Bahama Bank. It is approximately 100 miles (161 kilometers) long and 15 miles (24 kilometers) wide.]<sup>141</sup>

In the end of September in *England*, there was a great destructive hurricane. This year till the next years harvest, there was a great dearth in *England*. Wheat sold at 2l. 1s. 4d. per Quarter [quarter ton]. Rye at 2l. 2s. 8d. and malt at 1l. 14s. 4d. There was a grievous dearth in *Hungary*.<sup>72</sup>

There was a famine in *Hungary*.<sup>57, 91</sup>

In 1586, several regions of *China* experienced flooding including:<sup>153</sup>

— Hupeh (now Hubei province) in central *China* at Mien-yang.

— During the period between 19 April and 17 May, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Huai-chi.



— During the period between 15 August and 12 September, floods struck Kwangsi province at Po-pai, Ts'ang-wu, T'êng, Yü-lin and Pei-liu. At Ts'ang-wu, houses and crops were damaged by the floodwaters and 816 families were flooded. At T'êng, 240 families were flooded.

In 1586, a severe drought engulfed Shansi (now Shanxi province) in northern *China*; Honan (now Henan province) in central *China* at Chi; and Shensi (now Shaanxi province) in central *China* at Sian. During the same year, a drought engulfed Fukien (now Fujian province) on the southeast coast of *China*.<sup>153</sup>

In 1586, there was a great drought in Fuhkien, Honan, Shansi and Shensi provinces in *China*.<sup>165</sup>

*Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.*

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**1587 A.D.** There was an exceedingly cold and late spring in *England*. Summer and harvest time were very backwards; yet it was a year of plenty. September was intensely cold, white frost, boisterous north winds, hail, snow, and sleet; yet no bad harvest.<sup>72</sup>

During October and November 1587, a plague struck Chesterfield, *England*. It carried off whole households. There was a great scarcity of corn [grain].<sup>212</sup>

In 1587, a great flood at Derby, *England*, broke apart St. Mary's Bridge and several mills.<sup>212</sup>

The *Belgians* groaned under a terrible plague and famine. For the inhabitants of great towns and villages in Flanders [now *Belgium*] were either slain in war, dead of the plague or starved with hunger. All the country was waste, so that wolves and wild beasts stabled in the houses. These animals had become so numerous that they killed and tore in pieces, not only cattle, but also men, women and children. Dogs with hunger and madness ran up and down the country biting and killing cattle and one another. So great the desolation that neither fences nor walls were distinguishable from the rising ground. Nor could land be known by their owners. All were grown over with shrubs and bushes. Inconceivably great was the famine at Antwerp, Brussels, Bruges, etc. Honest, decent people begged from door to door in disguise. The vulgar and poor ate bones, excrements, etc. In Holland [now *the Netherlands*], and the united provinces, their navigation and shipping saved them. Multitudes of people flocked thither.<sup>72</sup>

The summer of 1587 was hot in southern *France*.<sup>79</sup>

In 1587, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing and Ningpo; Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang; and Hupeh (now Hubei province) in central *China* at Wuchang. At Nan-ch'ang, the floods caused a famine. During the same year, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China*.<sup>153</sup>

In 1587, there was a great drought in Fuhkien province in *China*.<sup>165</sup>

In 1587 during the second moon, there was a fall of yellow sand in the vicinity of Shanghai, *China*. All who ate of the vegetables on which it fell, died.<sup>166</sup> [Generally this is a marker for deep magma volcanic event. Hydrogen fluoride is one of the gases released by massive flood volcanic eruptions. Fluorine is a pale yellow gas that in relatively low concentrations is very toxic. Fluorine attached itself to fine volcanic ash particles. This ash flung high into the atmosphere and spread by the prevailing winds eventually fell back to Earth and coated the skin of edible plants. Animals that ate these plants died. Even in areas that received as little as a millimeter of this ash (a fluorine content exceeding 250 parts-per-million (ppm)), poisoning occurred. Fluorine is very reactive and generally forms soluble fluorine salts. Rainfall dissolved and flushed these salts into rivers, streams and lakes, poisoning surface water supplies.]

*Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.*

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**1588 A.D.** On 24 January 1588, a very dense fog rose over the city of Paris, *France* and its neighborhood. The fog lasted from noon until the next day. “It was so black and thick that two persons walking together in the streets could not see each other, and were compelled to provide themselves with torches, in order to recognize one another, when it was not yet three o’clock [in the afternoon]. Very many wild geese, and other flying creatures of the air, were found where they had fallen bewildered in the courtyards of the houses, having dashed themselves against the buildings and chimneys.”<sup>205</sup>

On 30 May 1588, there was a gale on the southern coast of *England*, which disabled many ships of the Spanish Armada.<sup>212</sup>

In 1588, there was a plague at Boston in Lincolnshire, *England*.<sup>212</sup>

In 1588, a hurricane struck Roanoke Island in North Carolina in the *United States* causing less than 116 deaths. [Hunter hypothesizes that most of the settlers of Roanoke Island were killed by a hurricane. He indicates that of 116 people on the island in 1587, some returned to England before the storm and a few of the settlers survived the storm.]<sup>141</sup>

In 1588, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chin-yün, Chia-hsing and Hsiao-shan. At Hsiao-shan, the floods caused a famine. During the same year, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Sung-chiang; and Hupeh (now Hubei province) in central *China* at Mien-yang, Huang-kang and Hanyang. Also during the year, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Kiukiang and Yunnan province in southwest *China* at Ch’u-hsiung.<sup>153</sup>

In 1588, there was a great drought in Hupeh, Kiangsi, Kiangsu and Yünnan provinces in *China*.<sup>165</sup>

In 1588 during the summer and autumn in the vicinity of Shanghai, *China*, there were storms of strange thunder and typhoon. The rice, wheat, and beans were broken down.<sup>166</sup>

*Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.*

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**1589 A.D.** In London, *England*, on the 18<sup>th</sup> of February and on the 1<sup>st</sup> of August, there were severe hailstorms.<sup>57, 72, 93</sup>

In 1589, an Atlantic hurricane off Florida and the eastern coast of the *United States* caused a ship of the fleet commanded by Perez de Olesbal to be wrecked. Forty of her crew was rescued.<sup>141</sup>

On approximately 9 September 1589, four ships were struck by a hurricane and sunk in the *Bahama Channel*. Two of the ships were the *Santa Catalina* and the *Jesus Maria*, 350 and 400 tons respectively. [The Old Bahama Channel is a strait off the northern coast of Cuba and the Sabana-Camagüey Archipelago and south of the Great Bahama Bank. It is approximately 100 miles (161 kilometers) long and 15 miles (24 kilometers) wide.]<sup>141</sup>

In September 1589, a four-day storm [hurricane] struck the *Bahama Channel*. On the first day alone, the sea swallowed up a total of ten ships.<sup>141</sup>

The cold winter of 1589 was so harsh that it completely froze the Rhône River. Mules, carriages, carts, all crossed in Tarascon in southern *France* like on a highway. Colonel Alfonsey even crossed the ice two

or three times with the guns [cannons]. Marshall Montmorency then crossed with his company of gendarmes.<sup>79</sup>

In 1589, a drought engulfed several regions of *China* including:<sup>153</sup>

- Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Sung-chiang.
- Shansi (now Shanxi province) in northern *China* at An-i. This drought was severe.
- Hupeh (now Hubei province) in central *China* at Huang-kang. This drought was severe.
- Kiangsu province at Hsing-hua. This drought was severe.
- During the period between 5 February and 6 May, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Lin-ch'uan, Yung-hsiu, I-ch'un, C'ing-chiang and Kao-an. These droughts led to a famine.

In 1589 during the spring, there was a great drought in Fuhkien, Hupeh, Kiangsi, Kiangsu and Shansi provinces in *China*.<sup>165</sup>

In 1589 during the spring, there was a drought in the vicinity of Shanghai, *China*. In this year, there was a famine. People ate bran, roots of grass and leaves of trees. Many people drowned themselves.<sup>166</sup>

In 1589 during the 7<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a storm of great wind; trees were torn up and grain injured.<sup>166</sup>

*Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.*

**1590 A.D.** In *England*, there was a drought all the year, and excessive heat.<sup>47, 72</sup>

A very strong heat and drought prevailed in 1590 in the temperate climate zones of *Europe*. In *Germany*, there was a lack of hay, rowen and vegetables. But wine was available. [The heat wave] caused numerous fires in *Germany*. In Thuringia, *Germany*, many cities and villages were destroyed by fires. In many places the forest fire started and burned, especially in the *Bohemian* mountains [now in the *Czech Republic*]. On 30 July, a fire was ignited in the vicinity of Vienna, *Austria* by the action of sunlight on the hay wagon, which then traveled into a dairy. The grape harvest began in Dijon, *France* on 10 September, i.e. 14 days earlier than the mean. This is the earliest time since year 1556.<sup>62</sup>

In *England*, there was a great drought through the whole year; so that corn was thin; wheat small; hay very little; herbs, peas and beans very few; little wine. [Because of the dryness] there were many fires in the Nation. In the area of Thuringia in *Germany*, towns and villages were burnt up; woods in many places took fire and were consumed; especially on the mountains of Bohemia. On 30 July, carts bringing hay home from the fields in Vienna, *Austria* were set on fire and burnt by the sun.<sup>72</sup>

In *England* in September, there was hail, with thunder and snow.<sup>57, 72, 93</sup>

In 1590 it rained all winter in *Italy*.<sup>72</sup>

In early November 1590, a hurricane struck the *Gulf of Mexico*. More than 1,000 were killed.<sup>141</sup>

In 1590, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Hsing-hua and Chekiang (now Zhejiang province) on the east coast of *China* at Taichow. During the same year, a drought engulfed Yunnan province in southwest *China* at Ch'êng-chiang. During the period between 30 August and 28 September, a drought engulfed Fukien (now Fujian province) on the southeast coast of *China*.<sup>153</sup>

In 1590 during the spring, summer and autumn, there was a drought in Chêhkiang, Fuhkien and Yünnan provinces in *China*. In Chêhkiang, this was a great drought.<sup>165</sup>

In 1590, there was no rain from fifth to seventh month in the vicinity of Shanghai, *China*. The Mau Lake was dry. The drought produced a famine.<sup>166</sup>

In 1590 during the 6<sup>th</sup> moon on the 18<sup>th</sup> day, in the vicinity of Shanghai, *China*, there was an unusual summer snowstorm. During the night, snow fell from midst of the moon, like the fine flowers of the willow, or shreds of silk. Taken in the hand, these snowflakes were all found to be hexagonal. [This may be one of the earliest historical accounts of a diamond dust ice fall]<sup>166</sup>

In 1590 in the vicinity of Shanghai, *China*, there was an overflow of the sea, destroying several thousand houses, drowning innumerable animals and more than 10,000 people. The survivors were attending to the interment of those who perished, when there was a false alarm that the Japanese were invading. This caused a panic and all fled to Shanghai city. In the process, several thousand people were trampled to death.<sup>166</sup>

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**1591 A.D.** During the winter in the year 1591 in *Provence*, there was an abundance of snow, and the fruit trees were damaged by the cold. When the Leaguers tried to attack the city of St. Denis, *France* [now a suburb of Paris] on January 3<sup>rd</sup> [the city walls protected by a broad moat]; it was very cold and the moat was frozen to the ground. [This allowed the attackers entry into the city.]<sup>162</sup>

In 1591, there was a drought in *England*. In spring, an uncommon drought struck Nottinghamshire. The summer produced strong west winds with little rainfall. The River Trent and other rivers were almost without water. The River Thames was so dried up that a man might ride over it on horseback near London Bridge.<sup>212</sup>

A plague struck Derby, *England*. It began in October 1592 and ended in October 1593. It was dispersed in every corner of the parish and there was not two houses together [next to each other] free of it.<sup>212</sup>

In *Italy* in 1591, there was a famine.<sup>57, 72, 91</sup>

In 1591 a sore famine afflicted all *Italy*, till it was relieved with corn [grain] imported from Denmark, Holface, etc. Then it fell from 34 to 14 per measure. The dearth of *Italy* in 1591 forced multitudes to feed on herbs, roots and bread made of them; as of arum and earth nuts, fern roots; hence came the malignant fever in 1592.<sup>72</sup>

On 17 July 1591, a fleet of seventy-seven sail [sailing ships] left Havannah [Havana, *Cuba*] for *Spain*: the smallest vessel in the fleet was 200 tons burthen, and the largest 1000. About the 10<sup>th</sup> of August, in latitude 35°, in a gale of wind from the north, the general of the fleet, with 500 men on board, foundered; and three or four days afterwards, in another gale, five or six of the largest ships were lost with all their crews and the vice-admiral. About the end of August, in latitude 38°, they experienced another gale, during which twenty-two sail perished. Upon the 6<sup>th</sup> of September, the remaining forty-eight arrived within sight of Flores, where they were separated by another gale: so that of 123 sail [sailing ships] that were expected in *Spain* this year from the *West Indies*, but twenty-five arrived. Seven were taken by the English off the *Azores*, and nineteen, with 2600 men on board, were wrecked on the coast of New Spain, upon their voyage to the Havannah.<sup>145</sup> [The island of Flores is the westernmost point of the *Azores Archipelago* and of the European continent. New Spain is the Spanish colonial empire of North America, whose capital was Mexico City, *Mexico*.] [From this account it appears approximately 91 Spanish ships were lost in storms and hurricanes in the Caribbean, Atlantic Ocean and off the *Azores* during the summer of 1591. The deaths of the crew and passengers might be around 13,000 individuals.]

On 10 August 1591, a hurricane struck the *Atlantic Ocean* causing 501 deaths.<sup>141</sup>

In mid-August 1591 in the *Atlantic Ocean*, five or six of a group's largest ships and all their crews were lost [due to a hurricane].<sup>141</sup>

Near the end of August 1591, twenty-two vessels perished in the *Atlantic Ocean* from a storm [hurricane]. These ships were returning from Bermuda after 24 August.<sup>141</sup>

During the end of August 1591, "over a hundred ships, galleons and merchant ships were wrecked, their crews drowned, their riches lost" from a hurricane off the *Azores*.<sup>141</sup>

In 1591, encountering storms [hurricanes], "29 ships were lost, many on Florida's coast" of the *United States*.<sup>141</sup>

In 1591, Spanish ships were lost in the *Atlantic Ocean* or *Caribbean Sea* [due to storms].<sup>141</sup>

In 1591, several regions of *China* experienced flooding including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Yüeh-ch'ing.

— Hupeh (now Hubei province) in central *China* at Han-ch'uan, Chung-hsiang, Ch'ien-chiang and Mien-yang.

— During the period between 25 March and 22 April, floods struck Shansi (now Shanxi province) in northern *China*. The floods caused a famine.

In 1591, a drought engulfed Yunnan province in southwest *China* at Ch'êng-chiang. During the period between 6 May and 8 August, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China*.<sup>153</sup>

In 1591 during the summer, there was a drought in Fuhkien and Yünnan provinces in *China*. In Fuhkien, this was a great drought.<sup>165</sup>

In 1591, in the vicinity of Shanghai, *China*, there was a famine and an epidemic.<sup>166</sup>

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**1592 A.D.** In *England*, there was an extreme drought and want of water.<sup>47, 72</sup>

In *England*, there was an excessive drought and a great death of cattle from want of water. Springs and brooks were dried up. Horsemen could ride the River Thames at London.<sup>72</sup>

In June, the River Thames, in *England* was dry at London-bridge and many people passed and repassed on the riverbed.<sup>40</sup>

The drought continued in *England* into the year 1592. The River Trent and other rivers were almost dried up. In the River Thames, the water was so low that a man might ride over it on horseback near London Bridge.<sup>212</sup>

On 6 September 1592, the wind being southwest as it had been for 2 days before and very boisterous, the River Thames [in London, *England*] was made void of water, by forcing out the fresh [water] and keeping back the salt [water]. As a result, men in diverse places might go 200 paces over the [dried river bank] and fling a stone to land [on the opposite bank].<sup>225</sup>

The winter was so cold in *Austria* that wolves entered Vienna and attacked men and beast.<sup>28</sup>

In 1592 during the 10<sup>th</sup> moon [early winter], there was a storm of thunder, lightning and hail in the vicinity of Shanghai, *China*.<sup>166</sup>

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**1593 A.D.** In 1593, floods struck Yunnan province in southwest *China* at Yao-an. In the same year, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Yüeh-ch'ing and Szechwan (now Sichuan province) in southwest *China* at Hsü-yung. At Yüeh-ch'ing, the drought led to a famine.<sup>153</sup>

In 1593, there was a drought in Chêhkiang and Kweichow provinces in *China*.<sup>165</sup>

In 1593, the plague continued in *England*. At Lichfield in Staffordshire, eleven hundred people perished. It also struck Canterbury.<sup>212</sup>

On 21 March 1593, there was a great gale in *England*. At Alrewas in Staffordshire, *England* “This yeare was an exceeding great tempest of winde, which continued all the daye longe, and did great hurte in many places, in blowing down of steeples, dwellinghouses, barnes, trees innumerable in every place. Within the parish there weare seven barnes overthrowen. In Lichfield the toppes of the steeples of St. Michael and St. Marie’s were blowen downe, which hurt the churche and chancel, and houses.”<sup>212</sup>

On 15 June 1593 very early in the morning [in *Germany*] a great storm with thunder and lightning arose. It caused 6 fires. In the afternoon hailstones fell that were the size of goose eggs. Many were formed in wonderful ways. Some looked like human heads, others looked like grapes together and others were round like apples. The hailstones were so hard they could not be broken in half. Hailstones fell that killed people, livestock and everything on the field. The tile roofs of the castle, church and town hall were completely shattered.<sup>172</sup>

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**1594 A.D.** In *England* during the 36<sup>th</sup> year of Queen Elizabeth’s reign “In May fell many great showers of raine, but in June and July much more, for it commonly rained day and night till St. James’s eve; and on St. James’s day in the afternoon it began again, and continued for two days together. Notwithstanding there followed a fair harvest. But in September great raines rayseed high waters, such as stayed the carriages, and bore down bridges, as at Cambridge, Ware, and elsewhere. Also graine grew to be a great price – a bushel of wheat at 6s., 7s., 8s., etc., which dearth happened more through the merchants’ overmuch transporting than the unseasonableness of the weather past.”<sup>47</sup>

In 1594 in *England*, there were floods in Surrey, Cambridgeshire and Hertfordshire.<sup>92</sup>

On 11 May, there were great floods at Surry, England caused by rain and hail. In September, there were great floods at Cambridge.

On 21 March 1594, there was a terrible tempest, hurricane and most destructive effects on trees and forest in *England*. On 11 April, there was an excessive rain, great floods and losses. In May and all summer and harvest time (except August), there were great rains and land floods. Corn [grain] was very dear.<sup>57, 72</sup>

In 1594, there was a dearth [in *England*] due to rain from the beginning of May to 25 July.<sup>212</sup>

In 1594 in *England* and *Hungary*, there was a famine.<sup>72, 91</sup> During the siege of Paris, *France*, by King Henry IV, owing to the famine, bread which had been sold, while any remained for a crown a pound, was at last made from the bones of the charnel-house of the Holy Innocents [bones of dead children].<sup>57</sup>

In 1594, ships were lost in the *Caribbean Sea* [due to storms].<sup>141</sup>



In 1594, floods struck Shansi (now Shanxi province) in northern *China* at Kao-p'ing. During the period between 8 August and 8 November, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Huai-chi.<sup>153</sup>

In 1594 during the autumn, there was a drought in Kwangsi province in *China*.<sup>165</sup>

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**Winter of 1594 / 1595 A.D.** *Europe* experienced a cold winter. The Lagoons of Venice froze and didn't thaw until February 1595.<sup>28</sup>

In 1594 in *Italy*, the Port of Venice was frozen.<sup>58, 80</sup>

In 1594 A.D., the sea at Marseilles, *France* and Venice, *Italy* froze.<sup>38, 60</sup>

In 1594, the sea froze on the coast of Marseille, *France*.<sup>79</sup>

In 1594, the Rhine River in *Germany*, the Po River in *Italy* were frozen as well as the sea at Marseilles, *France* and Venice, *Italy*.<sup>62</sup>

In *Europe*, the Rhine and Scheldt Rivers, and the *Adriatic Sea* at Venice froze.<sup>47, 90, 93</sup>

In 1594, the rivers of *Northern Europe* were frozen before Christmas. The Cattegat froze, together with a large part of the *Baltic Sea*. The Sea of Venice froze so that during three weeks no boats could be used. The Tiber River froze at Rome, *Italy* and men crossed it on the ice, a thing never known before or since.<sup>63</sup>

The extreme cold of the winter of 1594-95 began on 23 December 1594. The cold weather began again on 13 April 1595, which was as cold as Christmas, 1594. This period brought about many sudden deaths in Paris, *France* "particularly in young children and women". The Rhine River in *Germany*, the Po River in *Italy* and the lagoons of Venice were all frozen.<sup>62</sup>

During the winter of 1594-95, the severe cold broke on December 23. The extreme frost resumed April 13, 1595. On that day it froze as strongly as the day preceding Christmas, the sea on the coast of Marseille, *France*.<sup>79</sup>

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**1595 A.D.** In *Germany*, there were considerable floods.<sup>47, 92</sup> The floods occurred in February and flooded all *Germany*.<sup>72</sup>

In 1595 in Holland [now *the Netherlands*], *Guelderland*, the tract of the Rhine, *Austria*, Bohemia [now western *Czech Republic*], *Saxony*, *Silesia* and other parts of *Germany*, were shocking and extraordinary floods, which overturned many villages, and made terrible slaughter of many cattle and people.<sup>72</sup> [Guelderland is now located in east-central *Netherlands*.]

In 1595 and 1596 in *England*, there was great scarcity and dearth with profound shocking rains and great floods. There raged a sore famine over all *Italy*, which reached *Germany* that forced people to eat uncommon and unwholesome food, such as green hedge crabs, mushrooms, dogs, cats, reptiles and etc.<sup>72</sup>

In 1595, there was a plague at Canterbury in *England*.<sup>212</sup>

In 1595-96 in *Italy*, *Germany*, etc. there was a famine.<sup>57, 72, 91</sup>

There was so great a famine among the Turks in *Hungary* from 1595-97, that the Tartar women who followed the camp were forced to roast their own children and eat them. There was a great dearth in *England* and *Hungary* during these three years.<sup>72</sup>

In *England* in 1595, during the 36<sup>th</sup> year of Queen Elizabeth's reign – Since grain has lately been transported to foreign lands; grain in *England* has grown to exorbitant prices. In some parts of the realm it has risen from 14s. to 4 marks the quarter ton. This is having a dire effect on the poor. And likewise all other things made to sustain man have also increased in price, without conscious and reason. To remedy this condition, our merchants have imported much rye and wheat from Danshe [Gdańsk, *Poland*]. Because these food was scarce, and even though the quality was not the best, yet it served our need in the extreme condition that we find ourselves in. Some apprentices and other young people about the city of London, without as much food as they are accustomed to, took butter from the market folks in Southwark, paying only 3d. when the owners could not afford to sell it under 5d. per pound. For this disorder, the said young men were punished on the 27<sup>th</sup> of June by whipping, setting on the pillory and long imprisonment.<sup>57</sup>

In Holland [now *the Netherlands*] and *Germany*, there was a tempest and also one at Worcester, *England* with hail.<sup>72</sup>

In 1595, floods struck Yunnan province in southwest *China* at Yao-an. During the same year, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-chin. During the period between 8 August and 8 November, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam*.<sup>153</sup>

In 1595 during the autumn, there was a drought in Kwangsi and Shansi provinces in *China*. In Shansi, this was a great drought.<sup>165</sup>

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**1596 A.D.** In *England*, there were floods all summer.<sup>47, 72, 92</sup>

In Wells, *England* in December, there was a great hailstorm.<sup>57, 72, 93</sup>

In 1595 and 1596 in *England*, there was great scarcity and dearth with profound shocking rains and great floods. There raged a sore famine over all *Italy*, which reached *Germany* that forced people to eat uncommon and unwholesome food, such as green hedge crabs, mushrooms, dogs, cats, reptiles and etc.<sup>72</sup>

In 1596, wheat was very dear [scarce] in *England*. At Chester, wheat sold for 40 shillings per bushel and barley for 31 shillings.<sup>212</sup>

In 1596 [in *England*], there was a tempest and famine.<sup>72</sup>

The winter of 1596 [in *Europe*] was unusual because "The nature of the weather was sultry, cloudy and rainy; for we had this year the summer in April, the autumn in May and the winter in June."<sup>62</sup>

The weather in 1596 was unstable, unfriendly and rainy. It seemed that year consisted of summer in April, fall in May and winter in June. The grape harvest in Burgundy, *France* took place very late on 4 October.<sup>62</sup>

The summer of 1596 was hot in southern *France*.<sup>79</sup>

The winter of 1596 was very rainy in northern *France*. The Marne River covered one third of the town of Lagny.<sup>79</sup>

In 1596, there was a famine in *Central India*, which extended over the whole in *Asia*.<sup>156</sup>

— In 1596 “there was a scarcity of rain throughout the whole of Hindustan, and a fearful famine raged continuously for three or four years. The king ordered that alms should be distributed in all the cities; and Nawab Sheikh Farid Bokhari being ordered to superintend and control the distribution, did all in his power to relieve the general distress of the people. Public tables were spread, and the army was increased in order to afford maintenance to the poor people. A kind of plague also added to the horrors of the period, and depopulated whole houses and cities, to say nothing of hamlets and villages. In consequence of the dearth of grain, and the necessities of ravenous hunger, men ate their own kind. The streets and roads were blocked up by dead bodies, and no assistance could be rendered for their removal.”

In 1596 A.D., during the 41<sup>st</sup> year of Akbar’s reign [Akbar the Great], there was a famine in Delhi and its neighborhood in *India*. During this famine, Emperor Akbar sent officers in every direction to supply food every day to the poor and destitute and had also public tables opened at various centers of distress.<sup>179</sup>

In 1596, several regions of *China* experienced flooding including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Hu-chou and Ningpo.

— During the period between 27 May and 25 June, floods struck Kweichow (now Guizhou province) in southwestern *China* at An-shun.

— During the period between 24 August and 21 September, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ho. Pools overflowed.

In 1596, a severe drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hai-k’ang. During the period between 6 May and 8 August, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-fên. During the period between 22 September and 20 October, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hu-chou.<sup>153</sup>

In 1596 during the summer and autumn, there was a great drought in Chêhkiang, Kwangtung and Shansi provinces in *China*.<sup>165</sup>

**1597 A.D.** In 1597 and 1598, the plague ravaged Penrith in Cumbria, *England*. In 15 months, 2,260 persons perished.<sup>212</sup>

**Winter of 1597 / 1598 A.D.** In *England*, there was a very severe frost in January.<sup>47, 93</sup>

In *England* in 1598, there was a frost from 1-10 January.<sup>72</sup>

This winter was memorable in *Germany*.<sup>62</sup>

**1598 A.D.** [In *England*] on 26 March, there was a terrible storm of thunder and lightning.<sup>72</sup>

In *England*, there was a very great drought with flies and gnats.<sup>47, 72</sup>

In *England*, the summer was excessive heat and drought. Swarms of fleas, flies and gnats abound. Armenian apples were very plentiful.<sup>72</sup>

The summer of 1598 was extremely hot and dry in *England*. In Dijon, *France*, the grape harvest fell on 23 September.<sup>62</sup>

In Rome, *Italy*, there were considerable floods.<sup>47, 92</sup> in December.<sup>72</sup>

In Pegu [now Bago in lower *Myanmar/Burma*] in 1598, there was a very severe famine.<sup>57, 72, 91</sup>

[There was a famine not attributed to weather. In Pegu [*Myanmar*], one of the richest and fruitfulest countries of the world, yet it metropolis, lately replenished with millions of inhabitants, was wasted by a terrible famine from war. There were scarce 7,000 men, women, and children left alive. The inhabitants fed on human flesh. Parents ate children and children ate parents. The stronger ate up the weaker.<sup>72</sup>]

In 1598, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ü, Shao-hsing, Chin-hua and Taichow. During the same year, floods struck Chekiang province at Chien-tê. During the period between 8 August and 8 November, floods struck Shensi (now Shaanxi province) in central *China* at Fu-shih where many people and cattle drowned.<sup>153</sup>

In 1598, there was a great drought in Chêhkiang province in *China*.<sup>165</sup>

**1599 A.D.** In *England*, it was cold and dry during the months of April and May; and dry and hot during the months of June and July.<sup>47, 72</sup>

In *England* during the months of March, April, and May, it was cold and dry. During June and July, it was hot and dry.<sup>72</sup>

The months of June and July in 1599 were hot in *England*. The grape harvest in Dijon, *France* was held on 13 September.<sup>62</sup>

In *England* in November, there were floods.<sup>47, 92</sup> on November 24.<sup>72</sup>

In 1599 during the period between 22 June and 21 July, floods struck Yunnan province in southwest *China* at Pao-shan. During the period between 6 May and 8 August, floods struck Shansi (now Shanxi province) in northern *China* at Jung-ho and Yunnan province at Hao-ch'ing. At Hao-ch'ing, the crops were damaged by the floodwaters and this resulted in a famine.<sup>153</sup>

In 1599 during the period between 6 May and 8 August, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-fên, Hsiang-ling, Fên-ch'êng, Fên-hsi, and Ch'in.<sup>153</sup>

In 1599 during the spring, there was a great drought in Shansi province in *China*.<sup>165</sup>

**Winter of 1599 / 1600 A.D.** The winter in *France* was severe. The cold lasted from late November to late May, with interruptions in the southern provinces of *France*. The cold was so great that it killed nearly all fruit trees and a large number of animals.<sup>62</sup>

The winter of 1599-1600 in southern *France* began in late November 1599 and lasted until the end of May. The winter killed a large number of cattle and almost all the fruit trees.<sup>79</sup>

During the winter of 1600 in Lyon, *France*, many people lost limbs because they froze in the extreme cold.<sup>80</sup>

On 14 April 1600, fell a great snow in *England*. The rest of April and all May were cold and dry. The late cold spring raised the price of all corn [grain].<sup>72</sup>

**1600 A.D. – 1602 A.D. Russia. Famine**

One of the earliest famines in *Russia* of which there is any definite record was that of 1600, which continued for three years, with a death toll of 500,000 peasants. Cats, dogs, and rats were eaten; the strong overcame the weak, and in the shambles of the public markets human flesh was sold. Multitudes of the dead were found with their mouths stuffed with straw.<sup>84</sup>

In *Russia* in 1600, there was a great drought.<sup>47</sup>

In *Russia* in 1600, there was a famine and plague, of which 500,000 died and 30,000 in Livonia [currently *Latvia* and *Estonia*].<sup>57, 91</sup>

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**1600 A.D.** In *England*, there was a cold, dry summer.<sup>57, 91</sup> . . . which produced a dearth.<sup>72</sup>

In 1600, there was a great flood in *England*. The River Trent, during a heavy flood, changed its course near the village of Holme, by Newark, through which means the township became situated on the east side of the river, whereas it had previously been on the west side.<sup>212</sup>

On 12 September 1600, a hurricane struck offshore *Mexico* causing more than 60 deaths.<sup>141</sup>

On 26-27 September 1600, a hurricane struck offshore *Mexico* causing between 103 and 940 deaths. [Marx (1983) indicates that, in combination, the storms of 12 and 26-27 September 1600 caused about 1000 deaths.]<sup>141</sup>

On 8 December 1600 at Venice, *Italy*, a strong southeast wind caused the highest tide. “Inundatio ventis 6 ped. temp. Sirocco.” [translation from Latin: During the Sirocco, the wind caused a 6-foot surge/overflowing.] [Sirocco is a Mediterranean wind that comes from the Sahara and reaches hurricane speeds in North Africa and Southern Europe.]<sup>225</sup>

In 1600, floods struck Yunnan province in southwest *China* at Fu-min, Ch’u-hsiung, T’êng-ch’ung, Mêng-hua and Yung-peï. Houses and crops were damaged by the floodwaters. During the period between 7 September and 6 October, floods struck Shansi (now Shanxi province) in northern *China* at Lin-fên and Hsin-chiang.<sup>153</sup>

In 1600 during the period between 8 August and 8 November, a drought engulfed Yunnan province in southwest *China* at Hsin-t’ien. This drought led to a famine.<sup>153</sup>

In 1600 during the autumn, there was a drought in Yünnan province in *China*.<sup>165</sup>

*Also refer to the section 1600 A.D. – 1602 A.D. for information on the drought and famine in Russia during that timeframe.*

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**1601 A.D.** During the winter of 1601, the olive trees in *Provence* were damaged by the cold.<sup>62</sup>

The winter of 1601 in southern *France* killed all the olive trees.<sup>79</sup>

On 1 February 1601, a tempest struck London, *England*.<sup>72</sup>

[In *Belgium* and *England*], the month of June was very warm, and excessive heat remained during July and August. The drought lasted continuously for four months. The trees were laden with fruit, but the fruit turned black because it was burned by the sun before reaching maturity. In Dijon, *France*, the grape harvest began on 8 October.<sup>62</sup>

At the beginning of June 1601 at Maen-Clochog [Maenclochog] in Pembrokeshire, *Wales*, caterpillars were so abundant that a man could not thread without killing twenty or thirty. On this hill, they destroyed all the grass.<sup>212</sup>

In 1601, the sea being forced in by a strong northwest winds, did damage at Ostend, *Belgium*.<sup>225</sup>

On 26 October 1601, there was a great tempest at Ostend, *Belgium*. The west-northwest winds caused much higher tides than usual.<sup>225</sup>

On 23 December 1601 during the siege of Kinsale, in *Ireland*. “Our horsemen did see lamps burn at the point of their spears in the midst of these lightning flashes.” [St. Elmo’s fire] Similar appearances are mentioned by Theophrastus, Plutarch, Pliny, Seneca, Caesar, and Livy. Seneca says “Gylyppo Syracusas petenti visa est stella super ipsam lancem constitisse”; and that in “Romanorum castris vis a sunt ardere pila, ignibus scilicet in illa delapsis.” Caesar, in his history of African war, in a violent, stormy night, says, “Legionis pilorum cacumina sua sponte arserunt.”<sup>212</sup>

In 1601, a hurricane struck Veracruz, *Mexico* causing 1,000 deaths.<sup>141</sup>

In *Ireland* in 1601 to 1603, there was great scarcity and want. Cannibalism again reported.<sup>57, 91</sup>

In *England*, there was a drought this year of four continuous months. In *Switzerland*, the winter and spring were rainy and June and July was excessively hot. At Pisaurum [Pesaro, *Italy*], the winter was uncommonly snowy and rainy. The spring and the whole summer were hot and moist. The wind was from the south. The inhabitants ate plentifully of fruit and fish and of lamb. In July and August, the weather was excessively sultry hot.<sup>72</sup>

In 1601, a drought engulfed Ching-tang [uncertain name]. During the period 2-31 May, a drought engulfed several regions of *China*. During the period between 6 May and 8 November, a drought engulfed Yunnan province in southwest *China* at K’un-ming. This drought resulted in a famine. During the period 1-29 June, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping. During the period between 30 June and 28 July, a drought engulfed Yunnan province at Ch’eng-chiang.<sup>153</sup>

In 1601 during the summer and autumn, there was a drought in Chihli, Hunan, Hupeh, Kweichow and Yünnan provinces in *China*. In Hu-kwang [Hukwang - the rice bowl of China comprising the provinces of Hunan and Hupeh], this was a great drought.<sup>165</sup>

In 1601 during the period between 29 July and 27 August, floods struck Shansi (now Shanxi province) in northern *China* at Jung-ho. Fields were damaged by the floodwaters. During the period between 8 August and 8 November, floods struck Szechwan (now Sichuan province) in southwest *China* at Chao-hua. Houses and crops were damaged by the floodwaters.<sup>153</sup>

*Also refer to the section 1600 A.D. – 1602 A.D. for information on the drought and famine in Russia during that timeframe.*

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**1602 A.D.** On 23 and 24 February 1602, there blew a terrible northwest wind at Ostend, *Belgium* which made the water rise higher than usual.<sup>225</sup>

In *England*, it was dry and cold during the harvest and winter with north winds.<sup>47, 72</sup>

The plague visited *England* beginning in September 1602 at Chester and continued to February 1605.<sup>212</sup>



In Pisaurum, Pesaro e Urbino Province in east-central *Italy* in 1602, the year was long cold and humid with a dry harvest and winter with north winds.<sup>72</sup>

There were rains and floods in the years 1602 in northern *France*.<sup>79</sup>

In 1602, flood struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing. Innumerable people drowned. During the same year, floods struck Hupeh (now Hubei province) in central *China* at Hanyang. During the period between 20 June and 18 July, floods struck Shansi (now Shanxi province) in northern *China* at Kao-p'ing. Fields were damaged. During the period between 19 July and 16 August, floods struck Shansi province at Hsin-chiang. During the period between 8 November 1602 and 5 February 1603, floods struck Yunnan province in southwest *China* at Chien-shui. Dikes were damaged.<sup>153</sup>

In 1602 during the spring and autumn, four fus [prefectures] in the vicinity of Shanghai, *China*, experienced excessive and continuous rain. As a result, the wheat crop was damaged.<sup>166</sup>

*Also refer to the section 1600 A.D. – 1602 A.D. for information on the drought and famine in Russia during that timeframe.*

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**1603 A.D.** Loaded carriages passed the Rhône River in *France* on the ice.<sup>38, 60, 62</sup>

In 1603 in southern *France*, the carriages crossed the Rhône River on the ice.<sup>79</sup>

In 1603, the Rhône River in *France* froze.<sup>58, 80</sup>

In 1603, the winter in the south of *France* was very severe. Wagons passed over the frozen Rhône River on the ice.<sup>62</sup>

In 1603, the plague struck Boston in Lincolnshire, *England*. On 2 April it began at Aylesbury. In London, 30,578 people died of the plague. At Chester, 650 people perished.<sup>212</sup>

[There was a famine not attributed to weather. In 1603, wars occasioned such a famine in *Transylvania*, that roots, herbs, and leaves of trees were people's usual food. Horses, dogs, cats, and rats were dainties to the poor. A mother ate six children and two men their own mother.<sup>72</sup> *Transylvania* or the Principality of *Transylvania*, during this time period, was a semi-independent state, ruled primarily by Hungarian princes and included areas of modern day *Hungary*, *Romania* and *Serbia*.]

In 1603 during the period between 5 September and 4 October, floods struck Fukien (now Fujian province) on the southeast coast of *China* at T'ung-an. Innumerable houses damaged by the floodwaters and innumerable persons drowned.<sup>153</sup>

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**1604 A.D.** On 1 March 1604, the wind was very great at west and northwest, with a furious tempest, the tide at Ostend, *Belgium* rising so high, as it had not done in forty years before.<sup>225</sup>

In 1604 from July to September, the plague struck Colston Bassett in Nottinghamshire, *England*. There 83 persons perished. The plague was also present in London, *England* and *Ireland*. The plague carried off 600 persons at Stamford, *England*. At Chester, 986 persons died (at one period at a rate of 55 weekly). The fairs were not held, the Court of Exchequer was held at Tarvin, and the Assizes at Nantwich. Most of the inhabitants fled. At York and Beverley, 3,512 died.<sup>212</sup>

In 1604, floods struck Shansi (now Shanxi province) in northern *China* at Fan-chih. Many houses were damaged by the floodwaters and many people drowned. During the same year, floods struck Shansi province at P'ing-yao. Crops were damaged by the floodwaters. During the period between 27 June and 26 July, floods struck Yunnan province in southwest *China* at Chien-shui. Houses and fields were damaged.<sup>153</sup>

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**1605 A.D.** In 1605, there was a plague in London, *England*.<sup>212</sup>

In 1605, from a hurricane that struck *Haiti, Dominican Republic* and *Cuba*, three ships were lost but some men escaped.<sup>141</sup>

In 1605, a hurricane struck the Caribbean island of Santa Margarita off the coast of *Venezuela*. Four galleons were lost.<sup>141</sup>

In 1605, a hurricane struck offshore in *Nicaragua* causing 1,300 deaths. [Marx (1983) is probably describing the same storm when indicating no survivors of 4 wrecks resulting from "a hurricane between Serrana and Serranilla banks" in 1605.]<sup>141</sup>

In 1605, floods struck Shansi (now Shanxi province) in northern *China* at Chieh-hsiu and Hsiang-ling. At Chieh-hsiu, the occupants were drowned. At Hsiang-ling, hundreds of persons were drowned. Also in 1605, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Taichow. At Chia-hsing, the drought was severe. At Taichow, the drought was accompanied by a plague of locusts.<sup>153</sup>

In 1605, there was a great drought in Chêhkiang province in *China*. This drought was accompanied by a plague of locusts.<sup>165</sup>

In 1605, a couple of dragons fought at Whangpu [Huangpu River, *China*] and tore up a large tree, and demolished several tens of houses. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

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**1606 A.D.** In *England* on 29 March, there were general floods.<sup>47, 72, 92</sup>

On the Eve and Easter Day 1606, a terrible wind shook *France* and *Europe*.<sup>79</sup>

In 1606, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Fukien (now Fujian province) on the southeast coast of *China* at P'u-t'ien. During the same year, floods struck Hopei (now Hebei province) in northern *China* at Shu-lu; Hupeh (now Hubei province) in central *China* at Huang-kang; and Yunnan province in southwest *China* at Lu-hsi. During the period between 5 June and 4 July, floods struck Kweichow (now Guizhou province) in southwestern *China* at Kuan-ling and Ch'ih-shui. Over 300 families were flooded. During the period between 5 July and 3 August, floods struck Shansi (now Shanxi province) in northern *China* at I-ch'êng. Houses were damaged by the floodwaters.<sup>153</sup>

In 1606, there was a great drought in Chêhkiang and Fuhkien provinces in *China*. As a result, the land tax was remitted in Fuhkien.<sup>165</sup>

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**Winter of 1606 / 1607 A.D.** [During the winter of] 1606-07, on 20 January, there was a great inundation of the River Severn that did much damage in Somersetshire and Gloucestershire, *England*.<sup>225</sup>

The winter of 1607 [in *Europe*] passed without a significant frost.<sup>62</sup>

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**1607 A.D.** In *England* in 1607, the waters rose above the tops of the houses, and upwards of 100 people perished in Gloucestershire and Somersetshire.<sup>47, 90</sup> Flood also in Coventry, which destroyed 257 houses.<sup>47, 92</sup>

In *England* on April 16, there was a terrible storm of thunder, lightning and rain at Coventry and another at Somersetshire on January 10.<sup>72</sup>

In *Great Britain*, “Upon Tuesday, being the twentieth of January last past 1607, in diuers [diverse] places, as well in the westerne [western] parts of *England*, as also in diuers [diverse] other places of the realme [realm], there happened such an overflowing of waters, such a violent swelling of the seas, and such forcible breaches made into the firme [firm] land, namely, into the bosomes [bosoms] of these counties following, that is to say, in the counties of Gloucester [Gloucester], Sommerset [Somerset], together with the counties of Munmouth [Monmouth], Glamorgan, Carmarthen, and diuers [diverse] and sundry other places of *South Wales*; that the like never in the memory of man hath ever bin seine [been seen] or heard of; the suddayne terror whereof stroke such an amazed feare [fear] into the hearts of al [all] the inhabitants of those parts, that eury one [everyone] prepared him selfe [himself] ready to entertayne [entertain] the last period of his lives distruction [destruction], deeming it altogether to be a second deluge, or an universal punishment by water.”<sup>47</sup>

In 1607, there was a flood in Somerset and Gloucestershire, *England*. The water rose above the tops of houses, and about one hundred people perished.<sup>212</sup>

In *England*, both the summers of 1607 and 1608 were dry and hot.<sup>47, 72</sup>

In *England*, a strong west wind brought in the Sea into the River Severn with such violence; the water in several towns and villages ran higher than the housetops. So 80 persons drowned, and other damages to the value of 20000*l*.<sup>72</sup>

Other accounts place the Great Flood event in Great Britain in the year 1606. [On 20 January 1606, there was a Great Flood. Hundreds of people drowned between Minehead and Slimbridge as salt water to a depth of 2 meters swept across the land both sides of the estuary. Strong westerly gales blew in the channel, most likely the offshoot of an extreme depression off southern Ireland. John Paul [Vicar of Almondsbury] described the incident thus...”*But the year 1606, the fourth of King James, the river of Severn rose upon a sodden Tuesday morning, the 20th January, being the full prime day and highest tide after the change of the moon, by reason of a mighty strong western wind. So that Minehead to Slimbridge the low grounds along the river Severn were, that turning tide, overflown, and in Saltmarsh many houses overthrowen, sundry Christians drowned, hundreds of rudder cattle and horses perished, and thousands of sheep and lambs lost. Unspeakable was the spoils and losses on both sides of the river.*”<sup>150</sup>

In 1607, floods struck Shantung (now Shandong province) on the east coast of *China* at Shan and Hupeh (now Hubei province) in central *China* at Huang-kang, Yün and Fang. During the period between 6 May and 8 August, a drought engulfed Shansi at Lin-fên, Hsia and P’ing-lu. [P’ing-lu is located at longitude 111.00° East and latitude 34.51° North.]<sup>153</sup>

In 1607 during the summer, there was a drought in Shansi province in *China*.<sup>165</sup>

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**Winter of 1607 / 1608 A.D.** *England* experienced a severe winter. In *Scotland* the Firth of Forth froze on January 20. The River Thames froze in December in London and there were frost fairs on the river until February. In Danzig, [now Gdańsk, *Poland*] the ditches were still frozen on May 15.<sup>28</sup>

The winter of 1607 in *England* had a great frost that lasted off and on for 7 weeks.<sup>72</sup>

On the River Thames, London, *England* in 1608 from 10-15 January “the frost grew so extreme, as the ice became firme, and removed not, and then all sorts of men, women, and children, went boldly upon the ice in most parts; some shot at prickes; others bowled and danced, with other variable pastimes, by reason of which concourse of people, there wore many that set up boothes and standings upon the ice, as fruit-sellers, victuallers, that sold beere and wine, shoemakers, and a barber's tent, &c.” In these tents were fires. The ice lasted till the afternoon of the 2nd of February, when “ it was quite dissolved and clean gon.”<sup>29</sup>

During the winter of 1607-08 in *England*, fires and diversions on the frozen River Thames lasted for seven weeks.<sup>47, 90, 93</sup>

During the first week of December in 1607 in London, *England*, [they built] fires [bonfires] on the ice on the frozen River Thames.<sup>212</sup>

During the winter of 1607-08, there was a great frost and snow in *England* as observed in Alrewas in Staffordshire. It began on 5 December 1607 and continued until 14 February 1608. At this time all the rivers were frozen, and in most parts, they would bear the weight of horse, men and loaded wagons. Many of the mills were frozen up and could not grind any corn [grain]. The cold did great damage to wheat, gresse [grouse?] and herbs. The River Thames was frozen over and the people crossed on the ice from Southwark to Lambeth. At York, the River Ouse was frozen over, and horses crossed the ice.<sup>212</sup>

In January 1608, the frost was very severe in London, *England*. The River Thames was frozen over. Wheat rose in the Windsor market from 36 shillings to 56 shillings per quarter [quarter ton].<sup>212</sup>

In *England*, there were fairs on the frozen River Thames in 1607-08.<sup>90</sup>

In 1608 in *Germany*, the most rapid and deepest rivers are so cold and ice covered that loaded wagons drove over them. The River Thames in London, *England* supports the weight of wagons. The Scheldt River is frozen at Antwerp, *Belgium* and the *Zuiderzee* froze. All the rivers in *France* are frozen.<sup>62</sup>

The winter of 1608 was long known as a great winter. The cold reigned almost without cessation from 20 December 1607 until about mid-March 1608 in *France*, *England*, Holland [now *the Netherlands*], *Germany* and *Italy*. The historians provided full detail about the effects of frost. On 10 January, it was so cold in the church of Saint-André-de-Arcs [Paris, *France*] that the wine froze in the chalice. “You had to bring a brazier [bucket of hot coals] to melt it.” The bread served to King Henry IV of France on 23 January was frozen. In the northern part of *Europe*, all the rivers were frozen. The ice was so thick in Flanders [now *Belgium*], that as the historian Mathieu says, “Antwerp [*Belgium*], when they saw the Schelde (Scheldt) River so frozen as in the year 1563, they set up several tents in which they feasted.” Many people died in cities and in the countryside from this cold; while others remained paralyzed, and a large number had frozen hands and feet. The greater part of the young trees were destroyed, and a portion of the [grape] vines froze to the roots, and the cypresses, and many walnut trees were hit by the severe cold. *England* saw almost all its cattle destroyed. In London, the River Thames was so frozen that loaded carriages went over the ice. Many birds were killed and a large portion of the plants was destroyed. The spring thaw caused great devastation. The ice from the rivers destroyed the ships, roads and bridges and the melting snow-swollen rivers flooded all the valleys. Dams on the Loire River in *France* broke causing a second deluge, flooding neighboring lands. In *Italy*, the waters of the Tiber River almost flooded Rome. These waters came down from the Apennines Mountains with such violence that several houses were thrown down and destroyed. In Padua, *Italy*, a tremendous amount of snow fell.<sup>62</sup>

In 1608, all our rivers in *France* froze. The cold lasted from December until March. The cold killed all the [grape] vines.<sup>79</sup>

[Another account places this winter in 1608-09] During the winter of 1608-09 in Paris, *France*, many people lost limbs because they froze in the extreme cold.<sup>80</sup>

In 1608, the *French* historians cite great mortality of animals due to cold during this year.<sup>58, 80</sup>

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**1608 A.D.** [In *Germany*], the summer of 1608 was one of the hottest and it burned everything that had survived the great winter. Only cereals and the offspring of grape vines remain. In Dijon, *France*, the grape harvest began on 1 October.<sup>62</sup>

On 19 February 1608, the River Thames in *England* ebbed and flowed twice at noon.<sup>212</sup>

In 1608, a tremendous hurricane did incalculable damage at Beverley in Yorkshire, *England*.<sup>212</sup>

In *England*, both the summers of 1607 and 1608 were dry and hot.<sup>47, 72</sup>

[In *England*], on 26 July 1608, there was a tempest of thunder, lightning and rain.<sup>72</sup>

In 1608 in *France*, the Loire River overflowed its banks and caused destruction of property.<sup>47, 92</sup>

The spring in *Italy* was warm and moist. The harvest inconstant. Corn [grain] and grapes ill got; hence an epidemic.<sup>72</sup>

In 1608, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow and Chu-chi; Yunnan province in southwest *China* at Mi-lei; and Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang. At Mi-lei, the houses were damaged by the floodwaters. In Chekiang and Kiangsi provinces, the floods led to a famine.<sup>153</sup>

In 1608 during the 4<sup>th</sup> moon in the vicinity of Shanghai, *China*, a gyrating dragon was seen over the decorated summit of a pagoda; all around were clouds and fog; the tail only of the dragon was visible; in the space of eating a meal, it went away, leaving the marks of its claws on the pagoda. [In early *China*, tornadoes and waterspouts were commonly described as dragons. When one looks at the devastation left behind by a tornado, the splintered and uprooted trees, buildings torn asunder in an instant, one could imagine that only a great dragon could swoop down from the sky and cause such damage. In this account only the tail of this mighty beast (the funnel of the tornado) was seen.]<sup>166</sup>

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**Winter of 1608 /1609 A.D.** The winter of 1609 [in *Europe*] passed without a significant frost.<sup>62</sup>

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**1609 A.D.** In 1609, a hurricane struck southeastern *Bahamas* causing 32 deaths.<sup>141</sup>

On 4 August 1609, an Atlantic hurricane struck near *the Bahamas*, one ship was sunk.<sup>141</sup>

On 19 January 1609, the River Thames in *England* ebbed and flowed twice in an hour. And then on 6 February at London, there was a strange shifting of the tides.<sup>212</sup>

In 1609, the plague at Southborough, *England* caused 500 deaths. The plague was also present at Chesterfield.<sup>212</sup>

In 1609, a severe drought engulfed Honan (now Henan province) in central *China* at Ch'in-yang and Hupeh (now Hubei province) in central *China* at Mien-yang. During the same year, a drought engulfed Shensi (now Shaanxi province) in central *China* at Fu-shih and Chekiang (now Zhejiang province) on the east coast of *China* at Taichow.<sup>153</sup>

In 1609 during the summer, there was a great drought in Chêhkiang, Honan, Hupeh, Shansi and Shensi provinces in *China*. In Chêhkiang, wells and rivers dried up.<sup>165</sup>

In 1609, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo, Ch'êng, Hangchow and Sui-ch'ang. During the period 2-30 June, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Kuang-tsê, T'ai-ning, Chien-ning, Chiang-yüeh, Shun-ch'ang and Shao-wu, . At Shao-wu, the fields and houses were damaged by the floodwaters and innumerable people drowned. At Chien-ning, the city walls and houses were damaged by the floodwaters and tens of thousands of people drowned. At Chiang-yüeh and Shun-ch'ang, the floods were the severest in these localities during the last 200 years.<sup>153</sup>

In 1609 during the 6<sup>th</sup> moon, a white dragon was seen at Whangpu [Huangpu River, *China*]. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

**Winter of 1609 /1610 A.D.** In 1609, *England* experienced a severe winter beginning in October. The frost lasted 4 months and the River Thames was frozen.<sup>28</sup>

In *England*, the winter of 1609 was most rigorous hard frost from December to April. The River Thames became a highway. Birds and garden stuff were killed.<sup>72</sup>

In 1609, in *England*, the frost was severe and long.<sup>47, 72, 93</sup>

In 1610, The River Thames in *England* was frozen and carried [the weight of] pedestrians.<sup>62</sup>

During the winter of 1609-10, the weather in *England* from December to April was very cold. The River Thames froze so that it was passable on the ice. The birds and plants were killed.<sup>62</sup>

**1610 A.D.** In *England*, it was excessively hot and dry; harvest inconstant.<sup>47, 72</sup>

In *England*, being an excessive hot dry summer after the frost, there was plentiful wine.<sup>72</sup>

On 3 July 1610, a major storm of thunder, hail and lightning struck Humberstone [Humberston], near Grimsby, *England*. The corn [grain] was destroyed.<sup>212</sup>

In 1610, the plague began at Beverley, *England* in June and lasted till November. It raged violently at Leicester.<sup>212</sup>

The summer of 1610 [in *England*] was excessively hot and dry and there was a great abundance of wine. The grape harvest began in Dijon, *France* on 20 September.<sup>62</sup>

In 1610, Dresden in east-central *Germany* was visited by a famine.<sup>57, 91</sup>

In 1610 during the period between 6 May and 8 August, a severe drought engulfed Yunnan province in southwest *China* at K'un-ming. During the period between 21 June and 19 July, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Fên-yang, Liao and Ch'in.<sup>153</sup>



In 1610 during the summer, there was a drought in Shansi and Yünnan provinces in *China*. In Yünnan, this was a great drought.<sup>165</sup>

In 1610 during the period between 21 June and 19 July, floods struck Szechwan (now Sichuan province) in southwest *China* at Ch'ien-chiang. Houses and dikes were damaged and over 1,000 person and cattle were drowned.<sup>153</sup>

In 1610, there was a famine in the vicinity of Shanghai, *China*.<sup>166</sup>

**1611 A.D.** [In *England*] summer and winter wet and rainy, then great snows.<sup>72</sup>

In 1611, the plague raged violently in Leicester, *England*.<sup>212</sup>

In *England*, there were floods from the greatest rains all November and December.<sup>47, 72, 92</sup>

[In *England*] in 1611, there was heavy snowfall that lay on the ground for 2 months.<sup>72</sup>

In 1611, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chin-yün and Ningpo. During the period between 11 June and 9 July, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Huai-chi.<sup>153</sup>

In 1611 during the period between 6 May and 8 August, a drought engulfed Shansi (now Shanxi province) in northern *China* at Lin-fên. During the period between 11 June and 9 July, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Taichow.<sup>153</sup>

In 1611 during the spring and summer, there was a drought in Chêhkiang and Shansi provinces in *China*. The land tax in Shansi was remitted.<sup>165</sup>

**1612 A.D.** In *England* from 1<sup>st</sup> January to 1<sup>st</sup> May, there was a north wind, which produced dry, cold weather.<sup>47, 72</sup>

In 1612, there was a great drought in *England*. At Senogallia in Tuscany, *Italy*, the months of January, February and March was very dry, cold, and windy weather, preceded by a watery, moist, snowy season.<sup>72</sup>

**1613 A.D.** In *Germany* and *France*, all the grain was destroyed by rain.<sup>47, 92</sup> This resulted in a scarcity.<sup>72</sup>

On 25 June 1613, with a terrible thunder storm, with rain and hail struck Rouen in Normandy in northern *France*. It was felt over a distance of five leagues (15 miles, 24 kilometers), including La Bouille and Darnetal, *France*. Some hailstones were the size of walnuts. Others were the size of eggs. A few hailstones weighed half a pound; while other weighed three quarters of a pound.<sup>79</sup>

On 26 June 1613 at Alrewas in Staffordshire, *England*, there was “A mightie great tempeste of rayne, lightning, and thunder” [a mighty great tempest of rain, lightning and thunder] at 4 p.m. It was also violent at Southampton.<sup>212</sup>

In 1613, floods struck several regions of *China* including:<sup>153</sup>

— Hupeh (now Hubei province) in central *China* at Ch'i-ch'un, Kuang-chi and Mien-yang.

— During the period between 6 May and 8 August, floods struck Shansi (now Shanxi province) in northern *China* at Hsin-chiang and P'ing-yao. Houses and fields were damaged by the floodwaters.

— During the period between 16 August and 13 September, floods struck along the Ching River in Shensi (now Shaanxi province) in central *China*. Houses were damaged.

— During the period between 8 August and 8 November, floods struck Shansi province at Lin-fên, Hsiang-ling, Hung-tung, Ch'ü-wo, Chao-ch'êng, Fên-ch'êng, Hsia, Yüan-ch'ü, Chi, Hsi and Chung-yang.

In 1613 during the period between 8 August and 8 November, a severe drought engulfed Fukien (now Fujian province) on the southeast coast of *China* and Shansi (now Shanxi province) in northern *China* at Yung-chi, Lin-chin, I-shih, Jung-ho, Wan-ch'üan, An-i, P'u and P'ing-lu. [P'ing-lu is located at longitude 111.00° East and latitude 34.51° North.]<sup>153</sup>

In 1613 during the autumn, there was a great drought in Fuhkien and Shansi provinces in *China*.<sup>165</sup>

**Winter of 1613 / 1614 A.D.** In 1614, there was a severe winter at Boston, *England*.<sup>212</sup>

In January 1614 at York, *England*, there was a heavy snow and 11 weeks of frost. Then the River Ouse overflowed and flooded the streets. The flood lasted 10 days and destroyed many bridges.<sup>212</sup>

In 1614 on 19 February, fell such a storm of snow in the peak of Derbyshire, and over all the west of *England*, as was a full yard deep on the level. And because of such high winds, the snow was blown into vast snowdrifts. As a result, travelers on horseback or on foot went over hedges, fences, stonewalls, etc. The snow laid on the ground for a long time. It destroyed many cattle and sheep. A great scarcity of hay [immediately] followed. Corn [grain] next summer was very good and cheap.<sup>72</sup>

**1614 A.D.** In Lincolnshire, *England*, the sea came 12 miles inland during the flood.<sup>47, 72, 92</sup>

In 1614 at York, *England*, after the great flood, there was a drought that continued until August. This caused a scarcity of hay and corn [grain]. Hay sold for 30 to 40 shillings per load. At Leeds, it sold for 80 shillings.<sup>212</sup>

Thunderstorms or rainstorms desolated Provence, *France* in 1614.<sup>79</sup>

Southern *France* was very dry in 1614.<sup>79</sup>

In 1614, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Huang-kang and Fukien (now Fujian province) on the southeast coast of *China* at Lo-yüan.<sup>153</sup>

In 1614, there was a great drought in Fuhkien and Hupeh provinces in *China*.<sup>165</sup>

In 1614, floods struck Shansi (now Shanxi province) in northern *China* at An-tsê where fields were damaged and Hupeh (now Hubei province) in central *China* at Mien-yang. During the period between 8 August and 8 November, floods struck Fukien (now Fujian province) on the southeast coast of *China*. Houses and fields were damaged by the floodwaters.<sup>153</sup>

**Winter of 1614 / 1615 A.D.** [There appears to be some overlap of accounts between the winter of 1613/1614 and the winter of 1614/1615 in England. I am inclined to believe that there was only one severe winter and it occurred in 1614/1615.]

On 1 January 1615, a tempest of thunder and lightning struck Thuringia, *Germany*.<sup>72</sup>

On 16 January 1615 at Youlgrave [Youlgreave] in Derbyshire, *England*, began the greatest snow which ever fell upon the earth in man's memory. It covered the earth 5 quarters deep upon the plane [on the

level], and for heaps or drifts of snow, they were very deep, so that passengers, both horse and foot, passed over yates [gates], hedges and walls. It fell at ten several times, and the last was the greatest. The snow continued daily increasing until 12 March, when the sight of earth was no longer visible either upon hills or valleys. Then the snow began to decrease and was consumed little by little until 28 May. And then all the drifts were consumed, except for the one at Kinder Scout, which lay till Witson [Witsun] week [Pentecost, the seventh Sunday after Easter]. [A quarter is a unit of measurement, usually for measuring cloth, equal to nine inches. Therefore 5 quarters would be equivalent to 45 inches.]<sup>212</sup>

In *England*, there was frost from 17<sup>th</sup> January to 7<sup>th</sup> March. (An article from 1615 A.D. was reprinted in 1815 titled “The Cold Years: a Deep Snow in which Men and Cattle perished; written in Dialogue between a London Shopkeeper and a Northcountryman.”<sup>47</sup>

In *England* in 1615, there was frost from 17 January to 7 March.<sup>72, 93</sup>

During the winter of 1615, a very severe cold descended on *Germany*, *Hungary* and the neighboring provinces on 20 January. This cold froze and damaged many [grape] vines and a significant amount of fruit trees.<sup>62</sup>

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**1615 A.D.** The summer of 1615 was very dry throughout *Europe* and very hot. In the fields, everything was destroyed. In Picardy, a church was destroyed by lightning, which also killed several people. The drought was so great that in *Germany* more than 3,000 houses were consumed by fire. In Dijon, *France* the grape harvest was held on 21 September.<sup>62</sup>

In 1615, there was a great drought throughout *Europe*.<sup>212</sup>

In 1615, there was a great flood at Boston, *England*.<sup>212</sup>

In 1615, there was a great mortality among sheep at Boston, *England*.<sup>212</sup>

On 30 August 1615, off the coast of *Mexico*, the San Miguel (400-ton) was sunk in a storm. Nothing was saved, not even the crew or passengers.<sup>141</sup>

On 12 September 1615, an Atlantic hurricane struck *Puerto Rico* causing some deaths.<sup>141</sup>

In 1615, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chu-chi. During the period between 24 August and 22 September, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Yung-t'ai. The city walls and fields were damaged by the floodwaters and innumerable people and cattle drowned.<sup>153</sup>

In 1615, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tsinan and Yunnan province in southwest *China* at K'un-ming. At Tsinan, the drought resulted in a famine. Also during the same year, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ü. During the period between 5 February and 8 November, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Kuang-ch'ang. During the period between 6 May and 8 August, a drought engulfed Fukien (now Fujian province) on the southeast coast of *China*.<sup>153</sup>

In 1615 during the spring, summer and autumn, there was a great drought in Chêhkiang, Fuhkien, Shansi, Shantung and Yünnan provinces in *China*. The resulting famine was so severe that it led to cannibalism in Shantung.<sup>165</sup>

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**Winter of 1615 / 1616 A.D.** In 1616, the Seine River in *France* froze in the beginning of the year; the ice takes place on 30 January.<sup>62</sup>

The winter of 1616 brought cold weather to *France*. The cold was very severe on the royal army, which escorted the Queen of Poitiers to Tours, *France*. In Paris, the ice flow destroyed a support column of the bridge, Pont Saint-Michel.<sup>62</sup>

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**1616 A.D.** In *England*, during the summer there was a drought and it was excessively hot.<sup>47</sup>

In *England*, the summer was excessively scorching hot and droughty.<sup>72</sup>

In 1616, there was a great drought in *England*. Because of the drought, the country would not afford provisions for Sir Thomas Hutchinson's stables, so he was forced to remove from Owthorpe to winter in the town of Nottingham.<sup>212</sup>

[In *England*] the summer of 1616 was dry and heat was devouring. The harvest began on 12 September in Dijon, *France*, i.e. 12 days earlier than the average harvest time, dating back to the year 1590, the earliest date of the excellent harvest.<sup>62</sup>

In Manchester, *England*, there was an extraordinary flood.<sup>47, 92</sup>

[In *England*] on 8 November, there was a terrible storm of thunder and lightning with rain.<sup>72</sup>

In 1616, floods struck Kiangsi (now Jiangxi province) in southern *China* at Chi-an. This flood led to a famine. During the period between 14 July and 11 August, floods struck Shensi (now Shaanxi province) in central *China* at Ching-yang. Over 70 villages were flooded and the floods extended 100 li (about 35 miles). Also during the period between 14 July and 11 August, a drought engulfed Shansi (now Shanxi province) in northern *China* at Wên-shui, Yung-chi, An-i, Wên-hsi, Chi-shan, I-shih and Wan-ch'üan.<sup>153</sup>

In 1616 during the spring and summer, there was a drought in Shansi province in *China*.<sup>165</sup>

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**1617 A.D.** [In *England*] on 29 January, there was a tempest of thunder, lightning and earthquakes.<sup>72</sup>

In Catalonia in northeastern *Spain*, there were great floods; 15,000 people perished.<sup>47, 92</sup>

In 1617, an inundation occurred at Catalonia, *Spain*, where 50,000 persons perished.<sup>90</sup>

The winter of 1617 [in *Europe*] passed without a significant frost.<sup>62</sup>

In 1617, a drought and also floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow. In the same year, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Huang-an.<sup>153</sup>

In 1617, there was a drought in Anhwei, Hupeh, Kiangsi and Kiangsu provinces in *China*. In Hupeh, this was a great drought.<sup>165</sup>

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**1618 A.D.** [In *Europe*], there were extraordinary tempest, inundations of rivers, eruptions of the sea, earthquakes, bloody rain, snow, hurricanes and meteors in the air.<sup>72</sup>

In 1618, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo and Hunan province in south-central *China* at Yüan-ling. In the same year, a severe drought engulfed Hupeh (now

Hubei province) in central *China* at Huang-an and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam*. In Kwangsi province, the drought led to a famine.<sup>153</sup>

In 1618 during the summer, there was a drought in Hupeh and Kwangsi provinces in *China*. This resulted in a great mortality in Kwangsi.<sup>165</sup>

In 1618 during the 12<sup>th</sup> moon [winter] at midnight there was a great thunder and lightning storm in the vicinity of Shanghai, *China*.<sup>166</sup>

**Winter of 1618 / 1619 A.D.** During the harsh winter of 1618-19, on 22 February, Marie de Medici escaped from the castle of Blois, in central *France*. The Loire River carried along large icebergs, which began to pile up under the bridge, opposite the castle. [After two years of virtual imprisonment "in the wilderness" as she put it, she escaped from Blois in the night]<sup>79</sup>

**1619 A.D.** In Thuringia, *Germany* in July, there were great rain floods.<sup>47, 72, 92</sup>

The winter of 1619 [in *Europe*] passed without a significant frost.<sup>62</sup>

**1620 A.D.** In *Germany* in November, there were great floods.<sup>47, 72, 92</sup>

In 1620, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chu-chi and Yunnan province in southwest *China* at Ch'êng-chiang, Yao-an, Lu-hsi, An-ning, Fu-min, Yü-ch'i, Mi-lei and Ho-hsi. During the period 1-29 June, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu. During the period 29 July and 27 August, floods caused by a typhoon struck Shantung (now Shandong province) on the east coast of *China* at Wên-têng. Over 70 junks were sunk.<sup>153</sup>

**Winter of 1620 / 1621 A.D.** The winter of 1620-21 was very severe in the north and south [of *Europe*]. The *Zuiderzee* froze all over. A part of the *Baltic Sea* was covered with very thick ice. In *Italy*, the ice on the lagoon in the *Adriatic Sea* held back the Venetian fleet. The cold was very severe in *Provence*.<sup>62</sup>

In 1620, there was a great snow in *Scotland*. There was a snowstorm lasting 13 days and known as the "thirteen days' drift" in *Scotland*, where on Eskdale Moor, out of 20,000 sheep, only 45 were left alive.<sup>212</sup>

In *England*, there were fairs on the frozen River Thames in 1620.<sup>90</sup>

During the winter of 1620-21, the *Zuiderzee* freezes up entirely. The Venetian fleet is frozen in the ice of the lagoons of the *Adriatic Sea*.<sup>62</sup>

During the winter of 1620, the Sea between Constantinople (Istanbul) and Iskodar (Üsküdar) *Turkey* was frozen.<sup>1</sup>

In 1620, the sea between Constantinople (Istanbul) and Iskodar (Üsküdar) *Turkey* was passable on the ice.<sup>30, 41</sup>

**1621 A.D.** On 18 and 24 June, there was a tempest with great winds [in *England*].<sup>72</sup>

[In *England*], it was rainy all harvest and winter.<sup>72</sup>

In 1621, a severe drought engulfed Yunnan province in southwest *China* at Mi-lo. During the period between 19 July and 16 August, a drought engulfed Yunnan province at K'un-ming.<sup>153</sup>

In 1621 during the spring and summer, there was a great drought in Yünnan province in *China*.<sup>165</sup>

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**Winter of 1621 / 1622 A.D.** In 1621 in *England*, the frost was very severe from the 24<sup>th</sup> of November to the 7<sup>th</sup> of December.<sup>47, 72, 93</sup>

In *Italy*, during the winter of 1621-22, the Venetian fleet was arrested by the ice in the lagoons of Venice.”<sup>38, 60</sup>

The winter of 1621-22 was excessive in *Europe*. The Adriatic Sea froze from December to January.<sup>79</sup>

In 1622, the rivers in *Europe* and the Zuyder Zee were frozen. Ice covered the Hellespont [in *Turkey*].<sup>90</sup> [Hellespont is an ancient name of the narrow passage between the Aegean Sea and the Sea of Marmara. Today, it is known as Dardanelles.]

In 1622 during the winter, it was so cold that all the rivers in *Europe* were frozen along with the Zuyder Zee [*Zuiderzee*].<sup>212</sup>

In 1621 in *Italy*, the Port of Venice was frozen.<sup>58, 80</sup>

In 1622, *Europe* experienced a cold winter. All the European rivers and the Zuyder Zee (*Zuiderzee*) in the *Netherlands* froze.<sup>28</sup>

In 1622 in *Turkey*, ice covered the Hellespont.<sup>47, 93</sup>

The frost was very strong in the winter of 1621-22 in Flanders [now *Belgium*] and northern *France*. The Dutch lost half their army due to the cold and hunger before Sluis [in southwestern *Netherlands*].<sup>62</sup>

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**1622 A.D.** In 1622 and 1623, there was a famine [in *England*].<sup>72</sup>

[In *England*] during the summer it was excessively wet and sultry hot.<sup>72</sup>

In 1622, an Atlantic hurricane struck in the *Bahama Channel*. Two Spanish ships were lost in the hurricane.<sup>141</sup> [The Old Bahama Channel is a strait off the northern coast of Cuba and the Sabana-Camagüey Archipelago and south of the Great Bahama Bank. It is approximately 100 miles (161 kilometers) long and 15 miles (24 kilometers) wide.]

In 1622, a hurricane struck off the coast of Florida in the *United States*. A Spanish ship *Santa Ana Maria*, 180-ton, was lost during the storm.<sup>141</sup>

On 5 September 1622, a hurricane struck the Straits of Florida in the *United States*. More than 1,090 individuals were killed.<sup>141</sup>

In 1622, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui and Hupeh (now Hubei province) in central *China* at Yün. During the period between 7 August and 4 September, a drought engulfed Hupeh province in central *China* at Yün.<sup>153</sup>

In 1622 during the autumn, there was a drought in Hupeh province in *China*.<sup>165</sup>

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**Winter of 1622 / 1623 A.D.** On 15 and 19 December 1622, tempest struck [*England*].<sup>72</sup>



In *Europe*, during the winter of 1622, the month January was very warm, even in northern *Germany*. During the month of February all the trees were in bloom.<sup>62</sup>

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**1623 A.D.** In 1622 and 1623, there was a famine [in *England*].<sup>72</sup>

In 1623, there was a plague in London, *England*.<sup>212</sup>

[In *England*] on 19 & 31 May and on 19 July, there were terrible storms of thunder and lightning.<sup>72</sup>

On 14 & 15 February, 13 March and 23 June, tempests struck Strasburg [Strasburg might refer to Strasbourg, *France*; Straßburg, *Austria*; or Strasburg, *Germany*].<sup>72</sup>

In *Austria* and *Hungary*, the Danube River greatly overflowed.<sup>47, 92</sup>

On 12 and 18 February 1623, there were great floods on the Danube River.<sup>72</sup>

In September 1623, a hurricane struck *Cuba*. One account lists 250 deaths, while another account cites 150.<sup>141</sup>

On 19 September 1623, a hurricane struck St. Christopher's island [St. Kitts] in the *West Indies* and destroyed the crop of tobacco.<sup>145</sup>

In 1623, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Chi-an. This drought led to a famine.<sup>153</sup>

In 1623, there was a drought that cause great distress in Kiangsi province in *China*.<sup>165</sup>

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**Winter of 1623 / 1624 A.D.** In 1623 in *Eastern Europe*, the Danube River froze during the winter.<sup>47, 93</sup>

In 1624, the Danube River froze in *Germany*.<sup>62</sup>

In *England*, there was frost from 14 December 1623 to 11 January 1624. The Danube River was frozen.<sup>72</sup>

This winter of 1623-24 was very severe and as a result foiled the attack on Antwerp, *Belgium* by the army of the Prince of Orange. The winter produced a tremendously heavy snowfalls and great disasters. The winter lasted in *England* from mid-December to mid January; and in *Germany*, the Danube River froze.<sup>62</sup>

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**1624 A.D.** In Dijon, *France*, the harvest took place on 14 September. During the summer, lightning struck the powder mill at Verona, *Italy*; four monasteries, together with their inhabitants were buried under the rubble.<sup>62</sup>

[In *England*] tempest struck on 24 June, 18 July and 22 to 28 October 1624.<sup>72</sup>

[In *England*] on 18 August and 12 November, there were terrible storms of thunder and lightning.<sup>72</sup>

In 1624, floods struck Shansi (now Shanxi province) in northern *China* at An-tsê. Fields were damaged. During the period between 15 July and 13 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow. Dikes were damaged.<sup>153</sup>

In 1624, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Yang-shuo. This drought led to a famine. During the period between 5 February and 8 August, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Ching-yüeh.<sup>153</sup>

In 1624 during the spring and summer, there was a great drought in Shansi and Kwangsi provinces in *China*. This drought led to an insurrection in Hunan.<sup>165</sup>

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**Winter of 1624 / 1625 A.D.** A meteorologist living at the time [in *Belgium*] reported that: "After a harsh winter fell in February, westerly winds generate a large amount of snow. Some days, especially towards the end of February, brought very rough north wind chills. Moreover, most of the year was cold. Several species of trees, especially the walnut trees that were already far advanced froze up on the trunk."<sup>62</sup>

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**1625 A.D.** In Noremberg [Nuremberg, *Germany*] in July, there was a terrible storm of thunder, lightning and rain that lasted continuously for 15 days.<sup>72</sup>

In 1625 in London, *England*, there was a fearful plague during June, July, August and September. In London, there was a great mortality, 35,417 people died. The plague was also violent at Boston, *England*.<sup>212</sup>

In 1625, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing. During the period between 4 July and 2 August, a drought engulfed Shansi (now Shanxi province) in northern *China* at Wên-shui.<sup>153</sup>

In 1625 during the summer, there was a drought in Chêhkiang and Shansi provinces in *China*.<sup>165</sup>

In 1625, there was a famine, after excessive rains in the vicinity of Shanghai, *China*.<sup>166</sup>

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**Winter of 1625 / 1626 A.D.** The winter of 1625-26 was severe [in *England*]. This winter followed the infectious summer of 1625.<sup>212</sup>

About 5 April 1626 (old style [Julian Calendar]), there was a great snowfall [in *England*].<sup>212</sup>

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**1626 A.D.** In *England*, there were great hailstorms on the 29<sup>th</sup> of March and on the 25<sup>th</sup> to 30<sup>th</sup> of April.<sup>57, 72, 93</sup>

In *England* on 6 June, there were great floods.<sup>47, 72, 92</sup>

There were tempests on 10 & 13-16 February, 20 March, 31 August, 1 September, 5 & 8-9 December, and 10 & 13-14 February.<sup>72</sup>

In *England*, during the summer there was a drought and it was excessively hot.<sup>47, 72</sup>

In *England*, the summer was excessively hot. In November, the weather was excessively cold. December was mild soft warm weather, like a fine spring, yet it totally ceased and vanished.<sup>72</sup>

In the summer of 1626, excessive heat was in *England*. The first grape harvest in Dijon, *France* was held on 1 October.<sup>62</sup>

On 15 September 1626, a hurricane struck *Puerto Rico* causing 38 deaths.<sup>141</sup>

In 1626, floods struck Hopei (now Hebei province) in northern *China* at Shu-lu where crops were damaged and Shensi (now Shaanxi province) in central *China* at Fu-shih. During the same year, a drought engulfed Shensi province at Fu-p'ing.<sup>153</sup>

In 1626, there was a drought in Shansi province in *China*.<sup>165</sup>

In 1626 during the 3<sup>rd</sup> moon; wind, rain, and hail, damaged the wheat crop in the vicinity of Shanghai, *China*.<sup>166</sup>

**Winter of 1626 / 1627 A.D.** In *England* in 1627, there was a frost from the 20<sup>th</sup> January to 12<sup>th</sup> February.<sup>47, 72, 93</sup>

On 28 January 1627, there was a terrible south gale as reported in Alrewas in Staffordshire, *England*. Many houses and trees were thrown down.<sup>212</sup>

**1627 A.D.** In *Austria* on the Danube River on 10 September, "A cloud loaded with a sea of water burst and fell."<sup>47, 72, 92</sup>

In Apulia (Naples), *Italy*, there were great floods.<sup>47, 72, 92</sup>

In Apulia (Naples), *Italy*, 16,000 souls were lost by great floods.<sup>72</sup>

In 1627, there were tempests on 3-4 March, 13 & 27 October, 17 December, Bohemia [now western *Czech Republic*].<sup>72</sup>

In 1627, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Yü-yao and Chin-yün. During the period between 13 June and 12 July, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at San-chiang. Many houses were damaged by the floodwaters. During the period between 8 November and 7 December, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chiang. One thousand families were flooded.<sup>153</sup>

In 1627 during the 2<sup>nd</sup> moon, there was a storm of wind, rain, and hail that damaged wheat crop in the vicinity of Shanghai, *China*. During the 7<sup>th</sup> moon on the 1<sup>st</sup> day, there was a typhoon with rain, which destroyed trees and dwellings. Then a few days later, another typhoon struck.<sup>166</sup>

**Winter of 1627 / 1628 A.D.** In 1627 during the 12<sup>th</sup> moon, in the vicinity of Shanghai, *China*, there was a great fall of snow, over five feet in one night; bamboo and other trees broken; birds and animals died.<sup>166</sup>

**1628 A.D.** In 1628, the plague was ushered into Ausburgh [Augsburg, *Germany*] by a great famine in August and September.<sup>72</sup>

[In *England*] on 28 December 1628, there was a tempest.<sup>72</sup>

In 1628, floods struck several regions of *China* including:<sup>153</sup>

— Shansi (now Shanxi province) in northern *China* at Ch'ing-yüan.

— Hupeh (now Hubei province) in central *China* at Hanyang.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Sung-chiang and T'ai-ts'ang. Innumerable persons drowned.

— Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing, Hu-chou, Ningpo, Shao-hsing, Taichow, Chin-hua, Ch'ü, Chien-tê, Wên-chou and Li-shui. Innumerable persons drowned.

In 1628, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Pao-ting and a drought engulfed Hupeh (now Hubei province) in central *China* at Yün. During the period between 8 August and 8 November, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Huai-chi and Shansi (now Shanxi province) in northern *China* at Fên-ch'êng, Hsi, Jung-ho and Yung-chi.<sup>153</sup>

In 1628 during the autumn, there was a drought in Chihli, Hupeh, Kwangsi and Shansi provinces in *China*. In Chihli, this was a great drought.<sup>165</sup>

In 1628 during the 2<sup>nd</sup> moon, there was a fall of snow (in the spring) in the vicinity of Shanghai, *China*.<sup>166</sup>

**1629 A.D.** [In *England*] on 9-10 June, there was a tempest.<sup>72</sup>

In Mexico City in central *Mexico* on 30 June, there was a deluge from the mountains. The effects continued for several years.<sup>47, 92</sup>

In 1629 and 1630, there was a dearth in *England*. In London, they made bread from turneps [turnips].<sup>234</sup>

In 1629, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shao-hsing and Hupeh (now Hubei province) in central *China* at Hanyang. During the same year, a severe drought engulfed Shensi (now Shaanxi province) in central *China* at Mi-chih.<sup>153</sup>

In 1629, there was a great drought in Shensi province in *China*.<sup>165</sup>

### **1630 A.D. – 1631 A.D. India. Famine**

In 1630 a devastating drought afflicted the province of Gujarat and whole centers were depopulated. A Dutch merchant, returning from Swally [Suvali, *India*], reported that of 260 families only 11 had survived, while in Surat, *India*, a great and crowded city, he saw hardly a living soul, but at each street corner found piles of dead with none to bury them.<sup>84</sup> [Gujarat is a state in northwestern *India* on the Arabian Sea. Swally, Suvali and Surat are all located in Gujarat.]

In 1631 in *India*, there was a great drought and this drought extended through *Asia*.<sup>47</sup>

In 1631 in *India*, there was a general famine caused by drought and war. This extended throughout *Asia*.<sup>57</sup>

In 1631 A.D., there was a very general and terrible famine in *India*. In this terrible famine, Shah Jahan opened a number of soup kitchens or alms-houses (langar), gave away a lac of Rupees in charity, and remitted taxes to the amount of nearly 70 lacs of Rupees (80 crores of rupees) or one-eleventh part of the whole revenue.<sup>179</sup>

In 1631, there was a great famine in the Deccan region in *India*.<sup>156</sup>

— “There was a great deficiency of rain, and the drought was so intense that not a drop of dew could be found. The scarcity became so great that nothing but the herb bugloss [a coarse hairy plant of the borage family] was to be found in the shops of the bakers and druggists. The number of the dead exceeded all computation or estimate. Coffins and burial were not thought on in the Deccan. The distress compelled emigration to the north and east; but the poor wretches were reduced to such a state of weakness, that they did not accomplish the first stage. The towns and their environs, and the country, were strewn with human skulls and bones instead of seed. Men ate each other, parents devoured their children. Bakers ground up old bones, or whatever else they could get, and mixing the dust with a little wheat-flour, sold

the cakes as valuable rarities to the wealthy. Human bodies dried in the sun were steeped in water and devoured by those who found them. Cities were depopulated by the death and emigration of the inhabitants. No such famine has been recorded in history. The Emperor (Shah Jehan) ordered distribution of provisions to be made in the cities and towns, especially at Burhanpore. Khandesh and Balaghat, with many other districts, were quite depopulated. Sultanpore remained waste for forty years.” — The foregoing account refers especially to that part of India known as the Deccan; but other accounts indicate this famine was prevalent over all of *India* and also extended over the whole of Asia. — In describing this famine, the Orissa Commissioners remarked, “that money could not purchase bread, and a prodigious mortality ensued. Disease followed famine, and death ravaged every corner of *India*.”

**1630 A.D.** In *Scotland*, there were great floods on the River Clyde.<sup>47, 72, 92</sup>

In *England* in 1630, there was a dearth. Bread made of turnips, etc.<sup>57, 72, 91</sup>

In 1629 and 1630, there was a dearth in *England*. In London, they made bread from turneps [turnips].<sup>234</sup>

In 1630, there was a dreadful plague at Cambridge, *England*. It caused the business at the University to be suspended, and the Assizes [court] to be moved to Royston.<sup>212</sup>

During the drought summer of 1630, it was very dry in Alrewas in Staffordshire, *England*.<sup>212</sup>

On 5 November 1630, Zealand [the largest island in *Denmark*] was completely overflowed with saltwater [by the sea]. “Anno ter deno poft fequemille, Novembris Quinta, fiat falfis Zelandia tota fub Undis” [translation from Latin as written in Middle English: On November 5<sup>th</sup> in the third year by tens {hence 30} after the sequemille {1600}, Zelandia stands completely under salty waves.]<sup>225</sup>

Also refer to the section **1630 A.D. – 1631 A.D.** for information on the drought and famine in India during that timeframe.

**1631 A.D.** In 1631, the plague struck Dalton in Lancashire, *England* and the Isle of Walney. It began in July 1631 and continued until Easter 1632. At Dalton, three hundred and 3 score [360] people died of this sickness. At the Isle of Walney, it resulted in 120 deaths. At Louth in Lincolnshire, it caused 754 deaths.<sup>212</sup>

On 21 October 1631, a storm struck the *Gulf of Mexico* causing 300 fatalities. The storm appears to be a “norther”.<sup>141</sup>

On 6 December 1631, at the Gulf of Volo off *Greece*, riding at anchor, about 10 o’clock at night, it began to rain sand and ashes. This continued until 2 o’clock the next morning. It was 2 inches thick on the deck of the ship. The crew cast it overboard using shovels, as they did snow the day before. There was no wind stirring when these ashes fell. This strange ash fell in other places. Ships coming from St. John D’Acre [Acre, *Israel*] over 100 leagues [300 miles, 483 kilometers] away also encountered this ash. Comparing the ash from these ships, they found that the ash were the same. This shower of ash was due to the eruption of Mount Vesuvius.<sup>234</sup>

In 1631 during the 12<sup>th</sup> moon [winter], there was a storm of thunder in the vicinity of Shanghai, *China*.<sup>166</sup>

Also refer to the section **1630 A.D. – 1631 A.D.** for information on the drought and famine in India during that timeframe.

**Winter of 1631 / 1632 A.D.** Captain [Thomas] James wintered at Charleton [Charlton] Island at the

southern end of James Bay, *Canada* during the winter of 1631-32. He was obliged to take harbor in the beginning of October 1631, the snow and ice began in that month, but the Sea was not frozen close to the island until the middle of December. [On 29 November, the ship was deliberately sunk to keep it from being swept away or crushed by ice.] The cold was very intense until the middle of April. They endured great hardship in so long a winter, surrounded by a sea all covered with ice. On the 29<sup>th</sup> of April, it rained all day. On the 3<sup>rd</sup> of May, the snow was melted in many places on the island. On the 13<sup>th</sup> of May, the weather was warm in the daytime, but there was still frost in the night. On the 24<sup>th</sup> of May, the ice was consumed along the shore, and cracked all over the bay, and began to float by the ship. On the 30<sup>th</sup> of May, the water was clear of ice between the shore and the ship. On the 15<sup>th</sup> of June, the Sea was still frozen over, and the Bay full of ice. The 16<sup>th</sup> was very hot with thunder. On the 19<sup>th</sup> of June, they saw some open sea, and on the 20<sup>th</sup> all the ice was driven to the northward. [The ship was refloated in June.] The sea to the northward was full of floating ice until the 22<sup>nd</sup> of July.<sup>292</sup>

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**1632 A.D.** In *Italy* in 1632, they suffered from exceptional drought and heat. The first grape harvest in Dijon, *France* fell on 4 October.<sup>62</sup>

The drought of 1632 in *France* lasted from 12 July until 15 September.<sup>79</sup>

In 1632, floods struck Hupeh (now Hubei province) in central *China* at Hanyang.<sup>153</sup>

In 1632 during the autumn and winter, there was a great drought in Chêhkiang province in *China*.<sup>165</sup>

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**Winter of 1632 / 1633 A.D.** The winter of 1632-33 began early and was very hard. The *Mercure de France* reported that on 4 October 1632, the cold between Montpellier and Béziers in southern *France* was so severe that 16 Gardes du Corps (bodyguards) of Louis XIII, 8 of his Swiss and, 13 sutlers [civilian merchants who sell provisions to an army] died from the extreme cold.<sup>62</sup>

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**1633 A.D.** In Cork in southern *Ireland*, there was a “prodigious flood of the sea”. The flood swept away some of the public buildings and bridges.<sup>47,92</sup>

In 1633, a severe drought engulfed several regions of *China* including:<sup>153</sup>

— Shensi (now Shaanxi province) in central *China* at Mi-chih and Sian. At Sian, the drought led to a famine.

— During the period between 10 March and 7 April, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Sui-ch’ang.

— During the period between 8 August and 8 November, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Fên-ch’êng, P’u, An-i, Hsi, Fên-hsi and Yung-chi.

In 1633 during the autumn, there was a great drought in Shansi and Shensi provinces in *China*. The resulting famine was so severe that it led to cannibalism in Shensi.<sup>165</sup>

In 1633, floods struck Yunnan province in southwest *China* at Chiang-ch’uan. The city walls were damaged by the floodwaters. During the period between 5 August and 2 September, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Nanning and Ts’ang-wu. At Nanning, the houses were damaged by the floodwaters.<sup>153</sup>

In 1633, there was a famine in the vicinity of Shanghai, *China*. As a result, rice was extremely dear.<sup>166</sup>

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**1634 A.D.** On 5 October 1634, a hurricane struck western *Cuba* causing 40 deaths.<sup>141</sup>

In 1634, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui and



Yü-yao. During the period between 6 May and 8 August, floods struck Kiangsi (now Jiangxi province) in southern *China* at P'o-yang where the crops were damaged by the floodwaters.<sup>153</sup>

In 1634 during the 7<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a storm of great wind and rain, which damaged houses and the grain crop. During the 8<sup>th</sup> moon, there were three tides in one day at Nanhwai, *China*.<sup>166</sup>

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**1635 A.D.** In *England*, there was a severe frost from the 15<sup>th</sup> of December to the 11<sup>th</sup> of February.<sup>47, 72, 93</sup>

In *England*, the spring was warm and moist. The summer was excessively hot and droughty. During harvest, the weather was still hotter and drier. The winter was temperate and mild, neither dry nor wet.<sup>72</sup>

In *England*, it was hot and dry during the summer and harvest (fall).<sup>47, 72</sup>

[In *England*] on 1 August and 9 September, there were terrible storms of thunder and lightning.<sup>72</sup>

In 1635, the plague struck Kingston-on-Hull in *England*. It raged violently to the middle of June 1638. The number of persons who perished from the plague was 2,730, exclusive of those who fled out of the town and died elsewhere, who are said to have more than doubled that number. It raged at Canterbury from the beginning of August to the end of October.<sup>212</sup>

In 1635 in Holstein in northern *Germany* was so great a flood as drowned 6,000 people and 50,000 cattle.<sup>72</sup>

On 14 August 1635, a great storm struck the early settlers in New England in what was to become the *United States*. The winds from the gale caused the tides to rise to height unknown before. At Boston, Massachusetts, the tides measured 20 feet [6 meters]. The Narragansett Indians had to climb to the tops of trees to save themselves. Many failed to do so and were swallowed up by the surging waters. Trees were broken in two or torn up by the roots. The Indian corn, the main dependence of the colonists, was beaten down and destroyed. Houses were blown over. Several shipwrecks were caused by the storm, for there were at this time large immigration of settlers, and a number of ships were near the coast, having onboard many passengers and goods for New England. The ship *Great Hope* was driven aground near Charlestown, Massachusetts. The ship *James* with about one hundred passengers was almost driven onto the rocky shore of Piscataqua but the wind changed direction in the final minutes. The ship *Angel Gabriel* was dashed against the foam covered rocks off Pemaquid Point in Maine.<sup>199</sup>

On 24 August 1635, a hurricane struck the western *Atlantic Ocean* and the east coast of the *United States* causing 35 deaths.<sup>141</sup>

In 1635, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. During the same year, a drought engulfed Shansi (now Shanxi province) in northern *China* at Chi-shan and Yüan-ch'ü.<sup>153</sup>

In 1635, there was a drought in Shansi province in *China*.<sup>165</sup>

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**Winter of 1635 / 1636 A.D.** In *Western Europe*, the carts drive on the ice on the Maas [Meuse] River.<sup>62</sup>

During the winter of 1635-36 [in *Western Europe*], the frost began in December 1635, and took a portion of January 1636. The wagons drove over the ice on the River Meuse.<sup>62</sup>

In *England*, the winter was uncommon and unseasonably warm.<sup>72</sup>

In *England* on the 30<sup>th</sup> of January 1636, there was hail, with rain, snow and thunder.<sup>57, 72, 93</sup>

In Noremberg [Nuremberg, *Germany*] on 27 January 1636, there was a tempest of rain and floods.<sup>72</sup>

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**1636 A.D.** In 1636, the spring at Derby in Derbyshire, *England* was very forward [early].<sup>212</sup>

In *England*, it was hot and dry during the summer and harvest (fall). The winds came from the south or west.<sup>47, 72</sup>

In *England*, the summer was hot and droughty. There were winds from spring to winter from either the south or west.<sup>72</sup>

In 1636, East and West Bridgeford, Cotgrave, and Bingham in Nottinghamshire, *England* were severely visited by the plague. The plague also revisited Derby in Derbyshire, *England*. It desolated Bury St. Edmonds in Suffolk, *England*.<sup>212</sup>

On 4 November 1636, a furious and destructive storm struck Northamptonshire, *England*.<sup>195</sup>

In 1636 in Dijon, *France*, they collected the wine on 4 September, which is 20 days earlier than the average beginning in the year 1559.<sup>62</sup>

In 1636, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. During the same year, a severe drought engulfed Chekiang province at Chin-hua, His-ch'ang and Ch'êng. During the period between 6 May and 8 August, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at An-i and other regions of *China*.<sup>153</sup>

In 1636 during the summer, there was a great drought in Chêhkiang, Kiangsu and Shansi provinces in *China*.<sup>165</sup>

In 1636 during the spring, there was a flood in the vicinity of Shanghai, *China*. Then during the summer, there was a drought.<sup>166</sup>

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**Winter of 1636 / 1637 A.D.** In *England*, there were seven days of very hard frost in February 1637.<sup>72</sup>

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**1637 A.D.** In *England*, it was excessively hot and dry.<sup>47, 72</sup>

The summer of 1637 was unusually hot and dry [in *England*]. In *France*, the grape harvest began at Dijon on 3 September, which is 21 days earlier than average. This is the earliest date for the harvest since the year 1523.<sup>62</sup>

In East Friesland, Holland [now *the Netherlands*] on the 1<sup>st</sup> of September, there were great floods.<sup>47, 72, 92</sup>

In Friesland, *Holland* on 10 September, there was a terrible storm of thunder and lightning.<sup>72</sup>

In 1637, floods struck Kiangsi (now Jiangxi province) in southern *China*.<sup>153</sup>

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**Winter of 1637 / 1638 A.D.** In 1637 during the 12<sup>th</sup> moon, it was very cold in the vicinity of Shanghai, *China*. The Whangpu [Huangpu River, *China*] and lakes froze.<sup>166</sup>

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**1638 A.D.** In *England*, it was excessively hot and dry.<sup>47, 72</sup>

This summer of 1638 was extremely dry and hot [in *England*]. In Dijon, *France*, the grape harvest took place on 9 September, or 15 days earlier than average.<sup>62</sup>

In October 1638, an Atlantic hurricane struck off the southern coast of *Puerto Rico*. Two British ships were lost; two known survivors.<sup>141</sup>

During the winter of 1638, the French galley ships were arrested by the ice at the *Marseilles Sea*.<sup>38, 60, 62</sup>

The winter of 1638 in southern *France* cause more damage than the winter of 1599-1600. The port of Marseille froze around the galleys.<sup>79</sup>

The winter of 1638 was so severe in *Provence* that in the port of Marseille (*France*), the water froze around the ships.<sup>62</sup>

In 1638, during the period between 8 August and 8 November, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow.<sup>153</sup>

In 1638 in the autumn, there was a drought in Kiangsu province in *China*.<sup>165</sup>

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**1639 A.D.** In Montbéliard in east-central *France* on 21 June 1639, a cold wave struck that was so strong as in the full cold of winter.<sup>62</sup>

In 1639, almost no snow fell on the Alps. There was no rain in *Provence, France*. Durance and other rivers dried up. The water level on the Rhône River was down very low.<sup>79</sup> [Durance is a major river in southeastern *France*. Its source is in the southwestern Alps.]

In *England* in October, there were great floods.<sup>47, 72, 92</sup>

[In *England*] on 6, 24 and 27 December, there were tempests and hurricanes.<sup>72</sup>

In 1639, a drought engulfed Hupeh (now Hubei province) in central *China* at Chung-hsiang. During the period 1-29 July, floods struck Hupeh province) at An-lu. During the period between 8 November 1639 and 5 February 1640, a drought engulfed Shansi (now Shanxi province) in northern *China* at Ch'ang-chih.<sup>153</sup>

In 1639 during the winter, there was a drought in Hupeh and Shansi provinces in *China*. No snowfall.<sup>165</sup>

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**1640 A.D.** On 8 April 1640 there was a sudden overflowing or inundation of the River Weland in Northamptonshire, *England* to an incredible height. It was called the Easter Flood. The water rose five feet, eight inches above the ground. At the same time there was a great and sudden overflowing of the River Nyne. This caused a great flood. The floodwater flowed into the lower rooms of the houses on both sides of Bridge Street in Peterborough. The rains that caused this flood did not fall on Peterborough but rather in the upper part of the county.<sup>195</sup>

On 11 September 1640, a hurricane struck the western coast of *Cuba*. Thirty-six vessels were affected by the storm. Four ships were thrown on shore. Nearly all the sailors drowned, except 260 that were saved.<sup>141</sup>

In Dresden, *Germany* on the 23<sup>rd</sup> of September, there were great floods.<sup>47, 72, 92</sup>

In *England*, on October 11 through 14, there was a most severe frost. It froze up all the rivers and brooks.<sup>72</sup>

[In *England*] on 18 October, there was a terrible storm of thunder and lightning.<sup>72</sup>

During 1640-1655, there was a famine throughout *India*, principally felt in Deccan in southern *India* and in Bengal [today this is *Bangladesh* and the state of West Bengal in *India*].<sup>182</sup>

In 1640, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* leading to a famine. Also during the year, a drought accompanied by a plague of locusts engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Shao-hsing. During the period between 6 May and 8 August, a drought engulfed Chekiang province at Chu-chi.<sup>153</sup>

In 1640 during the summer, there was a universal great drought and distress in Chêhkiang and Shantung provinces in *China*. In Chêhkiang, the drought was accompanied by a plague of locusts. The resulting famine was so severe that it led to cannibalism in Shantung.<sup>165</sup>

In 1640 during the period between 17 August and 15 September, floods struck Fukien (now Fujian province) on the southeast coast of *China* at Fu-an. Houses were damaged by the floodwaters and innumerable people and cattle drowned. During the period between 8 August and 8 November, floods struck Chekiang (now Zhejiang province) on the east coast of *China*. As a result, the price of rice rose.<sup>153</sup>

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**1641 A.D.** In *England*, there were hailstorms on the 25<sup>th</sup> of June and the 14<sup>th</sup> and 19<sup>th</sup> of August with rain.<sup>57</sup>

In *England*, there was a great hailstorm on 25 June 1641. There were further hailstorms in *England* on August 24 and 29 and rain.<sup>72, 93</sup>

In 1641, the plague struck Stamford, *England*. Between 500 and 600 people died.<sup>212</sup>

In Montbéliard, *France*, on 27 July 1641 it froze. In Burgundy, *France*, the grape harvest began only on 3 October.<sup>62</sup>

On 24 September 1641, an Atlantic hurricane struck from *Hispaniola* to Florida, in the *United States*. Eight ships were lost and many people perished. Many ships were lost in the *Bahama Channel*. There were no survivors on four of the wrecked ships. There were some survivors on a fifth ship that was lost along the northeast coast of Florida in the *United States*.<sup>141</sup>

Governor Winthrop in his journal mentioned that the frost was so great that the Boston Bay in Massachusetts, *United States* was frozen over from the 18<sup>th</sup> of November to the 21<sup>st</sup> of December. The ice was so thick that horses and carts crossed over parts where ships had sailed. Loads of wood drawn by six oxen passed from Muddy River to Boston. It was frozen as far out to sea as one could discern. The great bay at Virginia was also frozen over, and all their great rivers.<sup>38</sup>

In 1641 during the period between 8 June and 7 July, floods struck Fukien (now Fujian province) on the southeast coast of *China*.<sup>153</sup>

In 1641, there was a drought in the vicinity of Shanghai, *China*. The drought was accompanied with a plague of locusts.<sup>166</sup>

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**1642 A.D.** [In *England*] on 22 & 27 January and on 17 February, there were terrible storms of thunder and lightning.<sup>72</sup>

In *England*, in 1642 and 1643, the summers were excessively hot.<sup>47</sup>

On 27 August 1642, a gale struck Nottingham, *England*.<sup>212</sup>

In *Germany* in September, there was a great flood at Dresden.<sup>72</sup>

In the news of the siege of Perpignan in southern *France* written by Louis XIII, we read, under date of May 24, 1642, the army experienced excessive heat.<sup>79</sup>

During 1642, there were three hurricanes in the *West Indies*. The second lasted twenty-four hours, during which, at St. Christopher's island [St. Kitts], twenty-three fully laden vessels were wrecked upon the coast. One of them belonged to the celebrated De Ruyter. The houses were all blown down, and the whole of the cotton and tobacco plants were destroyed. The salt lakes overflowed their banks, and were for some time afterwards unproductive.<sup>145</sup> [Michiel Adriaenszoon de Ruyter was the most famous and one of the most skilled admirals in Dutch history.]

On September 1642, an Atlantic hurricane struck the *Lesser Antilles*. Men in 22 ships were drowned.<sup>141</sup>

In 1642, a hurricane destroyed all the houses on St. Kitts in the *West Indies*.<sup>144</sup>

[In 1642 in Kaifong [Kaifeng] in the Henan province of central *China*, the area was besieged by rebels, and the embankments destroyed which caused a man-made flood. It was computed that 300,000 people perished by this inundation.<sup>92</sup>]

In 1642, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo. During the period between 6 May and 8 August, floods struck Kiangsi (now Jiangxi province) in southern *China*.<sup>153</sup>

In 1642, there was a drought in Chêhkiang province in *China*.<sup>165</sup>

In 1642, there was a drought in the vicinity of Shanghai, *China*. The drought was accompanied with a plague of locusts.<sup>166</sup>

In 1642 during the 8<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a storm [typhoon] of great wind, rain, and hail, which damaged the rice crops. During the same time, at Wangpoo [now Huangpu, *China*], there were three tides in one day, and violent wind and rain injured the crops there also.<sup>166</sup>

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**1643 A.D.** In Thuringia, *Austria*, there were great floods on 2 December.<sup>47, 72, 92</sup> On 6 February, there was a great flood at Maes.<sup>72</sup>

On 23 January 1643, there was a terrible high water flood at Friesland [now in *the Netherlands*] whereby much damage was done to the dikes and at the city of Gaes near Haerlingen [Harlingen, *the Netherlands*], the dead bodies streamed out of the earth [buried dead corpse floated to the surface].<sup>225</sup>

In *England*, in 1642 and 1643, the summers were excessively hot.<sup>47</sup>

[In *England*] on 16 March and 3 May, there were terrible storms of thunder and lightning.<sup>72</sup>

In *England*, the spring was very moist, almost constant rain. The summer was excessively hot.<sup>72</sup>

In *Italy* in 1643, there was excessive heat. In *France*, this was a year of great scarcity of grain. In Dijon, *France*, the grape harvest began on 1 October.<sup>62</sup>

In 1643, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo. This drought led to a famine. During the period between 18 April and 17 May, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu. During the period between 6 May and 8 August, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at Hui-min.<sup>153</sup>

In 1643 during the summer, there was a drought in Chêhkiang and Yünnan provinces in *China*. In Yünnan, this was a great drought.<sup>165</sup>

In 1643 during the 10<sup>th</sup> moon, there was at night a storm of violent thunder, rain and wind in the vicinity of Shanghai, *China*. It broke trees and carried off [clay roof] tiles.<sup>166</sup>

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**1644 A.D.** In *Spain* on 6 June, there were great floods.<sup>47</sup>

On 1 October, there was a great flood in *Spain*.<sup>72</sup>

In *Spain* and Holland [now *the Netherlands*], there were considerable floods.<sup>47, 92</sup>

On 15 & 16 May 1644, there was a hailstorm in Staffordshire and Warwickshire, *England*. Some of the hailstones were the size of walnuts and others the size of half crown pieces. "Maii 15 and 16, in divers places there fell great stormes of haile with haile stones of divers formes, some round as big as walnuts, and some flat as big as half crown pieces; with thunder and lightning in three or four several places at one instant; the like seldom seen."<sup>212</sup>

[In *England*] on 16-18 June, there was a tempest with high winds.<sup>72</sup>

In August 1644, the plague was violent in Leeds in West Yorkshire, *England*.<sup>212</sup>

In Montbéliard, *France* in 1644, the heat for more than two weeks was so strong that the fish died in the rivers. In Dijon, *France*, the grape harvest began on 15 September.<sup>62</sup>

In October 1644, a great Atlantic hurricane struck the western coast of *Cuba* and the Straits of Florida causing approximately 1,500 deaths.<sup>107</sup>

In October 1644, a hurricane struck western *Cuba* and the Straits of Florida in the *United States* causing less than 1,500 deaths. [Thirteen ships carried 1,500 people. Ten of these ships sank.]<sup>141</sup>

In 1644 during the period between 1 September and 30 October, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Tung-yang and Hopei (now Hebei province) in northern *China* at Hsing-t'ai. During the period 1-30 September, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu.<sup>153</sup>

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**1645 A.D.** During the winter of 1645, there was a furious wind that struck near Geneva, *Switzerland*. It took the roof off a house and laid dry the bed of the River Rhone above the bridge in view of the town. Many people crossed over the dry river to the little island with dry feet. One of the sons of Mr.



D'aubigny picked up some medals he found in the dry riverbed along his way. The river was dry for an hour and then the waters returned. A book printed in the year 1560 recorded a similar episode.<sup>234</sup>

In 1645, the plague was very violent in Leeds in West Yorkshire, *England*. 1,325 persons died between 12 March and 1 June. "The air very warm and so infectious that dogs, cats, mice, and rats died, and several birds in their flight over the town dropped dead."<sup>212</sup>

[In *England*] March 8, September 4 great rains and floods, a rainy floody winter.<sup>72</sup>

On 6 June 1645, a hailstorm struck Loughborough in Leicestershire, *England*. Some of the hailstones were as big as small hens' eggs and the least as big as musket bullets.<sup>194</sup>

In *England* on the 3<sup>rd</sup> of July, there was a hailstorm with rain.<sup>57, 72</sup>

In France there was a flood. On 11 July 1645, the Seine River in Paris, *France*, at the bridge "Pont de la Tournelle" reached a height of 9.04 meters (29.7 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

In *England*, the summer was excessively hot and dry.<sup>72</sup>

The summer of 1645 was short but hot in *England*. In Dijon, *France*, the grape harvest took place on 11 September; 13 days earlier than the mean.<sup>62</sup>

In *England*, there was a severe frost from the 8<sup>th</sup> of December to the 17<sup>th</sup> of January.<sup>47, 72, 93</sup>

In 1645 during the period between 26 April and 24 May, floods struck Kiangsi (now Jiangxi province) in southern *China* at Wan-tsai and Hopei (now Hebei province) in northern *China* at An-tz'ü. At Wan-tsai, the crops were damaged by the floodwaters. During the period between 21 August and 19 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'êng and Hopei province at Hsing-t'ai, Kao-yang [possibly a misprint], Tsao-ch'iang, Chêng-ting and Chi-tsê.<sup>153</sup>

In 1645 during the autumn in the vicinity of Shanghai, *China*, there was a storm of great wind; the sea broke the dike, salted the land, and thereby destroyed the rice.<sup>166</sup>

**1646 A.D.** In Friesland, Holland [now *the Netherlands*] and Zealand, *Denmark*, there were great inundations. The Sea drowned 110,000 people.<sup>47, 72, 92</sup>

The sea broke in at Dordrecht [Dordrecht] in Holland [now *the Netherlands*] and thereabout, and drowned 10,000 people. About Dullar in *Friesland* and *Zealand*, it drowned 100,000 people, and 300 villages, some of whose steeples and towers yet appear when the tide is out.<sup>72</sup>

In 1646, it was excessively hot [in *England*].<sup>212</sup>

In 1646, the plague ravaged Bideford in Devon, *England*. It also struck Bingham in Nottinghamshire where it raged violently.<sup>212</sup>

In 1646, the price of wheat [in *England*] averaged 48 shillings per quarter [quarter ton].<sup>212</sup>

[In *England*] on 26 June, there was a terrible storm of thunder and lightning with rain.<sup>72</sup>

In *England*, there were hailstorms on the 4<sup>th</sup> of May; 11<sup>th</sup> and 12<sup>th</sup> of July; and 17<sup>th</sup> of August.<sup>57, 72, 93</sup>

In 1646 during the period between 7 March and 8 October, a severe drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh and Mêng-shan; and Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang, P'ing-hsiang and Wan-tsai. During the same time period, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua, P'u-chiang, Taichow, Shao-hsing and Tung-yang.<sup>153</sup>

In 1646 during the period between 17 March and 15 April, floods struck Anhwei (now Anhui province) in eastern *China* at Fou-yang and Po. During the period between 13 June and 12 July, floods struck Yunnan province in southwest *China* at K'un-ming and Mêng-tzū; and Shantung (now Shandong province) on the east coast of *China* at Tzū-yang and Lin-i. At Tzū-yang, houses were damaged by the floodwaters. [Lin-i is located at longitude 118.24° East and latitude 35.07° North.] During the period between 11 August and 8 September, floods struck Shansi (now Shanxi province) in northern *China* at Kao-p'ing and Shantung province at Lin-tzū.<sup>153</sup>

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**1647 A.D.** In *England*, the weather was variable in 1647, but very rainy in 1648.<sup>72</sup>

[In *England*] form the harvest in 1647, both of the years [1647 & 1648] southerly windy, cold; all very rainy and floody.<sup>72</sup>

In *England*, “this was a most exceedingly wet year; neither frost nor snow all the winter for more than six days in all. Cattle died everywhere of a murrain [cattle disease].”<sup>47</sup>

In 1647, the price of wheat was high [in *England*]; averaging 73 shillings per quarter [quarter ton].<sup>212</sup>

In 1647, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 5 May and 2 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Wan-tsai.

— During the period 2-31 July, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh; Kiangsu (now Jiangsu province) on the east coast of *China* at Hsiao and Suchow; and Anhwei (now Anhui province) in eastern *China* at Wang-chiang, Wu-wei, Po, and Fou-yang.

— During the period 1-29 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Shui-an; Shantung (now Shandong province) on the east coast of *China* at Ch'ü-fou, I-shui, Kuang-jao, Wên-shang, Ch'ang-yüeh and An-ch'iu [it is possible the word order is inverted “Ch'iu-an”].

— During the period between 30 August and 27 September, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Mao-ming; Kiangsu province at Kao-yu; and Shantung province at Ning-yang.

In 1647 during the period between 6 May and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China* at T'ung [uncertain name]. During the period between 8 August and 8 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at K'ai-hua.<sup>153</sup>

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**1648 A.D.** In 1648, the price of wheat was high [in *England*]; averaging 85 shillings per quarter [quarter ton].<sup>212</sup>

Over the 100-year period from 1646 to 1745, the highest true market price of wheat at Windsor, *England* occurred in the years 1648 and 1649. The true-market price was computed averaging the price on Lady Day and the price at Michaelmas. In 1648, the price was 4£ 5s per Quarter [Quarter ton]. In 1649, the price was 4£ per Quarter [Quarter ton]. [This high price denotes a scarcity.] Over this time period, malt exceeded 2£ per Quarter in 1648, 1649, 1659 and 1662.<sup>297</sup>

In 1648, floods struck many regions of *China* including: <sup>153</sup>

— During the period between 5 February and 6 May, floods struck Anhwei (now Anhui province) in eastern *China* at Wu-ho and Shantung (now Shandong province) on the east coast of *China* at P'ing-yüan and Wên-shang.

— During the period between 21 June and 19 July, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh; Hopei (now Hebei province) in northern *China* at Mi-yün, Hsien, Hsin-ho, Pai-hsiang and Pa; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Tzū-chin [uncertain name – Yung-an].

— During the period between 20 July and 18 August, floods struck Hopei province at Wu-ch'iang, Chin, P'ing-hsiang, Nan-ho, Yung-nien, Tsao-ch'iang, and Mi-yün; Anhwei province at Su-sung; and Chekiang (now Zhejiang province) on the east coast of *China* at Chien-tê.

— During the period between 19 August and 16 September, floods struck Anhwei province at Po, Ying-shang and T'ai-p'ing; and Chekiang province at Ch'ang-shan.

In 1648 during the period between 6 May and 8 August, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Jao-p'ing. <sup>153</sup>

In 1648 during the 4<sup>th</sup> moon on the 3<sup>rd</sup> day in the vicinity of Shanghai, *China*, there was a hailstorm. The hailstones were the size of a [man's] fist. The hailstones wounded cattle and damaged crops. <sup>166</sup>

In 1648 during the 7<sup>th</sup> moon on the 21<sup>st</sup> day in the vicinity of Shanghai, *China*, there were three tides in one day. <sup>166</sup>

In 1648 during the autumn, there was a flood in the vicinity of Shanghai, *China*. <sup>166</sup>

**Winter of 1648 / 1649 A.D.** In *England* on 22<sup>nd</sup> January, "Now was the Thames frozen over and horrid tempests frown'd." <sup>47, 93</sup>

There was a great frost in *England* in January 1649. The River Thames was frozen over in London. On 22 January, there was a horrid tempest of wind. <sup>212</sup>

**1649 A.D.** In France there was a flood. In January 1649, the Seine River in Paris, *France*, at the bridge "Pont de la Tournelle" reached a height of 7.65 meters (25.1 feet) above the zero mark [the low water mark of the year 1719]. <sup>71</sup>

In 1649, continuous rain swelled the River Seine in Paris, *France*. The waters shook the small bridge "Pont Saint-Michel." In the living memory of the oldest bourgeois, they had not witnessed so great a rise of floodwaters in the Place de Grève [now called the Place de l' Hôtel de Ville] and the surrounding streets. The floodwater even overran the cemetery of St. John. <sup>79</sup>

In *England*, there were very general floods. <sup>47, 92</sup>

[In *England*], on 17 January (at Oxfordshire) and 17 June, there were great floods. All September and October rainy and floods. <sup>72</sup>

On 24 August 1649, there was a hailstorm at Peterborough in eastern *England*. Some of the hailstones were 9 inches in circumference. <sup>195</sup>

In 1649, the price of wheat was high [in *England*]; averaging 80 shillings per quarter [quarter ton]. <sup>212</sup>

Over the 100-year period from 1646 to 1745, the highest true market price of wheat at Windsor, *England* occurred in the years 1648 and 1649. The true-market price was computed averaging the price on Lady Day and the price at Michaelmas. In 1648, the price was 4£ 5s per Quarter [Quarter ton]. In 1649, the price was 4£ per Quarter [Quarter ton]. [This high price denotes a scarcity.] Over this time period, malt exceeded 2£ per Quarter in 1648, 1649, 1659 and 1662.<sup>297</sup>

In 1649 there was a famine in *Scotland* and northern *England*. The plague raged in *Ireland* and Shropshire in west Midlands *England*.<sup>72</sup>

In 1649 and 1650, there was a famine in *Scotland* and the North of *England* from rains and wars.<sup>57, 72, 91</sup>

In 1649 in Lancashire, *England*, there was a famine caused by the ravages of the armies. A plague followed.<sup>57</sup>

In 1649, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 11 May and 9 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Kiukiang and Hupeh (now Hubei province) in central *China* at Chung-hsiang and Hanyang.

— During the period between 10 June and 9 July, floods struck Anhwei (now Anhui province) in eastern *China* at Fou-yang. Innumerable houses were damaged by the floodwaters.

— During the period between 8 August and 6 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yen-ch'êng and Hopei (now Hebei province) in northern *China* at Wên-an, Chêng-ting, Hsing-t'ai, Kuang-p'ing, Ta-ming and Ho-chien.

In 1649 during the period between 5 February and 8 August, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Chi-an.<sup>153</sup>

**1650 A.D.** During the night of 18 January in *England*, there was a terrible storm. The cattle were so frightened that most of them broke out of the fields. Some in leaping broke their necks, others their legs. Some ran four miles off and when found were excessively hot.<sup>72</sup>

In Leicester, *England* on the 29<sup>th</sup> of April, there was a hailstorm.<sup>57, 93</sup> . . . with thunder and lightning.<sup>72</sup>

In Rome, *Italy*, during the summer of 1650, the heat was very strong and extremely dry. [In *France*], this year was noted for a great scarcity of corn; the price was three times higher than in the previous five years.<sup>62</sup>

In Rome, *Italy*, during the whole year, there was most excessive heat and drought, especially in the summer. After the harvest, the scorching heat was succeeded by very great rains and these were followed by a most rigorous cold.<sup>72</sup>

In 1650, an Atlantic hurricane struck St. Kitts in the *West Indies*. Twenty-eight ships were thrown on the roadstead of St. Christopher island; the sailors drowned. During two different hurricanes, a total of twenty-eight merchantmen [merchant ships] were lost along with a great number of lives.<sup>141</sup> [St. Christopher island is commonly known as St. Kitts. A roadstead is a place outside a harbor where a ship can lie at anchor.]

In 1650, the price of wheat was high [in *England*]; averaging 77 shillings per quarter [quarter ton].<sup>212</sup>

In 1650 and 1651 in *Ireland*, there was a famine throughout the country. Siege of Limerick in western *Ireland* and Siege of Galway in west-central *Ireland*.<sup>57, 91</sup>

In 1650, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 1 February and 1 March, floods struck Hupeh (now Hubei province) in central *China* at Hanyang.

— During the period between 30 May and 28 June, floods struck Shantung (now Shandong province) on the east coast of *China* at Ch'i-ho, Chang-ch'ing, T'an-ch'êng [probably a misprint, "Yen-ch'êng"], and Jih-chao. Nearly all the villages in the region of Chang-ch'ing were flooded.

— During the period between 29 June and 27 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Ts'ang-wu; Chekiang (now Zhejiang province) on the east coast of *China* at Taichow, Sui-ch'ang and Hu-chou; and Shensi (now Shaanxi province) in central *China* at An-k'ang.

— During the period between 8 August and 8 November, floods struck Shantung province at Tung-a, Tung-ming, Shih-p'ing [probably a misprint, "Jên-p'ing"], Ch'ang-i, Chiao, Ên, T'ang-i and Hui-min. At Tung-a, 67 villages were flooded. At Ch'ang-i, the crops were damaged by the floodwaters. Also during this time period, floods struck Kiangsi (now Jiangxi province) in southern *China* at Shih-ch'êng [uncertain name].

— During the period between 25 October and 22 November, floods struck Hopei (now Hebei province) in northern *China* at Fu-ning and Luan-ch'êng; and Chekiang province at Hsien-chü. At Hsien-chü, the city walls, fields and houses were damaged by the floodwaters and many people drowned.

In 1650 during the period between 6 May and 8 August, a drought engulfed Shansi (now Shanxi province) in northern *China* at Wan-ch'üan. During the period between 1 April 1650 and 18 May 1651, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Yai.<sup>153</sup>

**1651 A.D.** In France there was a flood. In January 1651, the Seine River in Paris, *France*, at the bridge "Pont de la Tournelle" reached a height of 7.8 meters (25.6 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

On 23 February 1651 occurred St. Peter's high flood, whereby much damage was done to the dikes in Friesland [now in *the Netherlands*], Embderland, and elsewhere, and not far from Dockum [Dokkum in *the Netherlands*] by Oudt-woudumer-ziil, there was a breach of 42 roods [42 rods, 693 feet, 211 meters] long broken in the dike.<sup>225</sup>

[In *England*] on 22 August, there was a terrible storms of thunder and lightning.<sup>72</sup>

In Dorchester in southwestern *England* on the 23<sup>rd</sup> of August, there was a hailstorm with stones 7 inches in circumference.<sup>41, 43, 56, 57, 93</sup>

In *England* in 1651, it was very hot days at the time of harvest. In Dijon, *France*, the grape harvest began on 22 September. This was another year in *France* where wheat was very scarce.<sup>62</sup>

In *England*, the years 1651-54 produced scorching hot dry summers and dry years.<sup>47, 72</sup>

In 1651, the price of wheat was high [in *England*]; averaging 73 shillings per quarter [quarter ton].<sup>212</sup>

Thunderstorms or rainstorms desolated Provence, *France* in 1651.<sup>79</sup>

The Seine River at Paris, *France* was so flooded that all houses near it were in danger, and great damage was done. On 4 March, a great tide broke down St. Anthony's banks, and overflowed all Dimermeer. There was significant damage in north *Holland* and Amsterdam.<sup>72</sup>

The thunderstorms of the year 1651 produced a great flood year in *France*. All the rivers overflowed their banks. In Provence, *France* on September 8th, the Durance River ascended to the gates of Avignon. In November at Grenoble, the Isère River overflowed bridge and fifty houses, drowned fifteen hundred beasts in the country and three hundred in the city. The flood left three or four feet of sand in the streets. The waters rose, they say, more than twenty feet above their usual height.<sup>79</sup>

During the period between 1 April 1650 and 18 May 1651, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Yai. In 1651 during the period between 19 May and 12 November, a drought engulfed Shensi (now Shaanxi province) in central *China* at Kan-ch'üan, Yen-ch'ang and An-ting.<sup>153</sup>

In 1651, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 21 January and 19 February, floods struck Anhwei (now Anhui province) in eastern *China* at Shih-tai; Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow; and Hopei (now Hebei province) in northern *China* at Ching.

— During the period between 9 May and 17 June, floods struck Anhwei province at Ch'ien-shan and Wang-chiang. At Ch'ien-shan, innumerable houses were damaged by the floodwaters. At Wang-chiang, there was a great storm.

— During the period between 18 June and 16 July, floods struck Anhwei province at Ching-tê. Innumerable people and cattle drowned.

— During the period between 15 September and 13 October, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Shui-an; and Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-ch'un and T'ai-ts'ang. The crops were damaged by the floodwaters.

— During the period between 13 November and 12 December, floods struck Hopei province at Nan-ho, Kuang-tsung, Nan-yüeh, Yü-t'ien, Hsing-t'ai, and Ning-ho.

**1652 A.D.** In *England*, the years 1651-54 produced scorching hot dry summers and dry years.<sup>47, 72</sup>

In *England*, the summer was excessively hot and dry.<sup>72</sup>

In 1652, the price of wheat [in *England*] averaged 49 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1652, there was a drought in *Scotland*. The warmth was very great, the summer being the driest ever known in *Scotland*.<sup>212</sup>

The summer of 1652 was very hot and very dry in *Denmark* and *England*. At Dijon, *France*, the grape harvest began on 20 September. This was the third famine year of the grain.<sup>62</sup>

In Copenhagen, *Denmark*, the summer was excessively hot and dry.<sup>72</sup>

On 23-24 September 1652, an Atlantic hurricane struck the *Leeward Islands*. Three ships and crew went missing.<sup>141</sup>

In 1652, Prince Maurice was lost in a hurricane in the *West Indies*. [Prince Maurice was a prince of the elector Palatine region of *Europe*.] He was in a fleet under the command of his brother Prince Rupert.<sup>145</sup>

The River Arve falls into the River Rhone, about 1000 paces beneath [Lake] Geneva, *Switzerland*. In December 1652, the River Arve swelled so that it not only overflowed its banks but also interrupted the course of the Rhone, and forced it to reenter in the Lake for a space of 14 hours.<sup>234</sup>

In 1652, floods struck many regions of *China* including:<sup>153</sup>



- During the period between 10 March and 7 April, floods struck Anhwei (now Anhui province) in eastern *China* at Tung-liu.
- During the period between 8 April and 7 May, floods struck Shantung (now Shandong province) on the east coast of *China* at Ch'i-tung.
- During the period between 6 June and 5 July, floods struck Shantung province at Lin-ch'ing, Hui-min, Shang-ho and Yüeh-ling; and Shansi (now Shanxi province) in northern *China* at P'ing-ting, Hsi-yang and Shou-yang. Nearly all the villages in these districts were flooded.
- During the period between 6 July and 3 August, floods struck Shantung province at Shou-kuang, Ch'ang-yüeh, An-ch'iu and Kao-wan; and Shansi province at Hsi-yang, An-tsê, Lin-fên and Jung-ho.
- During the period between 4 August and 2 September, floods struck Shantung province at Mêng-yin; Kansu (now Gansu province) in northwest *China* at T'ien-shui and Lung-hsi; Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou; Hupeh (now Hubei province) in central *China* at Chung-hsiang; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at K'ai-p'ing.
- During the period between 3 September and 2 October, floods struck Kwangtung province at P'u-ning and Chekiang province at T'ung-hsiang.

In 1652, a drought engulfed several regions of *China* including: <sup>153</sup>

- During the period between 5 February and 6 May, a drought engulfed Anhwei (now Anhui province) in eastern *China* at T'ung-ling, Wu-wei, Lu-chiang, Wuhu and Tang-t'u.
- During the period between 6 June and 5 July, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Shanghai.
- During the period 3-31 October, a drought engulfed Hopei (now Hebei province) in northern *China* at Wu-ch'iang.

In 1652 during the 4<sup>th</sup> moon on the 5<sup>th</sup> day, great rains cause the river to flood in the vicinity of Shanghai, *China*.<sup>166</sup>

**1653 A.D.** On 13 July 1653, an Atlantic hurricane struck Barbados in the *Lesser Antilles* and St. Thomas in the *Virgin Islands*. One ship and crew was lost. At *St. Vincent* in the Caribbean Sea, there was "death of many savages".<sup>141</sup>

In July 1653, it was so furiously hot in *Poland*, that in the regiment of foot [soldiers] which was the King's Guard, marching most of them barefooted upon sand, more than 100 fell down altogether disabled [heat stroke], whereof a dozen died outright, without any other sickness.<sup>234</sup>

In *England*, the years 1651-54 produced scorching hot dry summers and dry years.<sup>47, 72</sup>

In 1653, the price of wheat [in *England*] averaged 35 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In *Dijon, France* in 1653, the grape harvest began on 11 September; 13 days earlier than the mean. In *France* the price of corn fell by half.<sup>62</sup>

In 1653, floods struck many regions of *China* including: <sup>153</sup>

- During the period between 27 April and 26 May, floods struck Hupeh (now Hubei province) in central *China* at Shih-shou, Chih-chiang and Sung-tzū. At Sung-tzū, the dikes were damaged.
- During the period between 27 May and 24 June, floods struck Shansi (now Shanxi province) in northern *China* at Ch'in-shui and Shou-yang; Shensi (now Shaanxi province) in central *China* at An-k'ang; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'in.

— During the period between 25 June and 23 July, floods caused by a typhoon struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow. Many people drowned. During the same time floods struck Shensi province at An-ting and Pai-ho. The occupants drowned. Also during this time, floods struck Shantung (now Shandong province) on the east coast of *China* at Yang-ku and Wên-têng. At Yang-ku, crops and houses were damaged by the floodwaters. At Wên-têng, houses and over 4,000 acres of land were damaged.

— During the period between 23 August and 21 September, floods struck Kiangsu province at T'ai-ts'ang and Hsiao; and Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing.

— During the period between 22 September and 20 October, floods struck Shantung province at Hsin and Lin-ch'ing.

In 1653 during the period between 6 May and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Yüeh-t'ing. During the period between 8 August and 8 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning and Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu.<sup>153</sup>

In 1653, there was a very hurtful drought in the vicinity of Shanghai, *China*. The drought caused a famine.<sup>166</sup>

**1654 A.D.** In *England*, the years 1651-54 produced scorching hot dry summers and dry years.<sup>47, 72</sup>

In 1654, the price of wheat [in *England*] averaged 26 shillings per quarter [quarter ton].<sup>212</sup>

There was a great drought in southern France in 1654-56. Rains were very rare.<sup>79</sup>

In 1654 during the period between 17 April and 15 May, floods struck Hupeh (now Hubei province) in central *China* at Ao-ch'êng and Mien-yang. At Mien-yang the dikes were damaged. During the period between 15 June and 13 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsing-ning and Lung-ch'uan. During the period between 14 July and 11 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Shih-p'ing [probably a misprint, "Jên-p'ing"]. Villages were flooded.<sup>153</sup>

In 1654 during the period between 16 May and 14 June, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at T'ien-t'ai. During the period between 12 August and 10 September, a drought engulfed Shansi (now Shanxi province) in northern *China* at Hsiang-yüan and Ch'in. During the period between 9 December 1654 and 7 January 1655, a drought engulfed Hopei (now Hebei province) in northern *China* at Wu-ch'iang.<sup>153</sup>

In 1654 during the 3<sup>rd</sup> moon in the vicinity of Shanghai, *China*, there was a storm of great wind and hail. During the 5<sup>th</sup> moon, there was great rain for ten days. Again in the next month there was a storm that damaged the rice crop.<sup>166</sup>

**Winter of 1654 / 1655 A.D.** Mr. Fehre, Chief Secretary to Prince Radzivil, assures us, that in the war against the Muscovites and Cossacks in January 1655 at the siege of Bichow in White Russia [now *Belarus*], all their provisions of Spanish wines and peterfimen, and beer were in one night frozen upon the sledge, notwithstanding they were covered with straw. Insomuch that they were constrained to carry them into a stove to thaw them, which they could not do in two whole days, and were obligated to break the vessels, and put pieces of the ice wine into kettles, to thaw them over the fire in order to drink them. But he observed that the Hungarian wine resisted the cold better than the peterfimen. The scrue [screw lid] of a flagon of Aqua Vitæ [ethanol] being put to his mouth stuck close to his lips [froze to his lips] that

he could not draw it off without drawing blood. The pool of the village (where they quartered) was so thoroughly frozen, that there was but very little water left between the ice and the bottom.<sup>234</sup>

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**1655 A.D.** In *England* in January 20, there were considerable floods.<sup>47, 72, 92</sup>

In 1655, there was a plague in London, *England*.<sup>212</sup>

In 1655, the price of wheat [in *England*] averaged 33 shillings per quarter [quarter ton].<sup>212</sup>

There was a great drought in southern *France* in 1654-56. Rains were very rare.<sup>79</sup>

In 1655 during the period between 6 February and 7 March, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Yen-ch'êng. Innumerable persons were drowned. During the period between 6 May and 3 June, floods struck Anhwei (now Anhui province) in eastern *China* at Shih-tai; Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing; and Hupeh (now Hubei province) in central *China* at Chung-hsiang and Ch'ien-chiang. During the period between 4 July and 1 August, the Chang River flooded in Shansi (now Shanxi province) in northern *China* and Honan (now Henan province) in central *China*.<sup>153</sup>

In 1655, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 6 February and 7 March, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Hsing-t'ia.

— During the period between 6 May and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Sui-an.

— During the period between 6 May and 3 June, a drought engulfed Chekiang province at Chin-hua.

— During the period between 4 June and 3 July, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tsou-p'ing.

— During the period between 31 August and 29 September, a severe drought engulfed Shantung province at Ch'ang-yüeh; Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ü-chiang and Lung-mên; and Chekiang province at Hu-chou, Ch'ü, K'ai-hua and Chiang-shan. The crops were damaged by the drought.

— During the period between 29 October and 27 November, a drought engulfed Kwangtung province at Chieh-yang and Anhwei (now Anhui province) in eastern *China* at Ch'üan-chiao.

In 1655 during the winter, Mau and Tien lakes in *China* were frozen over. For several days, people could walk over them.<sup>166</sup>

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**Winter of 1655 / 1656 A.D.** In 1655-56, the Seine River in *France* was frozen from the December 8<sup>th</sup> to the 18<sup>th</sup>. It froze again without interruption from 29 December to 28 January. A new frost occurred a few days later and the river again froze which lasted into March.<sup>38, 60</sup> [Another account gives this as the winter of 1656-57.] “The Seine froze from 8 to 18 December 1656.”<sup>62</sup>

This winter of 1655-56 in *France* and *Germany* was very severe. In Paris, *France*, it froze on 25 and 26 November 1655. In the first days of December, it snowed. From 8 to 18 December the cold was the very great. The Seine River froze. From 18 to 28 December, the air was damp. On 29 December, the frost began again and lasted until 28 January 1656. Then a new frost began after a few days, which lasted until March. During the later frost, the cold was less severe than in December. In *Germany*, the cold was so great that one could get in Wismar (Mecklenburg-Schwerin) onto the frozen *Baltic Sea* with a loaded four-horse wagon and travel a distance of 5-6 German miles, which has not been the case for many years. On the land, the wells were frozen to the bottom. On the roads in Bohemia [now western *Czech Republic*], several people were found frozen to death.<sup>62</sup>

In 1655, the frost began on November 25 in northern *France*. The frost became intensive from December 8 to 10, and continued, after two short thaws, until March. The Seine River was taken [frozen].<sup>79</sup>

In 1655, it was very cold in *Scotland*. The excessive snow and rain did great injury this winter.<sup>212</sup>

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**1656 A.D.** In Rome, *Italy*, there were floods.<sup>47, 72, 92</sup>

In 1656 and 1657 in Rome, *Italy*, there was a famine.<sup>57, 72, 91</sup>

There was a great drought in southern *France* in 1654-56. Rains were very rare.<sup>79</sup>

In *England* beginning on 20 July 1656, there was two separate hailstorms in Norwich in quick succession. The following accounts were published.<sup>93</sup>

*The most Lamentable and Dreadful Thunder and Lightning in the County of Norfolk and the City of Norwich, on July 20, being the Lord's Day in the afternoon: the Whirlwind and thick darkness, and most prodigious hailstones, which being above 5 inches about, did so violently batter down the windows of the City, that three thousand pounds will hardly repair them. Divers [diverse] men and women struck dead. The firing of some towns, and whole fields of corn, by lightning, which also destroyed the birds of the air and the beasts of the field.*

*Together with another most violent Storm, which happened on Saturday last, in the same County, for almost thirty miles together, performed the like terrible effects. Attested by ten thousand witnesses, who were either spectators, or partakers of the loss. Entered according to order, the 31 July, 1656.*

The drought in *England* lasted to the spring. On 8 October, the River Thames ebbed and flowed thrice in three hours space. In July, there were so great rains, which caused the Danube River to flood over its banks. It broke down all the bridges and most of the mills. Many people were lost and a great number of cattle were carried away. Sixteen towns and villages were swept off by the irresistible torrents.<sup>72</sup>

[In *England*] it was excessively rainy, unequal and southerly.<sup>72</sup>

In 1656, the price of wheat [in *England*] averaged 43 shillings per quarter [quarter ton].<sup>212</sup>

In *Denmark*, the summer was very unequal with heat, rain and south winds.<sup>72</sup>

In 1656, a hurricane struck Guadeloupe in the *Lesser Antilles*. Every vessel at anchor in the roads was wrecked and most of their crews drowned.<sup>141</sup>

The island of Guadeloupe in the *Lesser Antilles* in 1656 was desolated by a tremendous hurricane. Most of the houses were destroyed. All the domestic animals were killed. All the plantations were laid waste. Every vessel at anchor in the roads was wrecked, and most of their crews drowned.<sup>143</sup>

In 1656 during the period between 24 May and 21 June, floods struck Hopei (now Hebei province) in northern *China* at Wu-ch'iang; Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsing-ning. During the period between 22 July and 19 August, floods struck Kiangsi (now Jiangxi province) in southern *China* at Wan-tsai, P'ing-hsiang and Ning-tu. During the period between 16 November and 15 December, floods struck Chekiang province at P'ing-hu, Hu-chou and T'ien-t'ai.<sup>153</sup>

In 1656 during the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Chang-ch'iu and Shansi (now Shanxi province) in northern *China* at Lu-ch'êng, Kao-p'ing and Ch'in-shui. These regions were also affected by floods. During the period between 18 October and 15 November, a severe drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Chieh-yang.<sup>153</sup>

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**1657 A.D.** In *England*, this year produced a scorching hot dry summer.<sup>47, 72</sup>

In *England*, the spring to the end of summer was most excessively hot, even scorching both night and day.<sup>72</sup>

In 1657, the price of wheat [in *England*] averaged 46 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1656 and 1657 in Rome, *Italy*, there was a famine.<sup>57, 72, 91</sup>

There were great thunderstorm outbursts in 1657 that were similar to those of 1651 in *France*. These caused great floods. Camargue, *France* was buried by the Rhône River.<sup>79</sup> [Camargue is the area where the two arms of the Rhône River form a delta in southern *France*.]

In 1657, a hurricane struck off *the Bahamas*. Two salvage vessels were sunk in a storm off Gorda Cay.<sup>141</sup>

On 2 August 1657 at Feversham in Kent, *England*, there was a very high spring tide. The interesting thing was the winds were at southeast, which deadens [deadens, diminishes] the tide there.<sup>225</sup>

In 1657, during the period between 12 June and 10 July, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Hsiao and Anhwei (now Anhui province) in eastern *China* at T'ai-hu. Rivers and wells dried up. During the period between 11 July and 9 August, floods struck Anhwei province at T'ai-p'ing, Shih-tai and T'ung-ling. During the period between 8 August and 8 November, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Wan-mên Mountain and Kao-yao; and Shantung (now Shandong province) on the east coast of *China* at An-ch'iu. During the period between 8 September and 6 October, a drought engulfed Shensi (now Shaanxi province) in central *China* at Ching-yang and Shang-nan.<sup>153</sup>

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**Winter of 1657 / 1658 A.D.** King Charles X Gustav of *Sweden* was at war with *Denmark*. An intense cold wave descended on the Small Belt in the middle of December 1657 and it appeared that *Baltic Sea* might freeze over. Charles X moved his army from *Poland* and approached Copenhagen from the south. He arrived at Haderslev in South Jutland on 28 January 1658. The cold on the night of 29 January was very severe. On the next morning, he gave the orders and his army crossed the frozen Small Belt on foot and invaded and conquered the island of Funen. He then traveled on the frozen Great Belt and leapfrogged through the islands of Langeland, Lolland, Falster, and finally his army reached Zealand on 11 February.<sup>35</sup> [The Small Belt is the strait between the Danish island of Funen and the Jutland Peninsula. The Great Belt is the strait between the main Danish islands of Zealand and Funen.]

In 1658, Charles X, King of *Sweden*, traversed the *Little Belt* with his army, artillery, caissons, baggage, etc.<sup>38, 60</sup>

In 1658, Charles X of *Sweden* crossed the *Little Belt* over the ice from Holstein, *Germany* to *Denmark*, with his whole army.<sup>90</sup>

In 1658, the bays and inlets of *Northern Europe* froze over early in December. Charles X of *Sweden* crossed the strait to *Denmark* with his whole army, including the artillery, baggage and provision trains.<sup>63</sup>



In 1658 in *Northern Europe*, the army of Charles X of *Sweden* crossed the ice from *Holstein* to *Denmark* – horse, foot and artillery.<sup>47,93</sup>

During the winter of 1657-58 in *France*, an uninterrupted frost occurred from the 24<sup>th</sup> of December 1657 to the 8<sup>th</sup> of January 1658. Then the cold moderated. But then an extreme cold wave set in and the *Seine* River in *France* was entirely closed due to the ice. A slight thaw took place on 8 February, but the frost again recurred and continued from the 11<sup>th</sup> to the 18<sup>th</sup> of February.<sup>38,60</sup>

*Europe* experienced a cold winter. There was great snow in *Rome, Italy* on 27 February 1658.<sup>28</sup>

In 1658, the *Seine* River in *France* was completely frozen from the first days of January to the 21<sup>st</sup>. The rivers of *Italy* froze deep enough to bear the heaviest carts. The army of Charles X, King of *Sweden*, marched on the ice on the *Little Belt*.<sup>62</sup>

The winter of 1658 in *France* destroyed the olive trees. The winter was accompanied by deep snows.<sup>79</sup>

In *England*, there was a frost from 1<sup>st</sup> December to 10<sup>th</sup> March with a “north wind”.<sup>47,93</sup> . . . with a north wind even to January.<sup>72</sup>

During the winter of 1658, it was excessively cold [in *England*] and the price of wheat doubled.<sup>212</sup>

In *England*, the winter was severely cold. From 1 December 1657 to the Equinox [around March 20/21], the earth was covered with snow. There were north winds the whole time. It continued till 1 June like a winter.<sup>72</sup>

The winter of 1657-58 was very severe in *Europe*, from the *Baltic Sea* to where Charles X of *Sweden* his whole army, cavalry, artillery, ammunition and baggage wagons, etc. went on the ice from *Funen* to *Zealand*. In *Italy*, the rivers were frozen deep enough to carry the heaviest wagon. In *Rome* there was a tremendous amount of snow. In *Provence* many olive trees were lost to the cold.<sup>62</sup>

The winter in *Paris, France*: "it was cold, 24 December 1657 until 20 January 1658, but the cold at that time was not very sharp. On 20 January, however; an unusually sharp violent north wind; very few people could remember to have seen such a piercing cold. Everything was frozen. This intense cold lasted until 26 January. On 27 January the weather turned somewhat milder and a hoped for thaw was in the air. But on 28 January, a very deep penetrating cold again reappeared and last until 8 February. On 9 and 10 February, the ice and the snow that had fallen in abundance began to melt. But at 2 o'clock in the morning on Monday the 11th, the wind again came from the north and northeast, and it froze the waters anew, and the frost was unusually severe. At sunrise no trace of the previous thaw could be seen. This severe cold lasted until 18 February. Finally on the 19th the winds changed to a northwesterly, and then the winds began to blow from the west. The snow and ice again began to thaw and continued without interruption. On 21 February the ice broke, which completely covered the *Seine* River. On the 22<sup>nd</sup> the river began to swell. On the 27<sup>th</sup> and 28<sup>th</sup> the river came out of its banks and the inundation was greater than anyone could remember. From 6 o'clock in the evening of the 27 February until noon on the 28<sup>th</sup>, the water washed the walls of the church of *St. Andre-des Arcs*. One needed wooden planks to cross the street. At noon on the 28<sup>th</sup>, the water began to fall. Due to the cold several people were killed, others suffered with the loss of family members. During the night of 28 February to 1 March was carried away a great part of the *Marienbrücke* (*Mary's Bridge*) from the river, and several people were killed. The following day, the water carried away the back building on the waterfront along with houses standing on the waterfront."<sup>62</sup>



In France, there was a flood [caused by spring melt]. On 1 March 1658, the Seine River in Paris, *France*, at the bridge “Pont de la Tournelle” reached a height of 8.8 meters (28.9 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

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**1658 A.D.** In 1658, there was a plague in London, *England*.<sup>212</sup>

On 22 August 1658 at Feversham in Kent, *England*, there was a very high tide in the afternoon, though the wind was southerly, and blew very stiff, which the seaman there wondered at.<sup>225</sup>

In *Europe*, “the day that Oliver Cromwell died (3<sup>rd</sup> September), a storm so violent and terrible extended all over Europe.”<sup>40, 41, 43, 56, 57</sup>

On 3 September 1658, the day that Cromwell died, there was a hurricane throughout *Europe*, which did very considerable damage.<sup>90</sup>

On May 22 at Faversham (Kent), *England*, there were considerable floods.<sup>47, 72, 92</sup>

In *England* during the spring, the north wind and cold continued so rigorous and long, that farmers lost hope of their corn [grain] either growing or ripening. But from 1 August came such an excessive heat, as was truly uneasy. In Modena in northern *Italy*, there was excessive heat and drought. In Abdera in *Thracia*, there was an excessively hot summer. In *Denmark* and Copenhagen, there was drought and excessive heat.<sup>72</sup> [Abdera in Thracia was a city-state on the coast of Thrace, 17 kilometers east-northeast of the mouth of the Nestos, and almost opposite Thasos. The site now lies in the Xanthi peripheral unit of modern mainland *Greece*.]

The summer of 1658 in *England* was remarkably warm, especially towards the end of the season. In Dijon, *France*, the harvest began on 30 September.<sup>62</sup>

On 3 September 1658, a very alarming and destructive storm struck *England* in which many houses were blown down and others unroofed. Churches, steeples, and whole groves of trees were prostrated, and immense damage done to the shipping. Among a great many other vessels which were lost with most of their crews, were eight frigates and ships of the line, and two thousand officers and seamen perished.<sup>1</sup>

On 3 September 1658, there was a great gale in *England*. “It was such a night in London as had rarely been passed by dwellers in crowded streets. Trees were torn from their roots in the park, chimneys blown down, and houses unroofed in the city. Cromwell died that night.” There was another great gale immediately before this one, which struck throughout *Europe*.<sup>212</sup>

In 1658 in London, *England*, the tide in the River Thames ebbed and flowed twice in three hours.<sup>212</sup>

In 1658, the price of wheat [in *England*] averaged 65 shillings per quarter [quarter ton].<sup>212</sup>

In 1658, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 3 April and 1 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow.

— During the period between 6 May and 6 August, floods struck Chekiang province at Ch’êng; Kiangsi (now Jiangxi province) in southern *China* at Hsia-chiang; and Hupeh (now Hubei province) in central *China* at Tzū-kuei, I-ch’ang, Sung-tzū, Ao-ch’êng, Huang-kang, Hanyang, An-lu, Kung-an, I-ch’êng, Tang-yang and Ching-mên. At I-ch’êng, the fields were damaged by the floodwaters. At Tang-yang, the city walls, dikes, houses and fields were damaged by the floodwaters and innumerable people drowned. At Ching-mên, crops and houses were damaged.

— During the period between 8 August and 8 November, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow; Anhwei (now Anhui province) in eastern *China* at Shu-ch'êng, Wu-ho, Shih-tai and Wu-yüan; and Hupeh province at Ch'ien-chiang and Chung-hsiang. At Chung-hsiang, the dikes were damaged.

In 1658, during the period between 29 May and 26 September, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ch'ang-yüeh.<sup>153</sup>

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**Winter of 1658 /1659 A.D.** During the winter of 1659 [in *Europe*], there was no frost or snow.<sup>62</sup>

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**1659 A.D.** In 1659, there was a great hailstorm in Staffordshire in the west Midlands of *England* that destroyed poultry and hares.<sup>93</sup>

On the Sunday before the Feast of Saint James in 1659, there was a hailstorm in Staffordshire, *England*. The hailstones were as big as pullets' eggs.<sup>194</sup>

In 1659, the price of wheat [in *England*] averaged 66 shillings per quarter [quarter ton].<sup>212</sup>

In 1659, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 21 May and 19 June, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsin-i.

— During the period between 20 June and 18 July, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling and Chekiang province at Ch'ü, Chiang-shan and Ch'ang-shan.

— During the period between 19 July and 17 August, floods struck Hupeh province at Han-ch'uan, Wuchang and Mien-yang.

— During the period between 14 December 1659 and 11 January 1660, floods struck Chekiang province at Hsien-chü; Kiangsu (now Jiangsu province) on the east coast of *China* at Nan-t'ung [uncertain name]; and Shensi (now Shaanxi province) in central *China* at Yen-ch'uan.

During the period between 25 November 1658 and 19 June 1659, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Lung-chou. In 1659 during the period between 20 June and 18 July, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hui-lai and Kweichow (now Guizhou province) in southwestern *China* at Ts'ên-kung, Yü-p'ing and An-nan.<sup>153</sup>

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**Winter of 1659 / 1660 A.D.** In *Provence* and in *Italy* the winter was very cold again. The olive trees were destroyed, almost completely.<sup>62</sup>

In 1659, the frost was severe [in *England*]. The price of wheat doubled during the winter.<sup>212</sup>

In 1660, it was very cold [in *England*], and the price of wheat doubled during the winter.<sup>212</sup>

On 8 December 1659, a gale struck *England*. A remarkably high wind, such as had never before been experienced in this country, did great damage to the houses in York.<sup>212</sup>

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**1660 A.D.** In *England* on the 11<sup>th</sup> of November, there were great floods in the River Thames valley.<sup>47, 72, 92</sup>

In *England*, the winter was stormy and tempestuous, causing great harm in many places. In the midst of it much thunder and lightning.<sup>72</sup>

In 1660, the price of wheat [in *England*] averaged 56 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1660 during the period between 12 January and 10 February, floods struck Hopei (now Hebei province) in northern *China* at Wang-tu and Hsien. During the period between 5 February and 6 July, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at San-shui [uncertain name]. During the period between 8 August and 8 November, a drought engulfed Kwangtung province at Hui-yang and Chekiang (now Zhejiang province) on the east coast of *China* at Chên-hai and T'ien-t'ai.<sup>153</sup>

In 1660 during the 1<sup>st</sup> moon in the vicinity of Shanghai, *China*, a dragon was seen, attended with great rain. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

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**1661 A.D.** In *India*, there was a great drought in the Punjab.<sup>47</sup> [The region known as the Punjab in now in the northwest region of *India*, and eastern *Pakistan*.]

In *India*, there was a famine caused by a drought, confined to the Punjab.<sup>57</sup>

In 1661 there was a famine in the Northwest Provinces and Punjab region in *India*.<sup>156</sup>

— A famine struck *India* during the third year of the reign of Aurungzebe. “The rents of the husbandmen [farmers] and other taxes were remitted. The treasury of the Emperor was opened without limit; corn [grain] was bought in the provinces where the produce was least, conveyed to those in which it was most defective, and distributed to the people at reduced rates. The great economy of Aurungzebe, who allowed no expense for the luxury and ostentation of a court, and who managed with skill and vigilance the disbursements of the state, afforded him a resource for the wants of the people.”

In 1661, there was a famine in *India* during the third year of the reign of Aurungzeb, who attempted to levy 50% of the produce.<sup>182</sup>

In 1661 A.D., there was a very general and terrible famine in *India*. Muhammad Amin Razwiny wrote: “Life was offered for a loaf, but none cared for it; rank was to be sold for a cake, but none cared for it. For a long time dog’s flesh was sold for goat’s flesh and the pounded bones of the dead were mixed with flour and sold. Destitute at length reached such a pitch that men began to devour each other and the flesh of a son was preferred to his [son’s] love. The numbers of the dying caused obstruction in the roads.” Emperor Aurangzeb carried relief through every corner of his dominions. Whole provinces were delivered from impending destruction and many millions of lives were saved. He accomplished this by remitting taxes that were due. He expended immense sums out of the treasury in procuring grain from Bengal and the countries, which lie on the five branches of the Indus (which suffered less on account of the great rivers) and transported the grain by land and water to the interior provinces. The grain was purchases at any price, with public money; and it was resold at a very moderate rate.<sup>179</sup>

On 18 February 1661, a great and dreadful storm of wind accompanied by thunder, lightning, hail and rain struck *England*. The damage was estimated at a little less than 2 million of money [2 million pounds {£240 million in today’s currency using the retail price inflation index}].<sup>209</sup>

— Several people were killed by falling chimneys, houses, trees, barns, and windmills. Five or six were killed in London; one in Chilterham [Cheltenham]; one in Scaldwel [Scaldwell]; one in Tewksbury [Tewkesbury]; two near Elsbury; one at Northampton; one at Colchester; two near Ipswich; and 3 near Langton, to name a few.

— Many churches were damaged by the wind. This damage included broken windows, stonework. The lead was torn up. Pinnacles, spires and steeples were thrown down. In some cases, the timberwork in the church was broken and the pulpit and pews were damaged. These included the churches at Tewksbury

[Tewkesbury], Red Marly [Redmarley], Newin, Worcester, Hereford, Leighton Beau-defart, Eaton-Soken [Eaton Socon], Shenley, Waddon [Whaddon], Woolston [Little Woolstone], Finchinfield [Finchingfield], and Ipswich, to name a few.

— Many houses and buildings were blown down, and others extremely shattered and torn.

— Many barns were destroyed. These included 30 barns near Ipswich; an incredible number near Tewsbury [Tewkesbury]; 11 barns at Twynning; 7 or 8 in Ashchurch; 5 in Lee; a great number at Norton; 140 in Worcestershire; 16 in Finchinfield [Finchingfield]; and at least 15 at Wilchamsted [Wilshamstead], to name a few.

— Many trees were blown down. These included 1,300 trees in Bramiton Bryan Park; 600 in Hopton Park; and 3,000 oak trees in the his Majesty's Forest of Dean, to name a few. Several persons lost whole orchards of trees in the counties of Gloucester, Hereford and Worcester.

— The winds were strong enough to take people up into the air. On the bridge near Wallingford House in London, several people were blown off and landed on top each other. In Herefordshire, a man was blown over a very high hedge. In a pond at James's Park, 2,000 fish were blown out and landed on the banks. Several people were blown into the air at Hereford.

— The rain that fell was as salty as brine.

On February 21, in Kent, *England*, there were considerable floods.<sup>47, 72, 92</sup>

In *England*, there were great hailstorms on 11<sup>th</sup> April and 11<sup>th</sup> October.<sup>57, 72, 93</sup>

In 1661, the price of wheat [in *England*] was high averaging 70 shillings per quarter [quarter ton].<sup>212</sup>

In 1661, there was a drought in *England*. The River Derwent was so wonderfully dried up that in many places there was no water, and people might go over dryshod [without wetting the feet].<sup>212</sup>

In 1661, upon Michaelmas day, there was a great overflowing of the River Severn in *England* that drowned the low grounds lying by it.<sup>225</sup>

In 1661, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 28 May and 25 June, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lung-ch'uan; and Kiangsi (now Jiangxi province) in southern *China* at Hsia-chiang and Wan-tsai.

— During the period between 26 June and 25 July, floods struck Kwangtung province at Ho-yüan; Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh and Ts'ang-wu; and Hopei (now Hebei province) in northern *China* at Wu-ch'iang.

— During the period between 23 September and 22 October, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'un-an and Ch'ing-yüan; and Kiangsi province at Nan-ch'ang.

In 1661, a drought engulfed many regions of *China* including:<sup>153</sup>

— Kweichow (now Guizhou province) in southwestern *China* at Nan-lung.

— Shansi (now Shanxi province) in northern *China* at Yung-chi.

— Chekiang (now Zhejiang province) on the east coast of *China* at Hai-yen and Shou-ch'ang.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Chiang-yin.

— Shantung (now Shandong province) on the east coast of *China* at Tung-a.

— During the period between 6 May and 8 November, a drought engulfed Chekiang province at Ningpo and Tung-yang.

— During the period between 23 September and 22 October, a drought engulfed Chekiang province at Yü-yao, Hangchow, Chien-tê and T'ung-hsiang.

In 1661 during the 7<sup>th</sup> moon on the 26<sup>th</sup> day in the vicinity of Shanghai, *China*, there were three tides in

one day.<sup>166</sup>

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**1662 A.D.** A great storm struck London, *England* on February 18.<sup>40, 41, 43</sup>

On 30 July there was a prodigious storm of hail at Ormskirk in West Lancashire, *England*. Hailstones were four inches about and more. In the afternoon, on Macclesfield Forest, Cheshire, rose a pillar of smoke twenty yards broad and as high as a church steeple, which making a hideous noise, went along the ground for six or seven miles, leveling all before it. It threw down strong stone fences, and carried the stones to a great distance from their former places. But falling on a moorish ground, it did little damage. Its noise frightened cattle; they ran out of its way and were saved. A cornfield it passed over was laid flat with the ground, as though it had been trodden with feet. It went through a wood and tore up 100 trees by the root. Coming into a mowed field with hay ready to be carried off, it swept all away so as scarce a handful was ever found. From this forest it went to Taxhall, then to Waily-bridge, and then to the Derbyshire Mountains, where it vanished. [This is an interesting description of a tornado. Storms that produce tornados are very energetic and also produce hailstorms. The pillar of smoke is the funnel of debris brought up by the tornado. Tornados create loud sounds like freight trains. They either break large trees in half or uproot them.]<sup>72</sup>

In 1662, the price of wheat [in *England*] was high averaging 74 shillings per quarter [quarter ton].<sup>212</sup>

In 1662, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 16 June and 14 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton.

— During the period between 15 July and 13 August, floods struck Shensi (now Shaanxi province) in central *China* at Pai-ho, An-k'ang, Yü-lin and Hsüan-yang [probably a misprint, "Hsün-yang"].

— During the period between 14 August and 11 September, floods struck Hupeh (now Hubei province) in central *China* at Hsiao-kan, Mien-yang, Chiang-ling, and Sung-tzū; Hopei (now Hebei province) in northern *China* at Chü-lu; Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow, Hsing-hua, Hsiao and P'ei [P'ei is located at longitude 117.00° East and latitude 34.47° North.]; and Kiangsi (now Jiangxi province) in southern *China* at Hsiu-shui [uncertain name].

— During the period between 12 September and 11 October, floods struck Hopei province at Ch'êng-an; and Hupeh province at Chung-hsiang, Ch'ien-chiang and T'ien-mên. At T'ien-mên, the dikes were damaged.

— During the period between 12 October and 10 November, floods struck Hopei province at Chi and Fou-ch'êng. [Chi is located at longitude 115.34° East and latitude 37.34° North.]

In 1662 during the period between 12 October and 10 November, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ang-li.<sup>153</sup>

In 1662 during the 1<sup>st</sup> moon, there were great rains in the vicinity of Shanghai, *China*. During the 7<sup>th</sup> moon in the vicinity of Shanghai, *China*, there were three tides in one day. During this year, there was a great drought in the vicinity of Shanghai, *China*. This caused a bad harvest and a very scarce year.<sup>166</sup>

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**Winter of 1662 / 1663 A.D.** There was intense frost at Paris, *France* from the 5<sup>th</sup> of December 1662 to the 8<sup>th</sup> of March 1663.<sup>38, 58, 60, 80</sup>

During the winter of 1662-63, the Seine River in *France* froze in December 1662 completely.<sup>62</sup>

During this winter of 1662-63, which was very severe, the frost in Paris, *France* lasted from 5 December until 8 March. The Seine River was frozen in December 1662 completely.<sup>62</sup>

In 1662 in northern *France*, there was a sustained frost from 5 December until 8 March. The cold moderated on three occasions. The Seine River froze in December.<sup>79</sup>

In *England*, a very hard frost occurred on 28<sup>th</sup> November 1662. A severe frost occurred from the 28<sup>th</sup> of January to 11<sup>th</sup> of February 1663.<sup>72</sup> The 8<sup>th</sup> of February 1663 being a very hard frost.<sup>47, 93</sup>

In 1662, the winter produced a strong frost in *England*. In London, the River Thames was partially frozen over towards the end of November. In this frost, ice skates were introduced into *England* from Holland [now *the Netherlands*]. On 1 December, the king witnessed the performance of skating.<sup>212</sup>

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**1663 A.D.** On 24 May 1663, there was a very high tide in London, *England*.<sup>225</sup>

In *England*, on the 28<sup>th</sup> of August “Cold all night and this morning, and a very great frost, they say, abroad; which is much, having had no summer at all, almost.”<sup>47, 93</sup>

[In *England*], it was rainy and floody.<sup>72</sup>

In *England*, there was a great death of cattle from a most severely rainy wet autumn.<sup>72</sup>

In 1663, the price of wheat [in *England*] averaged 57 shillings per quarter [quarter ton].<sup>212</sup>

In 1663 in London, *England*, there was a fog in August.<sup>212</sup>

The summer of 1663 was cold and rainy in Doubs in eastern *France*. The grapes in Dijon, *France*, were not harvested until 8 October.<sup>62</sup>

[Although this is cited as 1662, it is out of chronological order and these entries appear to belong within the year 1663.] In 1662, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 10 March and 2 August, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Tung-kuan and Shantung (now Shandong province) on the east coast of *China* at Yün-ch’êng.

— During the period between 7 May and 5 June, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Chiang-yin.

— During the period between 6 June and 4 July, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Wan-tsai and Hupeh (now Hubei province) in central *China* at Huang-kang.

— During the period between 5 July and 2 August, a drought engulfed Chahar province (now eastern *Inner Mongolia*) at Huai-lai.

— During the period 2-30 September, a drought engulfed Shensi (now Shaanxi province) in central *China* at Pao-an [uncertain name], Hupeh province at Lo-t’ien; and Kiangsu province at Hsiao.

— During the period between 12 October and 10 November, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch’ang-li.

In 1663, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 5 July and 2 August, floods struck Hopei (now Hebei province) in northern *China* at Chiao-ho; and Shensi (now Shaanxi province) in central *China* at Nan-chêng and along the Han River.

— During the period between 3 August and 1 September, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Mêng-shan, P’ing-yüeh and Kuei; Shensi province at Sian; and Hupeh (now Hubei province) in central *China* at Ta-yeh, Ch’i-ch’un and Chiang-ling.

— During the period 2-30 September, floods struck Hopei province at Chü-lu; and Hupeh province at Huang-kang, I-tu, Chung-hsiang, Ma-ch’êng, Sung-tzū, Kung-an and Chih-chiang. At Sung-tzū, the



dikes were damaged. At Kung-an, innumerable people drowned. At Chih-chiang, houses were damaged by the floodwaters and many people drowned.

— During the period 1-30 October, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at P'u-chiang; and Anhwei (now Anhui province) in eastern *China* at Tang-t'u and Wang-chiang.

The year 1663 was a year of great abundance in the vicinity of Shanghai, *China*. Rice was excellent and double the usual quantity.<sup>166</sup>

**Winter of 1663 / 1664 A.D.** The winter was very mild and rainy in *Prussia*.<sup>72</sup> [After the year 1618 Brandenburg and the Duchy of Prussia were combined to form Brandenburg-Prussia. Today this region comprises parts of *Poland* and *Lituania* and Brandenburg in now east *Germany*.]

**1664 A.D.** In London, *England* in January, there was a great hailstorm at Charing Cross.<sup>57, 72, 93</sup>

[In *England*], it was rainy and floody.<sup>72</sup>

[In *England*] on 26, 27 and 28 January 1664, there was an irregular tide when the sea flowed without ebbing.<sup>72</sup>

On 4 May 1664, heavy rains fell at Daintrey and the vicinity. At Dadford in Buckinghamshire, *England* in a short period of time rose at least 8 feet above the ordinary surface of the rill that runs through that town. The flood either on the 4<sup>th</sup> or 5<sup>th</sup>, broke down the two middle arches of the South Bridge at Northampton and overthrew many hundred yards of walling. On the 5<sup>th</sup> or 6<sup>th</sup> of May at Peterborough, two men who went out in the morning, upon their return home in the dark of night (knowing nothing about this unexpected flood on the River Nyne) were accidentally drowned. [The country in the lower part of the Rivers Weland and Nyne, particularly in the regions of Stamford and Peterborough have seen great inundations in no more than four hours space, yet not so much as a drop of rain in many miles about the towns.]<sup>195</sup>

In 1664, the price of wheat [in *England*] averaged 40 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1664 there was a great plague in London, *England* that began in December. It slumbered between Christmas to February.<sup>212</sup>

On 29 July 1664, a hailstorm struck Padua in northern *Italy*. "This storm happen'd July 29, about three o'Clock in the afternoon, at the bottom of the Euganean Hills, about fix [six] Miles from Padua, it extended upwards of thirty Miles in length, and about fix [six] in breadth; and the Hail-Stones which fell in great quantities were of different fizes [sizes]; the largeft [largest] of an Oval form, as big as Turkey Eggs [Eggs], and very hard; the next fize [size] Globular, but fomewhat [somewhat] comprefs'd [compressed]; and others that were more numerous, perfectly round, and about the bignefs [bigness] of Tennis Balls."<sup>194</sup>

In 1664, a violent hurricane at Guadeloupe in the *Lesser Antilles* destroyed their potato crop.<sup>143</sup>

In 1664, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 29 December 1663 and 27 January 1664, floods struck Hupeh (now Hubei province) in central *China* at P'u-ch'i, Ta-yeh, Mien-yang, T'ien-mên and Chiang-ling. At Chiang-ling, the dikes were damaged.

— During the period between 27 March and 25 April, floods struck Hopei (now Hebei province) in northern *China* at Fou-ch'êng; and Kiangsi (now Jiangxi province) in southern *China* at Wan-tsai.

— During the period between 24 June and 22 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ta-pu; Hupeh province at T'ien-mên; Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning; and Shansi (now Shanxi province) in northern *China* at P'ien-kuan [possible a misprint, "P'ien-lü"]. At P'ien-kuan, many houses were damaged by the floodwaters.

— During the period between 23 July and 20 August, floods struck Shensi (now Shaanxi province) in central *China* at Yen-ch'ang; and Hopei province at Ch'ang-li.

— During the period between 21 August and 19 September, floods struck Hopei province at Chiao-ho; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu.

— During the period between 20 September and 18 October, floods struck Chekiang province at Yü-yao, Shao-hsing, Hsien-chü and T'ung-hsiang. At Yü-yao and Shao-hsing, the crops were damaged by the floodwaters.

In 1664, a drought engulfed many regions of *China* including: <sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Chieh-yang and Hopei (now Hebei province) in northern *China* at Chiao-ho, Hsing-t'ai and Nei-ch'iu.

— During the period between 6 May and 9 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ch'ang-shan, P'ing-yüan, Yü-ch'êng, Tsou, Lin-i [uncertain name, "Lin-tao"], Hui-min, Fei, Ting-t'ao, Hsin and Mou-p'ing [uncertain name, "Ning-hai"]; Anhwei (now Anhui province) in eastern *China* at Fou-yang; and Szechwan (now Sichuan province) in southwest *China* at Hua-yang.

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**Winter of 1664 / 1665 A.D.** In *England*, there was a frost from 28<sup>th</sup> December to 7<sup>th</sup> February. The 6<sup>th</sup> of February "one of the coldest days, they all say, ever felt in *England*." <sup>47, 93</sup>

In *England* in the latter end of 1664 began a most severe frost which continued to the latter end of March 1665. <sup>72</sup>

In 1664 [in *England*] until the beginning of March, there was a very violent frost that froze up all things from the beginning of winter. <sup>212</sup>

In January and February 1665, there were sharp frosts [in *England*]. <sup>212</sup>

On 2 January 1665, the frost was so bitter in *Poland* that three soldiers died from the cold in passing a long ditch; and that diverse persons lost some of their limbs [to frostbite]. <sup>234</sup>

The winter was very severe [in *France*]. In *Belgium* there were very severe frosts and heavy snowfalls. The winter of January 1665 was similar to the winter of January 1655 in *Poland*. The winter in *Poland* was so severe that most of the wines froze and several people lost their limbs [due to severe frostbite], and others froze to death. <sup>62</sup>

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**1665 A.D.** In *England*, there were great flooding of rivers, and inundations from the sea. <sup>47, 72, 92</sup>

[In *England*], there were very great floods, both from rains and from the Sea. <sup>72</sup>

In *England* in February, there was a great tempest, accompanied by thunder, and lightning. <sup>72</sup>

In *England*, the whole summer was very temperate; neither cold nor hot; dry nor rainy; but pleasant mild breezes which fanned the air and kept it healthy. Great plenty of all sorts of fruits, good and cheap. <sup>72</sup>

In 1665, there was a great plague in *England*. One account gives the death toll at 68,000 people in London. Another account by Defoe reports the plague “May to July severe; August and September 8000 persons died weekly; in the middle of September, 12,000 persons in one week, and 4000 in one night; and in the whole 100,000 died.” After an order to kill cats and dogs, it is said that 40,000 dogs and 200,000 cats were destroyed. In a third account in 1665-66, “in London 68,596 persons are said to have died of the plague”. At Yarmouth, great havoc was made by the plague. The plague was very fatal at Derby. “The country people refused to bring their commodities to the marketplace, depositing them outside town; then retired to a distance till the buyer had deposited his money in a vessel filled with vinegar.” At Winchester, the dead were carried out by cartloads at a time, and the plague was as bad as in London. At Eyam, 259 persons perished.<sup>212</sup>

In 1665, there was a cattle plague in London, *England*.<sup>212</sup>

On 25 October 1665, there was a great gale in London, *England*.<sup>212</sup>

In 1665, the price of wheat [in *England*] averaged 69 shillings per quarter [quarter ton].<sup>212</sup>

In 1665, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 16 January and 14 February, floods struck Shansi (now Shanxi province) in northern *China* at Fên-yang.

— During the period between 15 April and 14 May, floods struck Anhwei (now Anhui province) in eastern *China* at Fou-yang and Fên-yang; and Hopei (now Hebei province) in northern *China* at Wang-tu.

— During the period between 11 August and 8 September, floods struck Shansi province at P’ing-ting; Hopei province at Ching, Fei-hsiang, Wang-tu and Chi-tsê; Hupeh (now Hubei province) in central *China* at T’ien-mên; Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Li-shui; and Kiangsi (now Jiangxi province) in southern *China* at P’ing-hsiang.

— During the period between 9 September and 8 October, floods struck Hopei province at Kao-i; Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Jên-hua; Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P’ing-yüeh and Ts’ang-wu.

In 1665, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ch’ao-ch’êng, Ch’êng-wu, Ên, T’ang-i, Hsia-ching and Yeh; and Hopei (now Hebei province) in northern *China* at Tung-ming, Ling-shou and Wu-i.

— During the period between 15 April and 2 June, a severe drought engulfed Shantung province at Kao-mi.

— During the period between 6 May and 8 August, a severe drought engulfed Shantung Province at P’êng-lai.

— During the period between 11 August and 8 September, a drought engulfed Honan (now Henan province) in central *China* at Mêng; Shansi (now Shanxi province) in northern *China* at P’ing-ting, Tai, Shou-yang, P’u and Wên-shui.

— During the period between 9 September and 8 October, a drought engulfed Shantung province at Tzū-yang and Chi-ning.

In 1665 during the 7<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a typhoon. The sea broke embankments. People floated out to sea on the wrecks of houses. Some people were rescued by an officer.<sup>166</sup>

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**Winter of 1665 / 1666 A.D.** On 17 December 1665, it was very cold in London, *England*.<sup>212</sup>

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**1666 A.D.** There was a very great drought in *England*. On 24 January, there was a tempest at Hampshire. On 10 May, there was a tempest of thunder and lightning at Oxford. On 17 July, there was a hailstorm on the coast of Suffolk with some hailstones nine inches about.<sup>72</sup>

On 24 January 1666, there was a thunderstorm at Andover, *England*. And on 12 May at Oxford.<sup>212</sup>

In 1666 at Cransted in Kent, *England*, there was a shower of fishes. A great tempest of thunder and rain, and, although no ponds about, two acres were scattered over with whittings of the size of a man's little finger. This occurred on the Wednesday before Easter.<sup>212</sup>

In 1666, the price of wheat [in *England*] averaged 36 shillings per quarter [quarter ton].<sup>212</sup>

In 1666, there was a plague at Sandwich and Stamford, *England*. At Stamford, upwards of 380 people died.<sup>212</sup>

In 1666, diarrhea prevailed in London, *England* and lasted until 1672.<sup>212</sup>

During the summer of 1666, there was an extreme drought in Somerset, *England*. In the moors [bogs] between Yeovil and Bridgewater, the dried pasture showed the outline of trees beneath. They were dug up and there was hundreds of oaks as black as ebony.<sup>234</sup>

The summer of 1666 was hot and dry in *England*. In Dijon, *France*, the grape harvest began on 10 September; 14 days before the mean.<sup>62</sup>

On 17 July 1666, a violent storm of hail fell on the coasts of Norfolk and Suffolk in east *England*. At North Yarmouth, the hailstones were comparatively small; but at Snape Bridge, one was taken up which measured a foot in circumference; at Seckford Hall, one which measured nine inches; and at Melton, one measured eight inches. At Friston Hall, one of these hailstones, being put into a balance, weighed two and a half ounces. At Aldborough, several of them were as large as turkeys' eggs. A carter [a person who hauls goods in a cart] had his head broken by hailstones even though he was wearing a stiff felt hat. In some places the wound bled, and in others, tumors arose. His horses were so pelted that they fled taking his cart with them. The hailstones were white, smooth without, and shining within.<sup>191</sup>

On 17 July 1666, there was a hailstorm in Suffolk, *England*. "At Seekford House, one stone [hailstone] 9 inches [23 centimeters] about [in circumference]; at Melton 8 inches [20 centimeters] about; at Snapebridge one hailstone 12 inches [30 centimeters] about; at Friston Hall, one weighed 12s. 6d.; at Aldborough some were full as bigg [big] as turkey's eggs (a hen egg weighs about 9s.); at Yarmouth hail small." <sup>212</sup>

On 17 July 1666, a hailstorm struck Aldborough [Aldeburgh] in Suffolk, *England*. The hailstones were as big as turkey's eggs.<sup>295</sup>

In *England* on the 31<sup>st</sup> of July, there was a severe hailstorm and rain.<sup>57, 72, 93</sup>

[In *England*] in 1666, there was a sundry of [many] tempest of thunder, lightning, rain, hail and wind.<sup>72</sup>

In 1666, a hurricane struck Antigua in the *West Indies*. During the hurricane, two English warships were lost in the English harbor with a great loss of life.<sup>141</sup>

On 28 July 1666, Lord Willoughby fleet set sail with seventeen sails [sailing ships] and nearly 2,000 troops [and took possession of St. Lucia.] On 2 August, his fleet was off *Guadeloupe*. On 4 August,

three frigates and some smaller vessels were sent in, and destroyed the French ships in the Saints [*Barbados*]. Symptoms of an approaching hurricane made Lord Willoughby extremely anxious for the return of the ships from the Saints; but the commanding officer's ship had suffered some damage, and could not be refitted before night. At 6 p.m., the gale began from the north, and continued with great violence till midnight, when after a calm, which lasted for a quarter of an hour, it shifted suddenly to the east-southeast driving every thing before it with irresistible violence. Every vessel and boat upon the coast of *Guadeloupe* was dashed to pieces. All the vessels in *the Saints* were driven on shore. The whole of Lord Willoughby's fleet, only two were ever heard of afterwards. An armée-en-flute of twenty-two guns got to Montserrat with only the stump of her mizenmast standing, and a fire ship got to Antigua, dismasted. The bottom of one ship was washed on shore at Cabsterre [Capesterre], *Guadeloupe*, and another at the Saints: the whole coast was covered with the wrecks of masts and yards) a figure from the stern of Lord Willoughby's ship was recognized among the ruins. The hurricane lasted twenty-four hours: houses and trees were blown down, and a great number of cattle killed. The sea rose, and was driven to an unusual height. All the batteries — walls of six feet thickness, near the sea, were destroyed, and guns, fourteen pounders, were washed away. The storm was felt at St. Christopher's island [St. Kitts] and Martinico, [Martinique] but with less violence.<sup>143</sup>

On 14-15 August 1666, a hurricane struck *Guadeloupe* in the Leeward Islands of the *West Indies* and *Martinique* in the eastern *Caribbean*. The hurricane caused < 2,000 deaths. [Alexander (1902) notes, "17 sail with 2000 troops...only two were ever heard of afterwards". Other references indicate that additional ships may have survived.]<sup>141</sup>

On 14-15 August 1666, a great Atlantic hurricane struck the islands of *Guadeloupe* and *Martinique* causing approximately 2,000 deaths.<sup>107</sup>

In *England*, it was intensely hot and dry.<sup>72</sup> There were east winds. The Great Fire of London occurred.<sup>47</sup> [The largest fire that ever occurred in London, *England* commenced on 2 September 1666 and continued for four days, and consumed thirteen thousand houses, eight-six churches and public buildings. St. Paul's Cathedral was among the number. The buildings were all destroyed on 400 streets.<sup>1</sup>]

In *England* in October, there were great floods.<sup>47, 92</sup> on October 14 and 16.<sup>72</sup>

In 1666, Lake Constance in *Switzerland* flooded.<sup>175</sup>

In Lincolnshire, *England* on 13 October 1666, there was a dreadful storm of thunder, accompanied with hail, the stones as large as pigeon or even pullet eggs, followed by a storm or tempest, attended with a strange noise. It came with such violence and force, that at Welbourn, it leveled most of the houses to the ground. It broke down some trees and tore up other trees by the roots. It scattered abroad much corn and hay. One boy only was killed. It went on to Willingmore, where it overthrew some houses and killed two children in them. Thence it passed on and touched the skirts of Nanby and ruined a few houses. Keeping its course to the next town, where it dashed the church steeple in pieces, furiously damaging the church itself, both stone and timber work. It left little of either standing, only the body of the steeple. It threw down many trees and houses. It moved in a channel, not a great breadth. Otherwise it would have ruined a great part of the country. It moved in a circle and looked like fire. It went through Nottinghamshire, where the hailstones were nine inches about. The whirlwind was about 60 yards broad. On Nottingham Forest, it broke down and tore up at least 1,000 trees, overthrew many windmills, overturned boats on the River Trent. In a village of 50 houses, it left only 7 standing. [description of a tornado]<sup>72</sup>

In 1666, a drought engulfed several regions of *China* including:<sup>153</sup>  
— During the period between 6 March and 3 April, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Chieh-yang.

- During the period between 4 April and 3 May, a drought engulfed Kwangtung province at San-shui.
- During the period between 3 June and 1 July, a drought engulfed Hupeh (now Hubei province) in central *China* at Chung-hsiang and Ta-yeh.
- During the period 2-31 July, a drought engulfed Hunan province in south-central *China* at Hêng-yang and Chekiang (now Zhejiang province) on the east coast of *China* at Ning-hai [uncertain name].
- During the period 8 August 1666 and 22 May 1667, a severe drought engulfed Chekiang province at Hsüan-p'ing and Sung-yang.

In 1666, there was a great drought in the vicinity of Shanghai, *China*.<sup>166</sup>

**Winter of 1666 / 1667 A.D.** At the end of December 1666, there was a very hard frost in London, *England*.<sup>212</sup>

In the beginning of January 1667 [in *England*], there was a hard frost.<sup>212</sup>

In *England*, there was a frost from the 15<sup>th</sup> of February to the 19<sup>th</sup> of March.<sup>47, 72, 93</sup>

In 1667, “On the 16<sup>th</sup> of March, a sharp northeast wind began to freeze very strongly, the sea that lies before Amsterdam; the Y on the 17<sup>th</sup> was solid; on the 18<sup>th</sup> we went from this city on the ice to *North Holland*; the *Zuiderzee* was completely frozen, and several ships were stuck in the middle of ice, which by the 1<sup>st</sup> of April is stopped.”<sup>62</sup> [The “IJ” which sometimes shows up on old maps as “Y” or “Ye” is a river formerly a bay in the Dutch province of *North Holland*. So the “Y” reference in this instance is the old *Zuider Zee*, that today in the area of Amsterdam is the *IJmeer Lake*.]

The winter in 1667 was very severe in Holland [now *the Netherlands*], but extreme cold occurred late in the season, from 16 March to 1 April.<sup>62</sup>

**1667 A.D.** [In *England*], the air was cold and wet. Winds were from the north. Summer was very unequal.<sup>72</sup>

In 1667, Nottingham and London, *England* were visited by the plague.<sup>212</sup>

In 1667, the price of wheat [in *England*] averaged 36 shillings per quarter [quarter ton].<sup>212</sup>

On 19 August 1667, a hurricane struck the island of *Nevis* in the Leeward Islands of the West Indies. Before the hurricane struck, there was a high mountain that was all green with trees. But afterwards, in most places it was bare. The wood lying is such a condition, with half trees, or stumps, or quarters, that one would think it almost incredible.<sup>234</sup>

In Montbéliard, *France* in 1667 the summer was very cold and dry. There was not a single month throughout the year in which it had not frozen. In Burgundy, *France*, the grape harvest began on 28 September.<sup>62</sup>

On 1 September 1667, a tremendous hurricane desolated the island of St. Christopher [St. Kitts] in the *West Indies*. The hurricane blew with such violence, that all the houses and buildings were blown down. The inhabitants sought shelter from its fury by throwing themselves flat upon the ground in the fields.<sup>143</sup>

In 1667, a hurricane struck St. Kitts in the *West Indies* destroying all the houses on the island. The French governor reported:<sup>143, 144</sup>

I hold myself obliged to inform you that this island is in the most deplorable state that can be imagined and that the inhabitants could not have suffered a greater loss, or been more unfortunate



except they had been taken by the English. There is not a house or sugar works standing, and they cannot hope to make any sugar for fifteen months to come. As for the manioc, which is the bread of the country, there is not one left, and they are more than a year in growing ... I assure you that if peace is not made, or men-of-war sent to this country to facilitate the bringing of cassava from the other islands, that the inhabitants and troops will die of famine.

On 6 September 1667, an Atlantic hurricane struck Virginia in the *United States*. [Virginia was originally called Wingandacoa.] Buried in the ruins were much goods and many people. Many lives were lost.<sup>141</sup>

In 1667 during the period between 18 September and 16 October, floods struck Hunan province in south-central *China* at Lei-yang; and Hopei (now Hebei province) in northern *China* at Huai-lai, Ho-chien and Li.<sup>153</sup>

In 1667, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period 8 August 1666 and 22 May 1667, a severe drought engulfed Chekiang province at Hsüan-p'ing and Sung-yang.

— During the period 5 February and 6 May, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton, Hui-yang, Hai-fêng and Hui-lai.

— During the period 23 April and 22 May, a drought engulfed Hupeh (now Hubei province) in central *China* at Huang-kang.

— During the period 6 May and 8 November, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Wan-tsai.

— During the period 21 June and 20 July, a severe drought engulfed Hupeh province at Ying-shan, Huang-an, Lo-t'ien and Ch'i-shui.

In 1667 during the 6<sup>th</sup> moon on the 14<sup>th</sup> day in the vicinity of Shanghai, *China*, dragons were seen fighting in the air; there was a violent wind and excessive rain; the canal rose four or five feet; many houses were destroyed, a tree above ten arms-length in circumference was torn up. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

The year 1667 produced a great harvest in the vicinity of Shanghai, *China*. One *hok* of rice (133 pounds) cost only two *tsien* [around 70 or 80 cash] at that time in Hukwang, *China* and on the right side of the river it was still cheaper. The fields did not yield enough to pay the taxes. The granaries of the rich were overflowing. They discarded the bountiful produce. Goods of every description were without purchasers. People called this the year of the "ripe dearth".<sup>166</sup>

**1668 A.D.** On 24 July 1668, there was a flood at Sutton Pool in Warwickshire, *England*. At Sutton Coalfield, owing to a sudden rain, a great flood took place. The waters flowed over a stone wall 10 feet [3 meters] high. Two large pools of 20 acres each, called Windley and Bracebridge, had their dam heads both broke through the force of the water, probably occasioned by the bursting of a waterspout.<sup>212</sup>

In 1668, the price of wheat [in *England*] averaged 40 shillings per quarter [quarter ton].<sup>212</sup>

In 1668 in London, *England*, a small pox epidemic killed 1/9 of the inhabitants.<sup>212</sup>

In *England*, on the 17<sup>th</sup> of December, there was a great hailstorm with rain.<sup>57, 72, 93</sup>

In 1668, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 9 June and 8 July, floods struck Hupeh (now Hubei province) in central *China* at Ma-ch'êng; Hopei (now Hebei province) in northern *China* at Yü-t'ien; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ta-pu.

— During the period between 9 July and 7 August, floods struck Hopei province at Luan-ch'êng, Tz'ü, Nan-kung and Kao-ch'êng.

— During the period between 8 August and 5 September, floods struck Hopei province at Chao, Kao-i, Lin-ch'êng, Shen-tsê, An'p'ing, Yung-nien, Li and Chü-lu; Chekiang (now Zhejiang province) on the east coast of *China* at Huang-yen and Yüeh-ch'ing; and Kiangsi (now Jiangxi province) in southern *China* at P'ing-hsiang.

— During the period between 5 September and 5 October, floods struck Hopei province at Chiao-ho and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu.

In 1668 during the period between 9 July and 7 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Huang-an and Lo-t'ien; Chahar province (now eastern *Inner Mongolia*) at Huai-an and Yang-yüan; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lung-mên. During the period between 8 August and 5 September, a drought engulfed Hopei (now Hebei province) in northern *China* at Ching-hai.<sup>153</sup>

In 1668 during the 6<sup>th</sup> moon on the 14<sup>th</sup> day, there was violent wind with sudden torrents of rain in the vicinity of Shanghai, *China*. The river swelled four or five feet and destroyed innumerable houses. The storm was accompanied with a waterspout.<sup>166</sup>

In 1668 during the 12<sup>th</sup> moon [during winter], there was thunder and a rainbow in the vicinity of Shanghai, *China*.<sup>166</sup>

**Winter of 1668 / 1669 A.D.** During the winter of 1668-69, Captain [Zachariah] Gillam on the *Nonsuch* catch wintered in the southern end of the Hudson Bay in *Canada*. He anchored in Rupert River on the 29<sup>th</sup> of September 1668. On the 9<sup>th</sup> of December, the river was frozen up. In April 1669, the cold was almost over.<sup>292</sup>

**1669 A.D.** In *England*, the entire year was dry.<sup>47, 72</sup>

On 20 June at Inspurg, there was a violent tempest of rain, hail, thunder and lightning. At Schwatz in northeastern *Germany*, the river overflowed, drowned all the neighboring fields and carried down 30 houses and drowned 200 people. In July at Holstein, *Germany* was a tempest with thunder and lightning, which so frightened the cattle, that many hundreds of them were lost. At Mecklenburg, *Germany*, there were many fires kindled by lightning in several parts of the country.<sup>72</sup> [Inspurg might possible be Insberg which is located south of Salzburg in the Austrian Alps.]

[In *the Netherlands*] in 1669, the spring and early summer by the continued influence of the north wind were exceptionally cold. The months of July, August and September influenced by a west wind were intolerable hot. In Dijon, *France*, the grape harvest began on 11 September.<sup>62, 72</sup>

In *England* on 7, 8, 9, 12, and 20 August, there were severe storms of thunder and lightning.<sup>72</sup>

On 18 August 1669, there was a mighty torrent of water from Pendle Hill, which flooded the village of Worston in Lancashire, *England*. The furniture floated about in the houses.<sup>212</sup>

In 1669, the price of wheat [in *England*] averaged 44 shillings per quarter [quarter ton].<sup>212</sup>

On 17 August 1669, a hurricane struck a *Caribbean Island* near Nevis and *Cuba* causing 182 deaths.<sup>141</sup>

On 1 September 1669 at Weymouth in Dorset, *England*, there was a very high tide. It was unusual because the weather was very calm and the little wind that was being at northeast, in the past contributed nothing at all to the tides in this haven.<sup>225</sup>

A little before 23 September 1669 in the *Atlantic Ocean*, a hurricane struck and several Newfoundland ships were cast away by a storm. The news was reported by a vessel from Rochel.<sup>141</sup>

Before 9 December 1669, an Atlantic hurricane struck St. Kitts in the *West Indies*. During the storm, 25 merchant ships and others were cast away. [Another account relates to a 19 December 1670 account that a violent hurricane lasting eight hours struck St. Christopher's island [St. Kitts] about the end of September last. [Thus this event may have occurred in September 1669.]]<sup>141</sup>

On 30 October 1669, there was a frightful hurricane of whirlwind in Northamptonshire, *England*.<sup>72</sup>

On 30 October 1669, a tornado passed through Ashley [Ashley Green] in Northamptonshire, *England*. It was 60 yards wide and was on the ground for only around 6 minutes. It took a milkmaid's pail from off her head and carried it many score of yards distance. In one yard, it threw over a wagon breaking off the wheels and axles, and blowing three of the wheels over a wall. It demolished the roof of the parsonage.<sup>195</sup>

In 1669 during the period between 28 June and 27 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at San-shui, Mao-ming, Tung-kuan and Hua; and Hupeh (now Hubei province) in central *China* at Fang. At Fang, house and fields were damaged by the floodwaters. During the period between 28 July and 25 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Taichow.<sup>153</sup>

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**Winter of 1669 / 1670 A.D.** In *England* in 1669, the frost was severe with some remissions.<sup>47, 72, 93</sup>

In 1670 between 25 January and 11 February, there was frost in *England*.<sup>72</sup>

In 1669 at Christmas in *England*, there was a hard frost. Another account reported that on 26 December 1669 in London, *England*, there was a great cold spell, freezing quickly for several days. After which there was a great snow. This cold spell was much colder than the winter of 1665 and the winter of 1666.<sup>212</sup>

In 1670, the frost [in *England*] was most intense this winter.<sup>212</sup>

In 1670, the winter was intensely cold. The *Little and Great Belts* were frozen, and many people perished. [The Great Belt in *Denmark* (Danish: Storebælt) is a strait between the main Danish islands of Zealand (Sjælland) and Funen (Fyn). The Little Belt separates Fyn from Jylland.]<sup>1</sup>

In 1670, the cold was intense throughout *Europe*.<sup>30</sup>

In 1670, sleighs traveled safely across the *Little and Great Belts*.<sup>62</sup>

The winter in 1670 was severe in *Europe*. The *Great and Little Belts* were traveled by sleigh without any danger. The Danube River was frozen so hard that it carried people, horses and wagons. In *Italy* and *France*, there was severe cold. The extreme cold [in *France*] during January and February destroyed a large number of trees.<sup>62</sup>

The Academy of Sciences compares the cold from 1669-70 in northern *France* to the winters of 1608 and 1709. Rigor, in January and February, killed lots of trees.<sup>79</sup>

In *Prussia* in 1670, the waters of the Rhine River frozen at Coblenz [now Koblenz in west-central *Germany*] from the 11<sup>th</sup> to 17<sup>th</sup> of January, so that the artificers (artistic craftsman) exercised their several trades upon the ice (ice fair on the Rhine).<sup>47, 93</sup>

The winter was most severe, especially about the end of January, when a great flood was the next night followed by such a frost, that the Danube River was frozen so hard in one night, the it carried the weight of men, horses and carts. Whether the flood or the frost did the most damage is hard to determine for both killed multitudes of people.<sup>72</sup>

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**1670 A.D.** In Bridgewater (Somerset), *England*, there were great floods on October 9.<sup>47, 72, 92</sup> another flood in *England* on March 10.<sup>72</sup>

On 7 October 1670, a hurricane drove all the fleet on shore in the harbor [Île à Vache, *Haiti*], except [the bloodthirsty pirate Henry] Moran's vessel, all of which, except three, were got off again and made serviceable.<sup>143</sup>

In 1670, the price of wheat [in *England*] averaged 41 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

On 13 October 1670, there was a very violent gale at Braybrook in Northamptonshire, *England*. It was only 6 yards wide. [This most likely refers to a tornado event.]<sup>212</sup>

On 13 October 1670, there was a frightful hurricane of whirlwind in Northamptonshire, *England*.<sup>72</sup>

The year 1670 was hot and dry in southern *France*.<sup>79</sup>

In 1670, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Ch'ing-p'u; Anhwei (now Anhui province) in eastern *China* at Ch'üan-chiao, Wu-ho and Fêng-yang; Hopei (now Hebei province) in northern *China* at Po-yeh; and Hupeh (now Hubei province) in central *China* at P'u-ch'i, Chung-hsiang, Ying-ch'êng, Ch'ung-yang and Chih-chiang; and Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo and Shang-yü; and Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo, Shang-yü and Hu-chou. At Hu-chou, innumerable people and cattle drowned and innumerable houses damaged by the floodwater.<sup>153</sup>

In 1670, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a severe drought engulfed Hopei (now Hebei province) in northern *China* at P'u-yang, Tung-ming, Li, Kuang-p'ing, Jên, Wu-ch'ing, Ta-ch'êng, Ching, Ch'ing-yün, Ling-shou, Sha-ho, Tz'ü and Ta-ming. The drought damaged the crops.

— During the period between 6 May and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Tung-yang and Hupeh (now Hubei province) in central *China* at Lo-t'ien.

— During the period between 8 November 1670 and 5 February 1671, a severe drought engulfed Hupeh province at Tsao-yang and An-lu; and Kiangsi (now Jiangxi province) in southern *China* at Tê-an.<sup>153</sup>

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**Winter of 1670 / 1671 A.D.** During the winter of 1670-71, Captain [Zachariah] Gillam on the *Nonsuch* catch wintered in the southern end of the Hudson Bay in *Canada*. The ice began in Rupert River on the 10<sup>th</sup> of October, but they had warm weather after that. The river was frozen over the 6<sup>th</sup> of November. The snow that year was 7 or 8 feet thick [2.1-2.4 meters]. On the 1<sup>st</sup> of February, there was an abrupt change of weather that it rather thawed than froze. About the 20<sup>th</sup> of March it began to thaw and the river was thawed on the 20<sup>th</sup> of April.<sup>292</sup>

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**1671 A.D.** In Dijon, *France* in 1671, the grape harvest began on 16 September.<sup>62</sup>

In 1671, the price of wheat [in *England*] averaged 42 shillings per quarter [quarter ton].<sup>212</sup>

In December 1671 in London, *England*, there was the thickest and darkest fog ever known in the memory of man.<sup>212</sup>

[In *England*], there were tempests or thunder, rain and wind on 3 & 12 September, 2 November, and 30-31 December.<sup>72</sup>

In 1671, a drought engulfed many regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at T'ung-hsiang. This drought was severe.

— During the period between 8 November 1670 and 5 February 1671, a severe drought engulfed Hupeh province at Tsao-yang and An-lu; and Kiangsi (now Jiangxi province) in southern *China* at Tê-an.

— During the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Pa and Hupeh province at Kung-an and Shih-shou.

— During the period between 9 May and 6 June, a severe drought engulfed Hunan province in south-central *China* at Lung-shan and Hupeh province at Huang-an, Ma-ch'êng and Kuang-chi.

— During the period between 7 June and 1 November, a severe drought engulfed Chekiang province at Chin-hua and Hu-chou.

— During the period between 6 July and 4 August, a drought engulfed Chekiang province at Ningpo, Hsiang-shan, Ning-hai, T'ien-t'ai, Hsien-chü, Hu-chou and Lan-ch'i.

— During the period between 5 August and 2 September, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ch'i-ho; Hopei province at Tung-ming, Hsing-t'ai, Kuang-p'ing, Jên, Ch'êng-an; and Kiangsu (now Jiangsu province) on the east coast of *China* at Chiang-p'u, Soochow and T'ai-ts'ang.

— During the period between 3 September and 2 October, a drought engulfed Anhwei (now Anhui province) in eastern *China* at T'ai-hu; Hopei province at Hsin-ch'êng and T'ang-shan; and Chahar province (now eastern *Inner Mongolia*) at Yang-yüan and Huai-an.

— During the period between 3 October and 1 November, a severe drought engulfed Chekiang province at Shao-hsing.

In 1671 during the period between 5 August and 2 September, floods struck Hupeh (now Hubei province) in central *China* at Sung-tzū and I-tu. During the period between 3 September and 2 October, floods struck Mu-yang [uncertain name]; Hopei (now Hebei province) in northern *China* at Wên-an and Hsü-shui; Shantung (now Shandong province) on the east coast of *China* at Chi-ning; and Hupeh province at Shih-shou.<sup>153</sup>

In 1671 during the 4<sup>th</sup> moon on the 11<sup>th</sup> day, there was excessive rain in the vicinity of Shanghai, *China*. In the next month the rains came again but with violent winds, which tore up trees and leveled houses. This storm continued for three days and nights. The next day, there was a freshet [flood]. Later that year, there was a famine.<sup>166</sup>

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**Winter of 1671 / 1672 A.D.** On 9-11 December 1671, a storm of freezing rain struck Bristol, *England* causing vast destruction of trees about Bristol, Wells, Shepton-Mallet, Bath and Burton. There was no ice on any water but the rain froze as it fell. A branch from an ash tree weighed  $\frac{3}{4}$  pounds [0.3 kilograms] had 16 pounds [7.3 kilograms] of ice on it. The ice being five inches [13 centimeters] in circumference on the branch. The trees along the highway from Bristol to Shepton were all thrown down. Also at Burton, the roads were all blocked up by fallen trees. The same ice storm struck Oxford. This weather was immediately followed by great heat. The bushes and the flowers were as forward as usually seen in

April. An apple bloomed before Christmas.<sup>212</sup>

Freezing rain fell in Somersetshire, *England* on 9-11 December 1672 [1671]. It made incredible destruction of trees in all the villages and highways from Bristol towards Wells, and towards Shepton-Mallet, and towards Bath and Bruton, and other places of the west. A sprig of an ash tree of just three quarters of a pound, which was brought to my table, the ice on it weighed 16 pounds, besides what was melted off by the hands of them that brought it. Even though the trees and hedges were loaded with ice, there was no ice on the rivers or standing pools of water. Some travelers were almost lost [died] from the coldness of the freezing air and freezing rain. All trees, young and old, on the highway from Bristol to Shepton, were so thrown down on both sides of the ways, that the road was unpassable [impassable]. Due to similar obstructions, the [mail/newspaper] carriers of Bruton were forced to return back. Some told me that riding on the snowy downs, they saw this freezing rain fall upon the snow, and immediately freeze to ice, without sinking at all into the snow, so that the snow was covered with ice all along, and had been dangerous, if the ice had been strong enough to bear them. Many travelers were stranded on the roads during their journey and were in great distress. On the 8<sup>th</sup> much snow had fallen. The incidences of freezing rain seemed to vary by elevation. The frost was very fierce and dangerous on the tops of hills and plains. On 11 December, one young man returned from a 5 mile journey, as he entered a warm room, he cried out in extreme torment in all parts of his body because of the unsufferable [insufferable] cold. After these frost were over, there was an excessive heat wave. As a result an apple tree blossomed before Christmas. On New-Years-Tide, this apple tree bore apples as big as one's finger end. This freezing rain also affected the countryside around Oxford. And when the heat wave came, green apples were observed in diverse trees, particularly in the parish of Holywell.<sup>234</sup>

On 8 December [1671] fell a great snow. On 9 December, there was much rain, which swept off the snow. On 10 December, sudden fits of cold and warmth. Some travelers were almost lost by the freezing air and rain. Trees young and old, were torn and broken down; for the freezing rain falling on the freezing snow on the boughs, and presently turning to ice, broke down the trees. This frost was the same in Oxfordshire as in Somersetshire, a raining of ice or rain freezing as it fell and succeeded by the like heat.<sup>72</sup> Great was the damage done to exotic plants by this and the frosts of 1683, 1684, 1709, 1716 and 1740.<sup>72</sup>

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**1672 A.D.** The winter [in *France*] was severe and the cold weather lasted for three months.<sup>62</sup>

In May 1672, the drought lowered the water in the l'Yssel [sometimes called Gelderse l'Jssel River in eastern *Netherlands*] and the Rhine River [in *Germany*]. The river was fordable on one arm of the river at several locations. This allowed the army of Louis XIV, to cross the river on June 5.<sup>79</sup>

In 1672, several great and violent rains fell in many parts of *England* in summer and harvest and washed away both corn [grain] and soil of many great fields. After this [winter], very long heats, causing excessive sweating both by day and night. Trees budded, flowers appeared as in April or May. On 2 September, there was shocking thunder and lightning at Leeds in West Yorkshire in north-central *England*.<sup>72</sup>

In 1672, the price of wheat [in *England*] averaged 41 shillings per quarter [quarter ton].<sup>212</sup>

In 1672, an epidemic of measles prevailed in London, *England*.<sup>212</sup>

On 2 September 1672, there was a thunderstorm at Leeds, *England*.<sup>212</sup>

[In *England*], there were tempests on 24-25 July, 2 September, 29 October, 19-20 December and 28 December. Some tempests produced great tides.<sup>72</sup>



In 1672 during the period between 5 February and 6 May, a drought engulfed Shansi (now Shanxi province) in northern *China* at Jui-ch'êng and Chieh. During the period between 27 April and 26 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Fu-shan. During the period between 27 May and 24 June, a severe drought engulfed Shantung province at Kao-mi. During the period between 21 September and 20 October, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Lin-ch'ü.<sup>153</sup>

In 1672, floods struck Szechwan (now Sichuan province) in southwest *China* at Chungking, Chung, Fêng-tu and Sui-ning; Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh and Mêng-shan; and Hopei (now Hebei province) in northern *China* at Jên. During the period between 25 June and 23 July, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at I-hsing and Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou. Houses were damaged by the floodwaters. During this same time period, floods also struck Chekiang province at Hangchow; Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ying-tê; Hopei province at Hsing-t'ai; Hupeh (now Hubei province) in central *China* at I-tu, Ch'ien-chiang; and Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing.<sup>153</sup>

In 1672 during the 7<sup>th</sup> moon, there was a great drought in the vicinity of Shanghai, *China*.<sup>166</sup>

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**1673 A.D.** [In *England*] on 25 May and 23 June, there were terrible storms of thunder and lightning.<sup>72</sup>

[In *England*], there were several tempests, which occurred on: 16 February, May 25 (rain, thunder, lightning), June 23 (rain, a spout), September 10-11, and October 11.<sup>72</sup>

At Hartshead in Yorkshire, *England*, an inundation struck on 11 September.<sup>40, 41, 43</sup>

In *England* in 1673, the year was cold and full of rough days. The harvest was late and the yield was poor. In Dijon, *France*, the grape harvest only took place on 5 October.<sup>62</sup>

In *England*, 1673 was a cold unseasonable bad year, and a very late lean harvest.<sup>72</sup>

In 1673, the price of wheat [in *England*] averaged 46 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1673, an Atlantic hurricane struck off the coast of *Puerto Rico*. A warship was wrecked but most of the (500) pirates made it ashore to *Puerto Rico* [alive].<sup>141</sup>

In 1673 during the period between 14 July and 11 August, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Kao-yao; Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu, Anhwei (now Anhui province) in eastern *China* at Szü; and Shantung (now Shandong province) on the east coast of *China* at Tsinan.<sup>153</sup>

In 1673 during the period between 5 February and 8 November, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Chieh-yang. During the period between 5 February and 6 May, a drought engulfed Kwangtung province at Hui-lai. During the period between 6 May and 8 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Yang-hsin. During the period between 10 October and 8 November, a severe drought engulfed Kwangtung province at Kao-ming and Hsing-ning.<sup>153</sup>

In 1673 during the 7<sup>th</sup> moon on the 20<sup>th</sup> day in the vicinity of Shanghai, *China*, there was a hailstorm. The hailstones were two or three catties weight, killing horses and oxen. [A catty or Chinese pound was

historically about 605 grams weight. Therefore these individual hailstones weighed around 2.7 to 4.0 pounds.]<sup>166</sup>

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**Winter of 1673 / 1674 A.D.** The *Zuiderzee* is completely frozen; 16 March we crossed it on foot, on horseback and sleigh on the ice between Stavoren and Enkhuizen in *the Netherlands*.<sup>62</sup> [Stavoren is a town in Friesland on the coast of then Zuyder/Zuidersea, now the IJsselmeer Lake. Enkhuizen is now in North Holland also on but the opposite side of the IJsselmeer Lake. Today, a ferry for pedestrians and cyclists operates between Stavoren and Enkhuizen.]

The winter of 1674 was remarkable in Holland [now *the Netherlands*] because of its severity and because of the late arrival in February. On 4 April we skated on the sea at Haarlem, *the Netherlands*.<sup>62</sup> [Haarlem is in the peninsular region of North Holland.]

[In *Europe*] near Marienburg and Borussia on 5 February, there was a severe frost, which lasted to 25 March. [In *England*] this year, it snowed 11 days together.<sup>72</sup> [Marienburg could be Malbork in northern Poland, during this time period the Polish province of West Prussia. Borussia is a Latin name for Prussia.]

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**1674 A.D.** [In *England*] there was a tempest on 7 & 10 April 1674.<sup>72</sup>

On 7-8 May 1674, there was a great flood on the rivers Trent and Tame in *England*.<sup>212</sup>

In 1674, the price of wheat [in *England*] averaged 68 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1674, an epidemic of smallpox was very violent in London, *England*. It destroyed 1/8<sup>th</sup> of the people.<sup>212</sup>

In 1674, a great storm of whirlwinds [tornados], thunder, lightning and hailstones of prodigious bigness struck *Holland* [*the Netherlands*]. At Amsterdam, many trees were tore up by the roots, ships sunk in the harbor, boats in the channels, houses beaten down, and several people were snatched from the ground as they walked the streets, and thrown into the canals. The great and ancient Cathedral Church at Utrecht was torn in pieces by the violence of the storm and utterly destroyed. The vast pillars of stone that supported it were wreathed like a twisted club. Hardly any church or house in the town escaped the violence. *France* and Brussels [in *Belgium*] also suffered infinite damage from this storm.<sup>209</sup>

[In *England*], the summer and harvest were mostly rainy and unequal. September and October were hot.<sup>72</sup>

On 21 December 1674, a northwest gale struck Tarbut [Tarbert], *Scotland*. Whole forests were torn up by the roots.<sup>212</sup>

The Camargue [river delta] in *France* was covered by the floodwaters of the Rhône River in 1674.<sup>79</sup>

Thunderstorms or rainstorms desolated Provence, *France* in 1674.<sup>79</sup>

On 10 August 1674, a hurricane struck Barbados in the *Lesser Antilles* causing 200 deaths.<sup>141</sup>

On 10 August 1674, a hurricane struck Barbados in the *Lesser Antilles* blowing down 200 houses, and destroying the plantations, so that the inhabitants made but little sugar the two succeeding years. Eight ships were wrecked in the harbor, and 200 persons killed.<sup>143</sup>

In 1674 during the period between 6 April and 5 May, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Hopei (now Hebei province) in northern *China* at Pa. During the period between 4 June and 3 July, floods struck Hopei province at Jên; Kiangsi (now Jiangxi province) in southern *China* at Wan-tsai; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'iung-shan. At Ch'iung-shan, houses were damaged by the floodwaters and innumerable people and cattle were drowned.<sup>153</sup>

In 1674, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Honan (now Henan province) in central *China* at Hsü-ch'ang and Shantung (now Shandong province) on the east coast of *China* at Fei, Yüeh-ling and T'an-ch'êng.

— During the period between 6 May and 3 June, a drought engulfed Shantung province at Tsinan.

— During the period between 4 July and 1 August, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu and Shantung province at Kuan-t'ao and Ên.

— During the period 2-30 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Yün, Huang-an, Ma-ch'êng, Lo-t'ien.

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**Winter of 1674 / 1675 A.D.** The winter of 1674-75 in *Ireland* was very mild and warmer than expected with very little rain. It did not rain more than 2 or 3 times in February. During the past 2 or 3 years, *Ireland* had scarcely any frosts or snow. But [the decade or two] before then it was not unusual to have frost and deep snows of a fortnight [2 weeks] and some that continued for 3 weeks and there were great rivers and lakes frozen completely over.<sup>234</sup>

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**1675 A.D.** [In *England*] on 24-25 May, there was a terrible storm of thunder and lightning.<sup>72</sup>

[In *England*], there were tempest on 24-25 May (thunder & lightning), and 26-27 December (with hurricane).<sup>72</sup>

On 10 September 1675, a hurricane struck Barbados in the *Lesser Antilles* causing greater than 200 deaths.<sup>141</sup>

In Burgundy, *France* in 1675, the grape harvest began on 14 October.<sup>62</sup>

In November 1675, a storm so violent struck *Holland* [*the Netherlands*] and caused several breaches in the great diques [dikes] near Enchusen and others between Amsterdam and Harlem [now Haarlem]. Forty-six vessels were cast away at Texel and almost all the men drowned. These breaches caused a great inundation, which caused much damage. Many people, cattle and houses were lost.<sup>209</sup>

In *England*, the summer was exceedingly rainy. The harvest was very unequal, like the months of March and April, sometimes clear; sometimes cloudy or rainy. The winter of this year was not so severe. There was neither rain nor snow. A north wind in spring made intermittents very rife.<sup>72</sup>

In 1675, the price of wheat [in *England*] averaged 61 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

Lightning can change the polarity of magnets. “Towards the year 1675 two English vessels went together on a voyage from London to Barbadoes [Barbados]. Near the *Bermudas*, lightning broke the mast of one of them and tore the sails; the other received no damage. The captain of the second vessel having remarked that the first turned about and appeared to wish to return to England, asked the cause of this sudden determination, and learnt, not without astonishment that his companion thought he was following the route as at first. An attentive examination of the compasses of the vessel that had been struck showed them that the *fleur de lys*, or arrowhead, which usually stands on the compass-card for the north-pointing

pole now indicated the south; so that the poles had been completely reversed by the lightning. It continued in this state during the whole remainder of the voyage.”<sup>271</sup>

In 1675 during the period between 23 July and 20 August, floods struck Anhwei (now Anhui province) in eastern *China* at Wu-ho and Hopei (now Hebei province) in northern *China* at Hsin-ch'êng, Su-ning and Li. During the same period of time, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning. During the period between 21 August and 18 September, a drought engulfed Hupeh (now Hubei province) in central *China* at Huang-an and Lo-t'ien. Then during the period between 19 September and 18 October, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu.<sup>153</sup>

In 1675 during the 6<sup>th</sup> moon, there was great wind and a flood in the vicinity of Shanghai, *China*. Then during the 10<sup>th</sup> moon, there were protracted rains.<sup>166</sup>

**Winter of 1675 / 1676 A.D.** The winter of 1675-76 in *Ireland* was very fair or rather no winter at all. There were only 5 or 6 mornings with frost this winter and the frost lasted no longer than noon. It snowed only 3 times. The first snow occurred before Christmas, the second on 11 January, and the third on 17 January. The last snowfall was the longest; it continued less than 48 hours but thawed. There were only 2 or 3 rainy days during the winter. On 14 March, there was a shower of rain and hail.<sup>234</sup>

**1676 A.D.** On 23 May 1676, the French ship *Le Vansour* sails along the coast of the island *Tristan da Cunha* located about midway between Africa and South America, and observed the peak on the main island was covered with snow.<sup>105</sup>

In 1676, the price of wheat [in *England*] averaged 38 shillings per quarter [quarter ton].<sup>212</sup>

On 16 June 1676, a hailstorm struck Dunstal [Dunstall] in Staffordshire, *England*. The hailstorm was 1½ miles [2.4 kilometers] long and ¼ mile [0.4 kilometers] broad. The hailstones were 4 inches [10 centimeters] about [in circumference] and of unequal and various shapes.<sup>212</sup>

[In *England*] on 19 June, there was a terrible storm of thunder and lightning.<sup>72</sup>

[In *England*] on 9 August, there was a tempest with great wind and high tides.<sup>72</sup>

[In *England*], the summer was exceedingly cold.<sup>72</sup>

In Dijon, *France* in 1676, the grape harvest began on 9 September.<sup>62</sup>

On 20 September 1676, a violent storm struck the coast of New England in what was to become the *United States*. It cause ships to sink and coastal damage. One of the ships placed in peril by the storm was a ketch, of about seventeen tons burden, commanded by a sea captain Ephraim Howe. During the storm, the ship lost a rudder and as a result any means of controlling the vessel. It floated aimlessly out to sea for three months. Over half the passengers and crew died of exposure. The ship finally struck a reef off the coast of Cape Sable in Nova Scotia. The survivors made their way onto an uninhabited desolate island. They were finally rescued and returned to Salem, Massachusetts on 8 July 1677, ten months after they left Boston.<sup>199</sup>

In 1676, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 14 February and 13 March, floods struck Hupeh (now Hubei province) in central *China* at Ch'ien-chiang, Ku-ch'êng and I-ch'êng. At I-ch'êng, houses and crops were damaged by the floodwaters and people and cattle were drowned.

— During the period between 11 June and 10 July, floods struck Shensi (now Shaanxi province) in central *China* at Pai-ho; Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Mêng-shan, P'ing-yüeh and Ts'ang-wu; and Hupeh province at Ao-ch'êng, Ta-yeh, P'u-ch'i, Huang-p'o, Hsiao-kan, Mien-yang, Kuang-chi, I-ch'êng and Tien-mên.

— During the period between 11 July and 8 August, floods struck Kwangsi province at Huai-chi; Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Ch'ing-p'u, Wu-chiang and Hsiao; and Hupeh province at Huang-kang, Chiang-ling, Chien-li and Kuang-chi.

— During the period between 7 October and 5 November, floods struck Kiangsu province at Suchow; and Hopei (now Hebei province) in northern *China* at Nan-yüeh.

In 1676 during the period between 5 February and 6 May, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsing-ning [uncertain name].<sup>153</sup>

**Winter of 1676 / 1677 A.D.** The Seine River in *France* was frozen for thirty-five consecutive days from 9 December 1676 to 13 January 1677.<sup>38,60</sup> The Maas (Meuse) River remained frozen from Christmas until the 15<sup>th</sup> of January.<sup>62</sup>

In 1676 in Paris, *France*, there were 35 days of frost.<sup>58,80</sup>

Extreme cold reigned from 2 December 1676 to 13 January 1677 in northern *France*. The earth was covered with snow, and the river remained frozen thirty-five days.<sup>79</sup>

This winter was very severe in *France*. Particularly intense was the cold from 2 December 1676 until 13 January 1677. "Thirty-five consecutive days the earth was covered with snow and the Seine River frozen. Then came wet weather. In February we had a few mild frosts and frequent rains. The same weather conditions prevailed in March. The sky was almost completely overcast. The beginning of April was still cold and wet, but around the middle of the month, the temperature was mild, but soon afterwards came the cool weather again which held until 22 May." On the frozen river Meuse, they travelled from Christmas to 15 January with heavily laden wagons over the ice.<sup>62</sup>

**1677 A.D.** [In *England*] on 1 June and on 8 & 29 July, there were terrible storms of thunder and lightning.<sup>72</sup>

[In *England*], there were tempests on 11 August (of wind) and 1 & 29 June (of rain, hail, thunder, lightning and wind).<sup>72</sup>

In 1677, the price of wheat [in *England*] averaged 42 shillings per quarter [quarter ton].<sup>212</sup>

[In 1677, Richard Towneley made the first regular measurement of rainfall in the north of *England*.] In Townley [Towneley Hall] in Lancashire, *England* the rainfall of January was 4.7 inches [12 centimeters]; of June 5.2 inches [13 centimeters]; of August 4.8 inches [12 centimeters]; of November 4.3 inches [11 centimeters]; of December 4.0 inches [10 centimeters]; whole year 43.6 inches [1.1 meters].<sup>212</sup>

In 1677, floods struck many regions of China including:<sup>153</sup>

— During the period between 4 March and 1 April, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu, Suchow and Hsiao.

— During the period 2-30 May, floods struck Hupeh (now Hubei province) in central *China* at Ch'ien-chiang and Anhwei (now Anhui province) in eastern *China* at Wang-chiang.

— During the period between 30 July and 27 August, floods struck Hopei (now Hebei province) in northern *China* at Ho-chien, Jên and Chi-tsê; Shantung (now Shandong province) on the east coast of

*China* at An-ch'iu; Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'in; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu, Hêng and Kuei-p'ing.

In 1677 during the period between 3 May and 27 August, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Kiangsi (now Jiangxi province) in southern *China* at Wan-tsai.<sup>153</sup>

In 1677 during the 6<sup>th</sup> moon, there was a flood in the vicinity of Shanghai, *China*.<sup>166</sup>

During the winter of 1677, there was a thunderstorm with snow [thunder-snow] in the vicinity of Shanghai, *China*.<sup>166</sup>

**1678 A.D.** In *England* on the 18<sup>th</sup> of January, there was a great hailstorm.<sup>57, 72, 93</sup>

[In *England*] on 19 January and 11 August, there were terrible storms of thunder and lightning.<sup>72</sup>

[In *England*], there were tempests on 19 January (thunder and lightning), on 22 March and 8 October.<sup>72</sup>

In Middlesex, *England*, there were considerable floods on 11 June.<sup>47, 72, 92</sup> another flood in *England* in September.<sup>72</sup>

In *England*, the year was all dry, hot and clear.<sup>47, 72</sup>

In *England*, the wind for the last two years and now [1678] having kept mostly north-northeast and east and sometimes northwest but mainly north the whole spring. Summer and harvest was droughty, hot and clear.<sup>72</sup>

In the beginning of July 1678, after some gentle rainy days, which had not swelled the waters of the River Garonne more than usual, one night the river swelled all at once so mightily, that all the bridges and mills above Toloufe [Toulouse in southwestern *France*] were carried away. In the plains which were below the town, the inhabitants who built in places which by long experience they had found safe enough from any former inundation, were by this surprised, some were drowned, together with their cattle, others only saved themselves by climbing trees or getting to the tops of houses. Others who were looking after their cattle in the field were warned by the horrible noise and furious torrents of water and fled but could not escape without being overtaken. At the exact same time the two rivers of Adour and Cave, which fall from the Pyrenæan Hills [Pyrénées Mountains], as well as the Garonne, and some other little rivers of Gascoygne, which have their source in the plain, as the Gimone, the Save, and the Rat, overflowed in a similar manner and cause the same devastation. This flood was believed primarily due to the release of subterraneous waters. This observation was derived from the mineral content of the water and the formation of new river channels in the mountains formed by the furious torrents, which tore up the trees, earth, and great rocks.<sup>234</sup>

In 1678, the price of wheat [in *England*] averaged 59 shillings per quarter [quarter ton].<sup>212</sup>

In *England*, there was a frost from the 9<sup>th</sup> of December to the 9<sup>th</sup> of February, with one remission.<sup>47, 72, 93</sup>

In 1678, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at T'ai-an and Anhwei (now Anhui province) in eastern *China* at Tung-liu, Shou, Ch'üan-chiao and Wu-ho.



— During the period between 6 May and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at T'ung-hsiang; Kiangsu (now Jiangsu province) on the east coast of *China* at Chia-ting; and Hupeh (now Hubei province) in central *China* at Huang-kang.

— During the period between 16 September and 15 October, a drought engulfed Chekiang province at Chin-hua; Kiangsu province at Kao-ch'un; and Kiangsi (now Jiangxi province) in southern *China* at Hsiu-shui [uncertain name, "Ning"].

In 1678, floods struck many regions of *China* including: <sup>153</sup>

— During the period between 20 May and 18 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lung-ch'uan and Ho-p'ing; and Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou.

— During the period between 19 July and 16 August, floods struck Kwangtung province at Ch'in and Hui-lai; and Szechwan (now Sichuan province) in southwest *China* at Sui-ning and Ho-chiang.

— During the period between 17 August and 15 September, floods struck Hopei (now Hebei province) in northern *China* at Jên and Hsing-t'ai; Kiangsu (now Jiangsu province) on the east coast of *China* at Hsiao and Suchow; Shensi (now Shaanxi province) in central *China* at Yen-ch'ang; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh.

In 1678 during the 5<sup>th</sup> moon, there was a hailstorm in the vicinity of Shanghai, *China*.<sup>166</sup>

**1679 A.D.** [In *England*], October was a month of continued rains.<sup>72</sup>

[In *England*], there were tempests on 10-11 February (wind), 8 July, 6 August (rain, thunder and lightning).<sup>72</sup>

In 1679, the price of wheat [in *England*] averaged 60 shillings per quarter [quarter ton].<sup>212</sup>

In 1679, it was very hot in *England* and *Scotland*. There was no rainfall beginning in May and all summer.<sup>212</sup>

In 1679, a drought engulfed many regions of *China* including: <sup>153</sup>

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, K'un-shan, Ch'ing-p'u, Shanghai, Wu-chin and I-hsing. This drought was severe. Creeks dried up.

— During the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Man-ch'êng.

— During the period between 10 May and 7 June, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow.

— During the period between 8 June and 4 October, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Huang-an, Lo-t'ien, I-tu, Ma-ch'êng and Kung-an.

— During the period between 8 July and 5 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Yeh and P'ing-tu.

— During the period between 6 August and 4 September, a severe drought engulfed Anhwei (now Anhui province) in eastern *China* at Ho-fei, Lu-chiang, Ch'ao, Wu-wei, Shu-ch'êng and Tang-t'u.

— During the period between 5 October and 2 November, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at Lin.

The year 1679 was a very scarce year in the vicinity of Shanghai, *China*. This scarcity was caused by a drought.<sup>166</sup>

In 1679 during the period between 9 August and 4 September, floods struck Hopei (now Hebei province) in northern *China* at An-kuo and Su-ning. During the period between 5 September and 4 October, floods

struck Shensi (now Shaanxi province) in central *China* at Nan-chêng and Hupeh (now Hubei province) in central *China* at Ch'ien-chiang. At Ch'ien-chiang, the dikes were damaged.<sup>153</sup>

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**1680 A.D.** [In *England*] on 11 February 1680, there was an irregular tide when the sea flowed three times in 5 hours.<sup>72</sup>

In Oxford, *England* in June, there were great floods.<sup>47, 72, 92</sup>

On 26 June 1680, there was a monstrous inundation near Londonderry, *Ireland*. It was believed that this inundation came from the release of subterraneous waters imbedded in the hills and from whence the waters gushed forth.<sup>234</sup>

In *England*, the summer was hot and dry.<sup>47, 72</sup>

The summer of 1680 was extremely hot in *England*. In Dijon, *France*, the grape harvest began on 9 September. This year was a good grain market in *France*.<sup>62</sup>

In 1680, the price of wheat [in *England*] averaged 45 shillings per quarter [quarter ton].<sup>212</sup>

In 1680, 1720, 1739 and 1740 [in *Europe*], storms of hail of one foot thickness fell.<sup>190</sup>

In *Ireland*, there was “an inundation near Londonderry.”<sup>47, 92</sup> [Londonderry is located in Northern Ireland near Lough Foyle.]

In Breslaw [now Wrocław in southwestern *Poland*], there was great heat during the summer.<sup>72</sup>

On 3 August 1680, a hurricane struck Martinique Island in the *Caribbean Sea*. During the violent hurricane over twenty large French ships and two English ships were totally lost in Cul-de-Sac Bay and the loss of life was great.<sup>141</sup>

On 15 August 1680, an Atlantic hurricane struck the *Dominican Republic*. The storm submerged many vessels including 25 ships of France, causing the death of most. Several Spanish ships were also lost as well.<sup>141</sup>

[In *England*] on 13 September, there was a terrible storm of thunder and lightning.<sup>72</sup>

[In *England*], there were tempest on 30 January, 28 February, 18 June, 24 August and 23 September (rain, thunder and lightning).<sup>72</sup>

In 1680, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 26 June and 25 July, floods struck Hupeh (now Hubei province) in central *China* at Kuang-chi, I-tu and I-ch'ang; Kiangsu (now Jiangsu province) on the east coast of *China* at I-hsing and Wu-chin; and Shantung (now Shandong province) on the east coast of *China* at Fu-shan, I-shui, Mêng-yin and T'êng.

— During the period between 26 July and 23 August, floods struck Kiangsi (now Jiangxi province) in southern *China* at Hsia-chiang and Hupeh province at I-ch'ang and I-tu.

— During the period between 24 August and 22 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou.

In 1680 during the period between 6 May and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Li. During the period between 8 August and 8 November, a drought engulfed

Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lien, K'ai-chieh and Wêng-yüan.<sup>153</sup>

In 1680, there was a great drought in the vicinity of Shanghai, *China*. There was no rain from 3<sup>rd</sup> to 8<sup>th</sup> month.<sup>166</sup>

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**Winter of 1680 /1681 A.D.** [In *England*], the winter was a long severe frost and an intense cold. The summer was excessively hot.<sup>72</sup>

In 1680 in *England*, the frost was long and hard.<sup>47, 72, 93</sup>

The winter was intensely cold in *Europe*. The Little and Great Belts in *Denmark* were frozen, and many people perished.<sup>1</sup>

This year the cold was so severe as to split whole forests of oak trees.<sup>30</sup>

In 1680 in southern *France*, the cold kills all the olive trees.<sup>79</sup>

The winter in 1680 was in *Italy* and *Provence* very severe. In *Provence*, the olive trees froze to death.<sup>62</sup>

During the period from 1718 to 1734, Antoine-Simon Le Page du Pratz lived in the early Louisiana Territory and documented *North America*. The following is a passage from his memoirs providing an account of the travels of Moncacht-Apè [name translates to “the killer of pain and fatigue”], a civilized Indian of Louisiana from the tribe of Yazoo: “Having lost my wife and children, I resolved to travel, in order to discover our original country [ancestral roots], notwithstanding all the perswasions [persuasions] of my parents and relations to the contrary. I took my way, by the high grounds that are on the eastern bank of the river of St. Louis, that I might only have the river Ouabache [Wabash River] to cross in order to join the Illinois, at the village of Tamaroua [near the site of East St. Louis, Illinois], a considerable settlement of the Canadian French. As the grass was short [These countries are all either woods, or vast plains or meadows, and when the grass of these meadows is long, travelling through them is very troublesome and fatiguing.] I arrived there in a little time. I stayed there 8 days to rest myself, and then continued my rout [route] along the eastern bank of the same river St. Louis, till I was a little above the place where the river Missouri falls into it. I then made a raft of canes, or reeds, and cross'd the river St. Louis, and when I was near the opposite side, I suffered my raft to be carried down the stream till I came to the conflux of the two rivers. Here I had the pleasure of seeing the rivers mix, and of observing how clear the waters of the river St. Louis are, before they receive the muddy streams of the Missouri. I landed her, and travell'd along the north side of the Missouri for a great many days, till at last I came to the nation of the Missouris; with them I stay'd a considerable time, not only to repose myself after my fatigues, but also to learn their language, which is spoken or understood by a great many nations. In this country one scarce sees any thing but large meads [meadows], above a days journey over, and cover'd with large cattle [buffalo]. The Missouris seldom eat any thing but flesh [meat], they only cultivate as much maiz [maize, corn] as may serve for a change, and prevent their being cloy'd [cloyed, sickened with an excess of] with beef and game, with which their country abounds. During the winter which I spent with them, the snow fell to the depth of 6 feet [1.8 meters].”<sup>299</sup> [It is believed that Moncacht-Apè journey across the continent occurred in the second half of the 17<sup>th</sup> century. I have arbitrarily placed this account in the year 1680.]

On 30 December 1708, the temperature at Upminster [a suburban town in east London, *England*] fell to 1° F [-17.2° C].<sup>300</sup>

During the period between 21 December 1680 and 19 January 1681, a severe drought engulfed Chahar province (now eastern *Inner Mongolia*) at Wan-ch'üan.<sup>153</sup>

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**1681 A.D.** [In *England*], there were tempest on 15 January (rain, hail) and 10-11 December.<sup>72</sup>

In *England*, all the spring and summer was dry.<sup>47, 72</sup>

The spring and summer of 1681 [in *England*] were so hot and so dry that no one remembered a state of vegetation, equal to the likes seen this year. The herbs and grasses were burned, and in the air, no trace of moisture could be detected.<sup>72</sup> In Dijon, *France*, the grape harvest began on 9 September.<sup>62</sup>

In 1681, the price of wheat [in *England*] averaged 46 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1681, an epidemic of smallpox was violent in London, *England*. It killed 1/8<sup>th</sup> of the inhabitants.<sup>212</sup>

In *England* on the 1<sup>st</sup> of May, there was a great hailstorm.<sup>57, 72, 93</sup>

In 1681, a hurricane struck the western *Caribbean Sea*. The loss of life was considerable from several ships.<sup>141</sup>

In 1681, the island of Antigua in the *Leeward Islands* was desolated by a tremendous hurricane.<sup>143</sup>

In 1681, a drought engulfed several regions of *China* including:<sup>153</sup>

— Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing and Chekiang (now Zhejiang province) on the east coast of *China* at Huang-yen, Hsien-chü and I-wu. Wells and springs dried up.

— During the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at An-ch'iu.

— During the period between 6 May and 8 August, a drought engulfed Chekiang province at Wên-chou and Ningpo. Wells and springs dried up.

— During the period between 8 August and 8 November, a drought engulfed Chekiang province at Fêng-hua. Wells dried up.

In 1681 during the period between 18 May and 15 June, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-shan and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Fêng-ch'uan. During the period between 16 June and 14 July, floods struck Chekiang province at Ch'ang-hua and T'ang-ch'i; Hupeh (now Hubei province) in central *China* at Chiang-ling and Chien-li; and Kiangsi (now Jiangxi province) in southern *China* at Hsin-chien. In Chekiang and Hupeh provinces, innumerable people were drowned.<sup>153</sup>

In 1681 during the 5<sup>th</sup> moon, there was a flood in the vicinity of Shanghai, *China*. Then during the 8<sup>th</sup> moon, there was a sudden torrent of rain and rise of water, which undermined and overturned part of the Shanghai walls and killed several persons.<sup>166</sup>

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**Winter of 1681 /1682 A.D.** In the *United States*, on 11 December 1681, the Delaware River near Philadelphia was frozen solid in one night so as to be passable on the ice.<sup>1</sup>

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**1682 A.D.** In *England*, "Rain, hail, floods, all the summer."<sup>47, 72, 92</sup>

On 22 March 1682, the tide on the River Thames in London, *England*, ebbd and flowed three times in four hours.<sup>212</sup>

In 1682 there was a storm and flood at Brentford, in West London, *England* that did much damage. The sudden flood occasioned by the tempest was so great that the whole place was laid underwater. Boats rowed up and down the streets and several houses were carried away by the force of the current.<sup>212</sup>

In 1682, the price of wheat [in *England*] averaged 44 shillings per quarter [quarter ton].<sup>212</sup>

On 6 June, at Tortorica in the Valley of Demana in *Sicily*, at 7 o'clock in the evening, there arose such a tempest of rain, thunder and lightning, which continued for 36 hours. At 1 o'clock the next morning, great torrents of water caused by these rains, fell down from the neighboring mountains with so great rapidity, that they carried down trees of extraordinary bulk, which demolished the walls and houses of the town. They overthrew St. Nicholas's Church, drowned the Archdeacon and many people with him. It left only fifty shattered houses, which fell soon after. It drowned 600 inhabitants, the rest were employed in their fields about their silk, fled to the mountains where they suffered much for want of provisions. The materials carried down by the flood, were so much, that they made a bank above the water, near two miles in length, near the mouth of the river, where the Sea was deep before. Several other towns near were much damaged by it.<sup>72</sup> [Tortorica or Tortorici in Sicilian is located in a province of Messina in Sicily, a region of *Italy*.]

In 1682, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing.

— During the period between 6 June and 4 July, floods struck Chekiang province at Chien-tê; Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Fêng-ch'uan; and Hupeh (now Hubei province) in central *China* at Chih-chiang.

— During the period between 3 August and 1 September, floods struck Chekiang province at Chien-tê; Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh and Ts'ang-wu; Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chiang; Anhwei (now Anhui province) in eastern *China* at T'ai-hu and Su-sung; and Shantung (now Shandong province) on the east coast of *China* at Tsou-p'ing.

In 1682 during the period between 6 June and 4 July, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lien-p'ing. During the period 1-29 October, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Po-pai and Pei-liu.<sup>153</sup>

**1683 A.D.** In 1683, the price of wheat [in *England*] averaged 40 shillings per quarter [quarter ton].<sup>212</sup>

In 1683, there was a flood at New Braintford [Brentford] in Middlesex, *England*.<sup>212</sup>

In 1683, there was a flood at Runswick in Yorkshire, *England*.<sup>212</sup>

In Dijon, *France*, the grape harvest began on 13 September.<sup>62</sup>

In 1683, a hurricane struck the east coast of Florida in the *United States* causing 496 deaths.<sup>141</sup>

In 1683, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 27 January and 25 May, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Chieh-yang.

— During the period between 28 March and 26 April, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Huang and Kwangtung province at Hui-lai and P'u-ning.

— During the period between 6 May and 8 August, a drought engulfed Shansi (now Shanxi province) in northern *China* at Ch'ü-wo and Shantung province at Wên-shang, Tsou and Tzū-yang.

— During the period between 22 August and 20 September, a drought engulfed Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing.

In 1683 during the period between 22 August and 20 September, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Mêng-shan and Ts'ang-wu. During the period between 18 November and 17 December, floods struck Hopei (now Hebei province) in northern *China* at Kao-ch'êng; Shantung (now Shandong province) on the east coast of *China* at Shan; and Kansu (now Gansu province) in northwest *China* at Ning [uncertain name].<sup>153</sup>

The year 1683 was a very productive year in the vicinity of Shanghai, *China*. Single stems of rice had double heads, some three or four. (Specimens were rolled up, and deposited in a temple, with a written account. These circumstances became known from the discovery eighty-four years later when the temple was repaired.)<sup>166</sup>

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**Winter of 1683 / 1684 A.D.** During the winter, the River Thames in *England* was frozen below Gravesend.<sup>1</sup>

The frost in *Britain* lasted for 13 weeks.<sup>2, 40</sup>

During the winter of 1683-84, there was a great frost in *England*. At the beginning of December, due to the extreme cold, there was fearful destruction of the trees and plants. Great oaks suffered; the bark was rifted [cracked] by the frost in the estates of Lords Weymouth, Chesterfield and Ferrars, and Sir W. Fermor. The figs killed to the ground. Elm, ash and walnuts cleft [split] by the frost, but not so much as oaks; the oaks in being cleft made a noise like a gun. Yew, holly and furze [gorse bush] in some places entirely killed and in many places lost their leaves. Rosemary, Laurustinus, Laurel, Arbutus, and Phyllyrea generally killed throughout the country. In dry mountainous places, trees escaped tolerably well. Firs and pines escaped the effects of the cold. There was great destruction of the herbs, plants, and flowers, except where covered with snow. There were coaches on the ice on the River Thames [at London]. There were shops on the River Thames until February. About 40 coaches plied for hire on the river daily. This was the longest frost on record, and the ice on the River Thames was 11 inches [28 centimeters] thick. Nearly all the birds perished. The frost lasted till 4 February. Small pox raged in London.<sup>212</sup>

In 1684, the frost in *England* began at Christmas and lasted 91 days, and mortality increased. Coaches drove along the Thames, which was covered with ice 11 inches [28 centimeters] in thick. Almost all the birds perished.<sup>212</sup>

On 5 January 1684, frost was very intense in London, *England*; the temperature was 8 degrees below zero.<sup>212</sup> [This entry is very suspicious. That is because the Fahrenheit temperature scale was invented by Daniel Gabriel Fahrenheit in 1714. The Réaumur scale was named after René Antoine Ferchault de Réaumur, who first proposed it in 1730. The Celsius temperature scale was invented by the Swedish astronomer Anders Celsius in 1742. The Kelvin temperature scale was invented by Lord Kelvin in 1848. Other historical temperature scales were the Rankine invented in 1859; the Newton invented in around 1700; the Rømer invented in 1701; and the Delisle invented in 1732. Early temperature measuring devices called thermoscopes existed since 1593, but these instruments were very crude and without a temperature scale, “8 degrees below zero” does not carry any meaning.] [But this brings up an interesting question “How cold did it get during the winter the English Channel froze? The answer partly lies in the splitting of oak trees.] The cold (in *England*) was so intense that the trunks of oak, ash, walnut, and other trees, were cleft asunder, so that they might be seen through; and the cracks were often attended with



noises as loud as the firing of musketry.<sup>29</sup> [Both *France* and *England* reported that the trees split apart with the sound like a musket shot. My property has a number of large oaks, walnuts and ash trees and even though the temperature during winter does many times fall below zero degrees Fahrenheit, I have not had the trunks of any of my trees split by the cold nor make the sound of rifle shot during the split. In the 35 years I have been here, the temperature dipped down below -20° F [-29° C] during a couple of these winters.] Shirley Loudon recorded in *Good Fruit Growers*, that at -47° F [-44° C], that many trees exploded in their orchard in Carlton, Oregon. Linda Runyon recorded in *The Essential Wild Food Survival Guide*, that at -40° F [-40° C], maple trees exploded due to the cold. Mikael Strandberg recorded that in his trip to Siberia, during the winter, “mercury will freeze solid and brandy becomes the consistency of syrup. It is so cold that trees explode, blue sparks fly from falling timber.” [The mercury solidifies (freezes) at -37.89° F [-38.83° C].] Mark Prangle reported that at -40° F [-40° C], it was cold enough for trees to explode and for mercury to freeze. My brother David Marusek who lives up in Fairbanks, Alaska and who experiences winter temperature that drop down to -50° F [-46° C] says that this indeed does happen when temperature fall below -40° F [-40° C]. In his backyard, he has a four-foot [1.2 meter] split in his spruce tree from this phenomenon. [Therefore I will suggest that the temperature in *England* on 5 January 1684 fell to -40°F or colder during this intense cold spell.]

[Temperatures along coastal regions are somewhat moderated by the ocean temperature whereas temperatures inland will feel the full severity of an extreme temperature fall. Thus in *England*, coastal regions such as London would not experience the same drop in temperatures as interior regions.]

The winter of 1683-84 was so severe in *England*, where it could expunge [destroy] the more defensible and such as were enclosed, it has ravaged all that lay open, and were abroad, without any mercy. Many of the older trees, especially the oaks, were damaged by cleaving or splitting due to the severe frost. Many of these trees split apart. Nor has this damage been limited to only the standing timber, but to that which has been felled and seasoned, as Mr. Shish, the master-builder in his Majesty’s Shipyard here, informed me. Some of the splits in the trees were large enough for a man to see through it, and many times the cracks came with so great a noise, that as it was related from Needwood Forest, they made such a noise, that the keepers there thought that the deer were shot by the people of the country; and that in several parts they were heard as loud as guns, some having been cruelly frightened, especially in the evenings or nights, as they have passed within the hearing of this so unexpected and surprising a noise.<sup>234</sup>

During the winter of 1683 and 1708, coaches were driven over the ice [on the River Thames in London, *England*] and large fires were made on the ice.<sup>235</sup>

In *England*, the frost of 1683 and 1684 were both the severest. One lasted for 13 weeks.<sup>72</sup>

In *England*, there were fairs on the frozen River Thames in 1683-84.<sup>90</sup>

In *England* on 9 September 1683, it was very rainy and then to the 16<sup>th</sup>, warm and pleasant, that night a great frost. This was the coldest winter in *England*, the longest hoar frost known in the memory of any living.<sup>72</sup>

In 1684, the River Thames at London, *England* froze eleven inches (28 centimeters) thick and was traversed by loaded wagons.<sup>38, 60, 80</sup>

In 1648 [misprint for 1684], the Thames River in *England* was covered with ice over a foot thick. Booths were erected for a fair, which was held on the river. Coaches plied to and fro on the ice as on dry land. All the *French* ports were closed for three or four weeks, the harbors being frozen over.<sup>63</sup>

Severe winter in *England*. The River Thames froze for 2 months and there was a frost fair that began on 1 January.<sup>28</sup>

From December 1683 to February 1684, the forest trees, and even the oaks in *England* were split by the frost. Most of the hollies were killed. The River Thames covered with ice eleven inches thick. Nearly all the birds perished.<sup>90</sup>

“The people kept trades on the Thames as in a fair, till 4 February 1684. About forty coaches daily plied on the Thames as on drye land. Bought this book at a shop upon the ice in the middle of the Thames.”<sup>90</sup>

In *England*, there was a terrible frost of long continuance. “Many forest trees split. In the severe frost of 1683-84, not only oaks, but elms and ash of considerable bulk, and also walnut trees, were very much rent by the violence of the cold; oaks were most of all affected, and some split in such a manner as to be seen through, with a noise like the report of a gun. These clefts were not towards the same point of the compass.”<sup>47, 93</sup>

In *England*, on the 20th of December, 1688 [misprint for 1683], a very violent frost began, which lasted to the 6th of February, in so great extremity, that the pools were frozen 18 inches (46 centimeters) thick at least, and the Thames was so frozen that a great street from the Temple to Southwark was built with shops, and all manner of things sold. Hackney coaches plied there as in the streets. There were also bull baiting, and a great many shows and tricks to be seen. This day the frost broke up. In the morning I saw a coach and six horses driven from Whitehall almost to the bridge (London Bridge) yet by three o'clock that day, February the 6th, next to Southwark the ice was gone, so as boats did row to and fro, and the next day all the frost was gone. On Candlemas Day (2 February) I went to Croydon market, and led my horse over the ice to the Horseferry from Westminster to Lambeth; as I came back I led him from Lambeth upon the middle of the Thames to Whitefriars' stairs, and so led him up by them. And this day an ox was roasted whole, over against Whitehall. King Charles and the Queen ate part of it.<sup>8</sup>

A whole street of booths, contiguous to each other, was built from the Temple Stairs to the barge-house in Southwark, which were inhabited by traders of all sorts, which usually frequent fairs and markets, as those who deal in earthenwares, brass, copper, tin, and iron, toys and trifles; and besides these, printers, bakers, cooks, butchers, barbers, coffee-men, and others, who were so frequented by the innumerable concourse of all degrees and qualities, that, by their own confession, they never met elsewhere the same advantages, every one being willing to say they did lay out such and such money on the river of Thames.<sup>29</sup>

During the Great Frost of (1683–84) in *England*, the River Thames was completely frozen for two months; the ice was 11 inches (28 centimeters) thick at London. Solid ice was reported extending for miles off the coasts of the southern North Sea (*England*, *France* and the *Low Countries*), causing severe problems for shipping and preventing the use of many harbors.<sup>7</sup> According to some sources, ice formed for a time between Dover (*England*) & Calais (*France*), with the two sides joined together.<sup>9</sup>

[One of the ways that a river freezes occurs when great mass of broken chunks of ice flow downstream and then there is an extreme drop in temperature, which then freezes these icebergs together. I believe a similar process occurred in the English Channel.]

It is also credibly attested that vast solid cakes of ice, of some miles in circuit, breaking away from the eastern countries of Flanders [now *Belgium*] and Holland [now *the Netherlands*], &c. have been by the east and north-east winds driven upon the marine borders of Essex, Suffolk, and Norfolk, to their no small damage.<sup>29</sup>

The London Gazette reported that in Dover on February 1: "This Road being almost clear of Ice, one of our Pacquet-Boats put to Sea yesterday with the Mails for Calais, though we cannot think they will be able to land them on that side; for from Dover Cliffs we can discern the Coast of *France* to be very full of ice. The Men on board the Dutch Doggers, which we told you in our last were put in here, reported that on the coast of Holland [now *the Netherlands*], and particularly off Sceveling, the Sea was frozen eight Leagues (24 nautical miles) from shore, and that in 16 fathom (96 feet deep) Water they had met with ice strong enough to bear, and that some of them had been upon it."<sup>10</sup>

From a letter by Guillaume Fillastre, monk at Fécamp, *France*: "Some sailors from St. Valery en Caux, setting out to go fishing, were surrounded by ice nearly three leagues (9 nautical miles) out to sea, opposite the port of Veules, from which people could see them indicating by signs the danger they were in, but could not give them any help. In this extremity, they risked returning to land on foot, across the ice; which they achieved, happily, thanks to two planks which they placed one after the other as they advanced, to serve as a bridge over the icebergs, which were by no means neatly joined."<sup>10</sup>

From "The World of Wonders: A Record of Things Wonderful in Nature, Science, and Art ..." (London, 1869), A private letter of the date of February the 9th of that year (1684), mentions the appearance of a great deal of ice in the *Channel*, adding that it was reported that the ice between Dover and Calais was within about a league of joining.<sup>10</sup>

On February 9 there was sea ice in the *English Channel*. The ice between Dover and Calais were "joined together".<sup>28</sup>

The frost was also very severe in *Northern Europe*. Ice 27 inches (69 centimeters) thick in the harbor of Copenhagen.<sup>47, 93</sup>

The winter of 1684 was excessively cold in northern *France*.<sup>79</sup>

Since the water in tree sap acquires greater volume when it freezes, in extreme cold, trees burst apart with a loud noise. In Strasbourg, *France* more fruit trees burst when the cold reaches  $-16^{\circ}$  Reaumur ( $-20^{\circ}$  C,  $-4^{\circ}$  F). A great number of trees in *France* burst in the winter of 1683-84.<sup>58, 80</sup>

In 1684, the River Thames at London, *England* froze 11 inches thick. Loaded carts drive over it. The frost in February and March was so severe that one can almost cross all the rivers in Flanders [now *Belgium*] with carts.<sup>62</sup>

The winter of 1684 was so cold in the northern *France*, but it was mild and dry in the south.<sup>79</sup>

The winter of 1683-84 was severe in *Europe*. There was very severe cold in Paris, *France* from 11 to 17 January. During those seven days, the alcohol decreased in the bulb [alcohol thermometer] down to a point where it had not yet reached during other winters. The academics timed how long it would take wine to freeze in the open. It took 10-12 minutes time. There was an extraordinary amount of snow in the south [southern *France*]. The effects of the cold were very significant, especially in *England*. At London, the River Thames was during a large part of this time frozen so strong that huts and booths were erected on the ice and a market was held there for 14 days. From 9 January, they drove across the ice on the River Thames by carriages and wagons, and in all directions the same as on the mainland. A bullfight and a foxhunt were organized on the river, and White Hall roasted a whole ox on the ice. On the shores of *England*, *France*, Flanders [now *Belgium*] and Holland [now *the Netherlands*], the sea was frozen a few miles wide in such a way that for more than 14 days, boot packages could not enter the ports on or off. Most birds were killed; in the next summer we saw none. In the woods, many oak trees burst. The frost destroyed almost all the plants and the hopes of the peasants. Several people were victims of the

violent cold weather. As a result in the main streets of London large piles of wood were lit so that the inhabitants who were forced to flee their homes could warm up. In Holland [now *the Netherlands*] and *Belgium* in February and March, all the rivers were frozen over.<sup>62</sup>

[The dates of this entry appear to be a year off] On 5 or 6 February 1683 [1684] there was a very destructive flood throughout the whole Trent valley in *England*, and in many other parts, occasioned by the breaking up of a frost with much snow. The frost commenced early in September 1682 [1683] and continued without interruption till 5 February 1683 [1684]. The Trent Bridge at Nottingham, then composed of wood on stone piers, was almost completely destroyed by pieces of ice floated down the stream.<sup>212</sup>

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**1684 A.D.** In *England*, the spring was dry and cold and the summer was very hot and dry.<sup>47, 72</sup>

In *England*, the summer was intensely hot and dry, and preceded by a very cold severe winter, and droughty spring.<sup>72</sup>

In 1684, the price of wheat [in *England*] averaged 44 shillings per quarter [quarter ton].<sup>212</sup>

Jean-Dominique Cassini ranked the year 1684 among the warmest in an array spanning 82 years of great heat in Paris, *France*. Cassini developed a Fahrenheit thermometer, which he placed against the window of the tower northeast of the Observatory. He took his measurements between noon and three o'clock each day. The summer of 1684 produced sixty-eight days of a temperature of 77° F (25° C), sixteen days of a temperature of 87.8° F (31° C), and three days of a temperature of 95° F (35° C).<sup>79</sup>

The summer of 1684 was the first hot summer, over which we have thermometric data. In *England*, it was preceded by a very harsh winter and a wet spring. The summer was hot and dry. In *France*, the drought was exceptionally severe. In Dijon, *France*, the grape harvest began on 4 September. In Paris, *France* there were:

Hot days	68 days
Very hot days	16 days
Extremely hot days	3 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

These peaks occurred on 10 July and on 4 & 8 August.<sup>62</sup>

In 1684 during the period between 15 February and 14 March, floods struck Anhwei (now Anhui province) in eastern *China* at T'ung-ling and Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng. During the period between 14 May and 12 June, floods struck Kansu (now Gansu province) in northwest *China* at Ning [uncertain name]; Shantung province at Hsin and Kuang-jao; and Hopei (now Hebei province) in northern *China* at Kao-ch'êng.<sup>153</sup>

In 1684 beginning during the 1<sup>st</sup> moon, there began steady rainfall for five months in the vicinity of Shanghai, *China*. This rain damaged the wheat crop.<sup>166</sup>

In 1684, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 13 June and 8 October, a drought engulfed Szechwan (now Sichuan province) in southwest *China* at P'êng-shui and Pi-shan.

— During the period between 12 July and 10 August, a drought engulfed Szechwan province at P'êng-an and Lin-shui; Kiangsi (now Jiangxi province) in southern *China* at Hêng-fêng [uncertain name,

“Hsing-an”]; Hupeh (now Hubei province) in central *China* at Hanyang; Shansi (now Shanxi province) in northern *China* at An-i; Shensi (now Shaanxi province) in central *China* at Hsün-yang and Sui-tê; and Kansu (now Gansu province) in northwest *China* at T’ien-shui.

— During the period between 8 August and 8 November, a drought engulfed Hopei (now Hebei province) in northern *China* at Hsing-t’ai, Tsao-ch’iang, Huo-lu and Ching-ching; and Szechwan province at Fêng-tu, Sui-ning and Wu-shan. Wells dried up.

**Winter of 1684 / 1685 A.D.** The winter in *England* in 1684-85, was a little short of the previous winter either in severity or duration.<sup>72</sup>

In 1684 during the 12<sup>th</sup> moon [winter], It was excessively hot, like summer in the vicinity of Shanghai, *China*. At night, there were heavy peals of thunder, with torrents of rain.<sup>166</sup>

**1685 A.D.** In 1685, the price of wheat [in *England*] averaged 46 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1685, there was a flood in the historical county of Cumberland in northwest *England*. “Ye overflowing of Kirganton Waters in ye County Cumberland.”<sup>212</sup>

In 1685, there was an epidemic of smallpox in London, *England*, where 1/9<sup>th</sup> of the population died.<sup>212</sup>

On 23 October 1685, lightning struck 2 ships, the *Royal-James* and the *Cornation* in the harbor at Portsmouth, *England*.<sup>234</sup>

In 1685 during the period between 5 February and 6 May, a drought engulfed Shensi (now Shaanxi province) in central *China* at An-ting [uncertain name]. During the period between 5 February and 8 August, a drought severe enough to cause wells and springs to dry up, engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Shui-an and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch’ü-chiang and Yüeh-ch’ang.<sup>153</sup>

In 1685, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 3 February and 4 March, floods struck Shantung (now Shandong province) on the east coast of *China* at Tung-p’ing; and Hopei (now Hebei province) in northern *China* at Jao-yang, Lin-ch’êng, Ch’ien-an, Hsien, Ho-chien and Yüeh-t’ing.

— During the period between 6 May and 8 August, floods struck Shantung province at Kao-wan; Hopei province at An-p’ing and Wu-ch’iang; and Hupeh (now Hubei province) in central *China* at Wuchang, Huang-kang, Ch’i-shui, Ma-ch’êng, Huang-p’o, Huang-mei, Kuang-chi, Lo-t’ien, Mien-yang, Chien-li, T’ung-ch’êng, Chiang-ling, Chung-hsiang, Hsiao-kan, P’u-ch’i and Kung-an [“Kung” uncertain name, the “-an” may have been omitted by mistake].

**Winter of 1685 / 1686 A.D.** The winter in *England* in 1685-86, was a mild and warm winter with no cold weather or storms.<sup>72</sup>

**1686 A.D.** In *Italy*, during the years 1686-89 there was a great drought.<sup>47, 72</sup>

The summer of 1686 was very hot in Paris, *France*. There was:

Hot days	46 days
Very hot days	8 days
Extremely hot days	5 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperatures occurred on 19-23 June. In Dijon, *France*, the grape harvest began on 4 September.<sup>62</sup>

On 25 May, there fell at Lille, a storm of prodigious hail, some stones above a pound weight. People broke one that had brown matter in it and threw it in the fire. It produced an explosion. The storm broke down trees and most glass windows and killed partridges and hares.<sup>72</sup>

On 25 May 1686 the city of Lille in Flanders [now in *Belgium*], was visited by a tremendous hailstorm. The hailstones weighed from a quarter pound to a full pound, and even more. One among the rest, was observed to contain in its center a dark brown matter, and being thrown into the fire, gave a very loud report [like a gunshot]. This storm passed over the city and citadel, leaving not a whole pane of glass in the windows on the windward side unbroken. The trees were broken, and some beaten down, and partridges and hares killed in abundance.<sup>191</sup>

There was a severe hailstorm in Lille, Flanders [now in *Belgium*] in 1686. Some of the hailstones were not only vastly large, but appeared dusky in the center. Those that came down chimneys into fires, when the icy part was melted, and this brown substance was exposed to the fire, burst with a loud report [like a gunshot].<sup>192</sup>

In 1686, the price of wheat [in *England*] averaged 34 shillings per quarter [quarter ton].<sup>212</sup>

In June 1686, a flood came down from the mountains and nearly destroyed the towns of Kettlewell and Starbottom in Yorkshire, *England*.<sup>212</sup>

In 1686, there was an inundation in Yorkshire, *England*, when a rock opened, and poured out water to the height of a church steeple.<sup>90, 92, 212</sup>

In June 1686, the inhabitants of Kettlewell and Starbottom in Craven, in the County of York, *England*, suffered a great loss by a sudden overflow of water. The towns are situated under a great hill on the east and west. The country is very mountainous and rocky. The descent of the rain after a thunderclap continued for 1½ hours with extraordinary violence. The rocks on the east side opened visibly, and the water they beheld thence into the air the height of an ordinary church steeple, so that the current of water came down the hill into the respective towns, as in one entire body, and with a breast [to rise over] as if it would have drowned the whole towns. Several houses were quite demolished, and not a stone left. Others graveled to the chamber windows. Some inhabitants were [permanently] driven from their houses. Currents of water ran through the houses. Mighty rocks descended from the mountains into the valley, and there they lay unmovable. Many fair meadows were covered with sand and stone. Household goods taken away into the great River Wharfe, and so lost, besides many quick goods [consumer goods]. Many families were quite ruined.<sup>234</sup>

In July 1688 [June 1686], the villages of Kettlewell [Kettlewell] and Starbottom [Starbottom] in Yorkshire, *England* were utterly destroyed. During a violent thunderstorm, an immense chasm opened in an adjacent mountain, and the mass of water that gushed from it contributed, as much as the rain, to the destruction of these towns.<sup>205</sup>

In 1686, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 21 June and 16 October, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Kung-ch'êng.

— During the period between 20 July and 18 August, a drought engulfed Shansi (now Shanxi province) in northern *China* at Ch'in and Hopei (now Hebei province) in northern *China* at Kao-ch'êng, Jao-yang and Chin [possibly a misprint, P'u-chou].



— During the period between 19 August and 17 September, a drought engulfed Hupeh (now Hubei province) in central *China* at Hsiao-kan, Huang-an and Ma-ch'êng.

In 1686 during the period between 20 July and 18 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-shan and Shantung (now Shandong province) on the east coast of *China* at Kuang-jao, Shou-kuang, Ch'ang-yüeh and P'êng-lai. During the period between 19 August and 17 September, floods struck Chekiang province at Taichow and Hopei (now Hebei province) in northern *China* at Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]<sup>153</sup>

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**1687 A.D.** “By excessive rains, and a violent storm, there happened a great inundation in Dublin in east-central *Ireland*, which put the lower part of the city under water, up to the first floor; so that boats plied in the streets. At which time Essex-bridge was broken down, when a coach and horses passing over it, fell into the river, where the coachman and one horse perished.”<sup>39</sup>

In 1687, there was a great estuary flood in the River Severn in *Great Britain*.<sup>150</sup>

On 3 March 1687, there was a thunderstorm at Cloyne, *Ireland*. The next morning the barometer read 28.4 inches, the lowest that had been before seen there.<sup>212</sup>

In *Ireland*, there were excessive rains; great flood in Dublin.<sup>47, 92</sup>

In *England*, the year was very rainy and the earth produced plenty of watery crude fruits. In summer the rivers were terribly flooded. Brooks overflowed their banks. Extraordinary tempest of rains demolished houses and buildings. Torrents carried along with them and drowned multitudes of people. At the time of ripe fruits were great swarms of gnats and insects.<sup>72</sup>

[In *England*], the year produced frequent tempest and hurricanes.<sup>72</sup>

In 1687, the price of wheat [in *England*] averaged 25 shillings per quarter [quarter ton].<sup>212</sup>

All summer rainy in *Germany*.<sup>72</sup>

In *Italy*, during the years 1686-89 there was a great drought.<sup>47, 72</sup>

The summer of 1687 in Paris, *France* was characterized by:

Hot days	34 days
Very hot days	6 days
Extremely hot days	3 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperatures occurred on 29 June, 10 July and 16 August. In Dijon, *France*, the grape harvest began on 29 September.<sup>62</sup>

In 1687 in *England*, the season was very dry and extremely hot and on 15 August, there was a waterspout seen at Hatfield in Yorkshire.<sup>212</sup>

On 15 August 1687 at Hatfield, Yorkshire, *England*, there was a land-spout [tornado], like those at sea [waterspout].<sup>72</sup>

[There was an inundation not caused by weather, but rather a tsunami triggered by a massive earthquake. On 10 October at 4 o'clock on Monday morning, there was a terrible shock of an earthquake, with a

horrible roaring of the Sea at Lima in central *Peru*. Many houses fell and killed several people. At 5 o'clock a second shock and at 6 o'clock the greatest of all. The Sea bellowed, swelled and overflowed. This city was wholly overthrown. Several seaports were flooded. By the inundation, which carried off several ships nine miles into the land, much people and cattle drowned. At one place near the seaside were found 5,000 dead bodies and more were daily cast up so that at last the number of the dead was not known.<sup>72]</sup>

In *England*, the frost lasted from the 8<sup>th</sup> of December to the 30<sup>th</sup> of January with some remissions.<sup>47, 72, 93</sup>

In 1687, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 6 May and 8 November, a severe drought engulfed Yin-yang [uncertain name].

— During the period between 10 May and 9 June, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Yüeh-ch'ang.

— During the period between 10 June and 5 October, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chien-tê. The drought damaged crops.

— During the period between 8 August and 6 September, a drought engulfed Yunnan province in southwest *China* at Hao-ch'ing and Kwangtung province at K'ai-chien and Hai-fêng.

In 1687, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Kao-ming and Lien. During the period between 8 August and 8 November, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chiang and Shantung (now Shandong province) on the east coast of *China* at Kao-wan.<sup>153</sup>

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**1688 A.D.** In *Italy*, during the years 1686-89 there was a great drought.<sup>47, 72</sup>

The summer of 1688 in Paris, *France* was characterized by:

Hot days	40 days
Very hot days	12 days
Extremely hot days	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperature occurred on 9 September. In Dijon, *France*, the grape harvest began on 27 September.<sup>62</sup>

In 1688, there was an epidemic fever in Dublin, *Ireland* that lasted from July to the middle of August and in London, *England* that lasted from May to June.<sup>212</sup>

In *Germany*, spring and summer was most inconstant.<sup>72</sup>

In 1688, John Clayton wrote to the Royal Society and described his stay in Virginia in the *United States*. He related the following accounts of thunder and lightning storms in Virginia. Dr. A. was smoking a pipe of tobacco and looking out the window when he was struck dead [by lightning], and immediately became so stiff that he did not fall, but stood leaning in the window, with the pipe in his mouth in the same posture he was in when he was struck. Lightning generally breaks in at the gable end of the houses, and often kills persons in, or near the chimney's range, darting most fiercely down the funnel of the chimney, more especially if there be a fire. Thunder split a mast of a boat at James Town [Jamestown]. It is dangerous when it thunders standing in a narrow passage, or between two windows. Several people have been killed in the open fields. It is incredible to tell how it will strike large oaks, shatter and shiver them, sometimes twisting round a tree, sometimes as if it struck the tree backwards and forwards. I had noted a fine spreading oak in James Town Island, in the morning I saw it fair and flourishing, in the evening I

observed all the bark of the body of the tree, as if it had been artificially peeled off, was orderly spread round the tree, in a ring, whole semi diameter was four yards, the tree in the center; all the body of the tree was shaken and split, but its boughs [branches] had all their bark on; few leaves were fallen, and those on the boughs as fresh as in the morning, but gradually afterwards withered, as on a tree that is fallen. I have seen several vast oaks and other timber trees twisted, as if it had been a small willow that a man had twisted with his hand, which I could suppose had been done by nothing but the thunder. I have been told by very serious planters, that 30 or 40 years since [1650-1660 A.D.], when the country was not so open, the thunder was more fierce, and that sometimes after violent thunder and rain, the roads would seem to have perfect casts of brimstone; and frequently after much thunder and lightning for the air to have a perfect sulphurous smell.<sup>229</sup> [Lightning struck one of my large trees selectively peeling off the bark as it traveled down the length of the tree. When it was done, the tree had the appearance of a large candy cane.]

In 1688, the price of wheat [in *England*] averaged 46 shillings per quarter [quarter ton].<sup>212</sup>

In 1688, there was a plague of cockchafer [also called May bug, mitchamador, billy witch, or spang beetle] in County Gallway [Galway] in *Ireland*. They covered the trees and clung to each other like a swarm of bees. Towards evening when they flew, they made a strange humming sound and darkened the air for 2 or 3 miles [3.2-4.8 kilometers] square. They ate up all the leaves off the trees for miles round making them as bare as in winter. Their grubs destroyed all the roots of the grass.<sup>212</sup>

In Noremberg [Nuremberg in Bavaria in southern *Germany*], there was a rainy cold harvest.<sup>72</sup>

In 1688, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Hsiu-shui [uncertain name, "Ning"]. During the period between 6 May and 8 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Shui-an. Then during the period between 29 May and 27 June, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ên-hai; Shansi (now Shanxi province) in northern *China* at Chin-ch'êng; and Shensi (now Shaanxi province) in central *China* at Chên-pa.<sup>153</sup>

In 1688 during the 7<sup>th</sup> moon on the 10<sup>th</sup> day in the vicinity of Shanghai, *China*, there was a storm [typhoon] of great wind, rain, thunder, and lightning. The next day the storm was still worse, it extended over a thousand *li* [around 370 miles]; destruction of life and property in every direction.<sup>166</sup>

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**Winter of 1688 / 1689 A.D.** The winter in *England* was severe. The River Thames was frozen until 6 February 1689. There was a frost fair on the river.<sup>28</sup>

In the winter of 1688, in January, there was very severe frost in *England*. The River Thames was frozen.<sup>212</sup>

In *England*, there were fairs on the frozen River Thames in 1688-89.<sup>90</sup>

The winter in 1688 in *Germany* was very severe.<sup>62</sup>

The winter in 1688 was severely cold in *Germany* with great snow, followed by a sudden thaw and heat.<sup>72</sup>

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**1689 A.D.** In *Italy*, during the years 1686-89 there was a great drought.<sup>47, 72</sup>

At Modena and all over *Italy*, for three or four years previous, there had been an uncommon drought. During the drought there were plenty of provisions. But in 1689 about the vernal Equinox [around March 20/21], there fell great rains, which returned quickly after, rendering the whole spring frightful and good

for nothing. The summer following was most rainy. About the Solstice and much more after all sorts of corn [grain] was wholly blasted and mildewed. But there were still hopes from the remains of the old store. At the beginning of September, and much more about the Equinox [around September 22/23], greater rains fell, which continued the whole month of October; so that it was with much labor and difficulty that the rivers were prevented from breaking down their banks, and drowning the country. The last two months concluded the year pleasantly.<sup>72</sup>

The summer of 1689 in Paris, *France* was characterized by:

Hot days	27 days
Very hot days	7 days
Extremely hot days	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperature occurred on 10 August. In Dijon, *France*, the grape harvest began on 27 September. “You sing the vintage of Burgundy 27 September. You reap little wine, but it was excellent.”<sup>62</sup>

In 1689, LaHire in *France* began taking observations using precipitation gauges. The year 1689 ranked as the driest year for next thirty years.<sup>79</sup>

In 1689, the price of wheat [in *England*] averaged 30 shillings per quarter [quarter ton].<sup>212</sup>

In 1689, there was a famine at Londonderry in Northern *Ireland*. “The inhabitants glad to eat rats, tallow and hides.”<sup>212</sup>

Beginning on 4 October 1689, there was rainfall at Bungay in Suffolk, *England* that lasted till noon on 10 October. The rain was continuous except for a few hours on the 6<sup>th</sup>. This caused a great flood that overflowed the lower part of Norwich and broke down the bridges at Bungay.<sup>212</sup>

In 1689, a hurricane struck *Jamaica*. The hurricane was not very severe.<sup>124</sup>

In 1689, an Atlantic hurricane struck Nevis. A dreadful mortality swept away one-half of the inhabitants of Nevis in the *West Indies*.<sup>141</sup>

In 1689, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 6 May and 8 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hsüan-p’ing. Wells and springs dried up.

— During the period between 17 June and 11 November, a drought engulfed Hupeh (now Hubei province) in central *China* at Lo-t’ien, Shih-shou and Chih-chiang.

— During the period between 17 July and 14 August, a drought engulfed Chahar province (now eastern *Inner Mongolia*) at Wan-ch’üan; Honan (now Henan province) in central *China* at Hsin-an [uncertain name]; and Hopei (now Hebei province) in northern *China* at Ching, Pao-ting, Hsien, Tung-Kuang, Chin [uncertain name, “P’u-chou”], Ch’ü-yang, Wu-ch’iang and Sha-ho.

— During the period between 8 August and 8 November, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at K’ai-chien and Hupeh province at Ying-ch’êng. Rivers dried up.

In 1689 during the period between 6 May and 8 August, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ho-yüan and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Mêng-shan and P’ing-yüeh.<sup>153</sup>

**1690 A.D.** An awful snowstorm pounded *Scotland*. The storm lasted thirteen days and nights. During that time nine-tenths of the sheep were frozen to death, and many shepherds lost their lives.<sup>30</sup>

In 1690 in *Ireland*, there was famine and disease.<sup>57, 91</sup>

In London, *England* on 11 January 1690: “This night there was a most extraordinary storme of wind, accompanied with snow and sharp weather; it did greate harme in many places, blowing down houses, trees, &c. killing many people. It began about 2 in the morning, and lasted till 5, being a kind of hurricane, which mariners observe have begun of late yeares to come Northward. This winter hath ben hitherto extremely wet, warm, and windy.”<sup>29</sup>

In France there was a flood. In March 1690, the Seine River in Paris, *France*, at the bridge “Pont de la Tournelle” reached a height of 7.5 meters (24.6 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

The summer of 1690 in Paris, *France* was characterized by:

Hot days	34 days
Very hot days	2 days
Extremely hot days	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperature occurred on 31 July. In *Dijon, France*, the grape harvest began on 4 September. The summer in the area of Burgundy was very stormy. It produced a lot of wine of medium quality.<sup>62</sup>

In 1690 in *Italy*, there was a famine from rains.<sup>57, 72, 91</sup>

In the beginning of 1690, the rains in *Italy* returned much severer than before, and were almost continual. The winter had been rainy and cloudy with some little cold and snow, which melted as it fell. The beginning of March was uncommonly dry and calm. But at the Equinox [around March 20/21], the heavens seemed to open their bosom and pour out their whole great reservoir of water. By one night’s rain, all the country about Modena, Finlan, Ferraria, Mirandola, etc. were laid under water, deluged like a Sea. These cities standing up like little islands. This rainy weather continued the whole spring and summer, scarce one fair day. The wind was mostly from the north and cold. The mercury all the while stood higher in the barometer than ordinary in such a season. Frogs croaked over all the country. Fish was never more plentiful or freely eaten, from the scarcity of corn [grain]. In the beginning of June, mildew appeared on the corn again, and increased to its total destruction both on low and high grounds. Of all the products of the earth, nuts alone escaped this plague. They were uncommonly good and plentiful. At the latter end of July, the rains stopped and we had two months very dry but cold weather. Near the end of September, the rains returned again, but were moderate and useful. The last two months of the year were dry but moderately cold.<sup>72</sup> [Modena, Finlan, Ferraria, Mirandola are all in the Emélia–Rumâgna administrative region of northern Italy. Ferraria is now Ferrara.]

In 1690, the price of wheat [in *England*] averaged 34 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1690 during the period between 9 May and 6 June, a drought engulfed the entire province of Hupeh (now Hubei province) in central *China*. During the period between 6 May and 8 November, a drought engulfed Hupeh province at Chu-ch’i. During the period between 6 July and 4 August, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Yüeh-p’ing [uncertain name]. Then during the period between 3 September and 1 October floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Yü-yao, Chu-chi and Shang-yü. At Chu-chi and Shang-yü, crops were damaged by

the floodwaters. During the same time, floods struck Hopei (now Hebei province) in northern *China* at Chi and Pao-ti. [Chi is located at longitude 117.24° East and latitude 40.03° North.]<sup>153</sup>

In 1690, in the vicinity of Shanghai, *China*, there was a famine from drought.<sup>166</sup>

In 1690 during the 9<sup>th</sup> moon, there was rain without clouds in the vicinity of Shanghai, *China*. There was no harvest that season.<sup>166</sup>

**1691 A.D.** In *Italy*, it was hot and dry.<sup>47</sup>

The summer of 1691 in *Italy* was too hot and no rain. The summer in Paris, *France* was characterized by:

Hot days	44 days
Very hot days	12 days
Extremely hot days	5 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperatures occurred on 8, 9, 22, 23, and 28 August. In Dijon, *France*, the grape harvest began on 17 September; 10 days earlier than the average from the years 1689-1800. There was little wine but it was of good quality. There was excessive heat and severe drought in *Jamaica*.<sup>62</sup>

[In *England*] on 26 July, there was a terrible storm of thunder and lightning.<sup>72</sup>

On 27 July 1691, there was a violent thunderstorm at Daventry in Northamptonshire, *England*.<sup>212</sup>

On 27 July 1691, a violent storm of thunder, lightning and rain struck in Everdon Field, near Daventry in Northamptonshire, *England*. Several people were at work reaping the corn [grain] in the fields when the storm appeared. The reapers, 20 in all, retreated for shelter to a quickset hedge [plant cuttings set in the ground to grow especially in a hedgerow] with a ditch by the side of it. Lightning killed 4 outright, 8 others were dangerously hurt. Of the rest, several were struck down, but recovered. One of those dangerously injured was a pregnant woman named Mary Bird. She had over her body nearly a hundred wounds, some as large as a man's hand, on each arm one, and one on each side of her belly. Out of most of her wounds came cores, some bigger, some less. The biggest were bigger than a walnut, dry and black like leather. She had two sores on the soles of her feet, but her shoes and stockings were not touched. She sat next to those that were killed. She was sensible of the stroke, and sensible that her husband looked pale, and then swooned away. She and her husband were both blooded [had blood drained], she within an hour after and her husband eight hours after, and they bled freely. Their legs were mightily swelled before they were carried out of the field. The woman was very sore and full of pain, so that she could hardly bear any clothes to touch her. She was three weeks ill before she could rise [to her feet]. She continued ill for about a quarter of a year. No medicine used for burns did any good, but occasioned some great torment to her. The first [medicine] that they perceived to do good to her was oil of St. John's Wort, and after the cores were coming out, the black salve [drawing salve]. She went to full term and the child she bore had no marks or blemishes [and lived a healthy life].<sup>234</sup>

In 1691, the price of wheat [in *England*] averaged 34 shillings per quarter [quarter ton].<sup>212</sup>

In 1691 [in *the Netherlands*], there was a frosty dry winter; an excessive hot summer without rain. Winds were mostly east, northeast or north. The only stagnant water to be had were in the marshy countries, which was greedily drunk by thirsty parched laborers.<sup>72</sup>



In 1691 in *Italy*, the year was as hot and dry as the previous two years were wet and rainy. The year began with a north wind and great frost. Roads were as dusty as in August. The summer was intensely hot.<sup>72</sup>

In 1691, floods struck Szechwan (now Sichuan province) in southwest *China* at Hsü-yung. Over 3,300 acres of land was damaged by the floodwaters.<sup>153</sup>

In 1691 during the 7<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a storm and flood that damaged the crops.<sup>166</sup>

In 1691, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 29 January and 27 May, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Yang-ch'un.

— During the period between 5 February and 6 May, a drought engulfed Kwangtung province at Hua, K'ai-p'ing and Chieh-yang.

— During the period between 28 May and 25 June, a drought engulfed Shansi (now Shanxi province) in northern *China* at Chieh-hsiu.

— During the period between 25 July and 23 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Hsing-t'ai and Chahar province (now eastern *Inner Mongolia*) at Huai-an.

**Winter of 1691 / 1692 A.D.** The winter was awfully severe in *Russia* and *Germany*, and many people froze to death, and many cattle perished in their stalls.<sup>1</sup>

Wolves came into Vienna, *Austria* and attacked men and women, owing to the intense cold and hunger.<sup>30</sup>

In 1691, the wolves, driven by the cold, entered Vienna, *Austria*, and attacked cattle and men.<sup>90</sup>

In 1691 in *Europe*, the severity of the weather drove the wolves into the cities, Vienna, etc.<sup>47, 93</sup>

In 1691, the cold was so severe in *Eastern Europe* that packs of starving wolves entered Vienna, *Austria* and attacked men and women in the streets. All the canals of Venice, *Italy* were frozen, and the principal mouth of the Nile River in *Egypt* was blocked with frozen ice for a week.<sup>63</sup>

In 1691 during the 12<sup>th</sup> moon, there was snow for four or five days in the vicinity of Shanghai, *China*. Men, horses, and animals froze to death. For half a month it was so cold that no one went abroad.<sup>166</sup>

**1692 A.D.** In Noremberg [Nuremberg in Bavaria in southern *Germany*], the winter was very wet and cold. The harvest was very cloudy, rainy and cold.<sup>72</sup>

[In *Italy*] in 1692, the winter was exceedingly regular and agreeable to the climate. Spring, summer and harvest the same. So was winter again neither too wet nor too dry; too hot nor too cold.<sup>72</sup>

In the spring of 1692, a deluge, called the Great Flood, occurred at Delaware Falls (Trenton, New Jersey) in the *United States*. The first settlers of the Yorkshire tenth in West Jersey had built on the lowlands near the Falls and had been making improvements there nearly sixteen years. This flood, caused by the melting of the snow above, almost entirely demolished their settlement. The water rose to the upper stories of some of the houses, and many people were conveyed from their homes by canoes. Two persons, in a house were swept away by the torrent and were lost. Many cattle were drowned. The inhabitants, taught by experience the evils, of which the natives had forewarned them, fixed their habitations on higher grounds.<sup>174</sup>

This year in *Jamaica*, the weather was very dry and hot in March, which was normally a very boisterous rainy month. From then until 7 June, it was excessively hot, calm and dry.<sup>72</sup>

On 7 June 1692, an earthquake struck *Jamaica*. Within 2 minutes, most of the town of Port Royal was destroyed. The earth opened up and swallowed an abundance of houses and people. The water gushed out of the openings of the earth and people tumbled into it in heaps. Some people had the good fortune of catching hold of beams and rafters of houses, and these individuals were later saved by boats. Several ships were cast away in the harbor. The frigate *Swan* was carried away over the tops of sinking houses. Luckily the ship did not capsize and several hundred people retreated to this boat and were saved. Major Kelley, who was in the town at the time said that the earth opened and shut very quickly. He saw some people sink down to the middle and others sunk so low that just their heads were above ground and they were squeezed to death. The sky, which was clear before the earthquake, became in a minutes time as red and as hot as an oven. The fall of the mountains made a terrible crack, and at the same time dreadful noises were heard under the earth. The principal streets, which lay next to the key, with large warehouses and stately brick building all sunk. But part of the town near the neck of the land, which ran into the sea, was left standing. At the end of this strip of land stood the castle, which was shattered but not demolished. Then the town was struck by a large tsunami. It drove most of the ships from their anchor. Then the sea immediately went out two or three hundred yards. It left the fish dry on the land. But the sea returned two minutes later and overflowed part of the shore. After the first great shock, as many people as were able got onboard the ships left in the harbor. They dared not venture back on shore for some weeks. The aftershocks still continued. It is estimated that 1,500 people died in the earthquake. And as many more by sickness from the noxious vapors that came out of the openings in the earth. The earthquake struck the entire island of *Jamaica*. Two mountains, which lay between St. Jago and Sixteen-Mile-Walk joined together and stopped the current of the river, so that it overflowed several woods and savannahs. On the north side of the island, over a thousand acres were sunk with houses and people inside them and a huge lake formed. This lake latter dried up, but there were no sign of the houses. At Yellows, a great mountain split and destroyed several plantations with people. One plantation was removed a mile from where it formerly lay. Houses were destroyed or damaged all over the island. It was estimated that 3,000 people were killed with those that were lost in Port Royal.<sup>227, 234</sup>

In 1692, a severe hurricane struck *Jamaica* causing more than 100 deaths.<sup>141</sup>

In *England*, the summer was very rainy.<sup>72</sup>

In July of 1692, there were big floods in the north. In Burgundy, *France*, the grape harvest did not begin until 9 October. It produced little wine and a great part of it was sour. The year was barren.<sup>62</sup>

There were rains and floods in the years 1692 in northern *France*.<sup>79</sup>

In 1692, the summer in *England* was cold and there was a great deluge of rain until reaping [harvest] time.<sup>212</sup>

In 1692, the price of wheat [in *England*] averaged 44 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1692, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 18 March and 15 April, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsou-p'ing and Hopei (now Hebei province) in northern *China* at Hsin-ch'êng [uncertain name] and An-hsin [uncertain name, "Hsin-an"].

— During the period between 12 August and 10 September, floods struck Szechwan (now Sichuan province) in southwest *China* at Yüeh-shan, Mei-shan, Mien-yang, Kuan and Hsin-ching. Houses and crops were damaged by the floodwaters.

— During the period between 10 October and 7 November, river water suddenly shot up into the air.

In 1692 during the period between 16 April and 15 May, a drought engulfed Shensi (now Shaanxi province) in central *China* at Lin-t'ung. During the period between 6 May and 8 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Hsiao-kan. During the period between 10 October and 7 November, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Ch'ing-p'u [uncertain name].<sup>153</sup>

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**Winter of 1692 / 1693 A.D.** In 1692 in *Germany*, the winter was extremely warm.<sup>62</sup>

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**1693 A.D.** The year 1693 was all unseasonable in *Italy*. The whole winter [1692/1693] with rain, cold, frost or snow. The spring cold and almost constant rain, and north wind. The summer rainy and all corn mildewed. Harvest was intolerably hot and dry. The winter [1693/1694] was also very warm and dry.<sup>72</sup>

In *Italy*, the winter 1693 was cold and much snow (which is rare in *Italy*). The spring was cloudy and wet. The summer was temperate and showery.<sup>72</sup>

On 20 March 1693 at Oundle in Northamptonshire, East Midlands, *England*, there was a stormy day and a terrible tempest at night. There was great rain, winds from the southwest, and thunder with blue lightning, hail and rain most terrible.<sup>72</sup>

On 20 March 1693, there was a considerable thunderstorm at Oundle in Northamptonshire, *England*. The storm produced hail and [the lightning] set fire to the steeple of Oundle.<sup>212</sup>

In 1693, the price of wheat [in *England*] averaged 67 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In *Italy*, there was excessive scorching heat and great drought in 1693.<sup>72</sup>

In *Italy*, it was hot and dry.<sup>47, 72</sup>

In *Sicily*, after the sun entered Virgo, the heat was great and at noon intolerable. On 1 August there was the most tempestuous day of hail, rain, and thunder. After that the earthquake struck. Another quake on the 11<sup>th</sup> desolated *Sicily*. Of the 254,936 inhabitants; 59,963 were swallowed up or killed. *Sicily*, late the most fruitful, rich and beautiful island in the world was left in rubbish and desolation.<sup>72</sup>

The summer of 1693 in *Italy* had excessive heat at the time of harvest. In *England*, the heat was intense in September; and at noon it was unbearable. The summer in Paris, *France* was characterized by:

Hot days	33 days
Very hot days	9 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The spring in Burgundy, *France*, was very cold and the grape harvest began on 27 September. It produced little wine, but the quality was good.<sup>62</sup>

In 1693 in *France*, there was an awful famine.<sup>57, 90, 91</sup>

[In *Germany*] during the beginning of the year it was very rainy; the latter part cold and frosty. The spring and summer were excessively hot.<sup>72</sup>

In *Britain* and *Ireland*, October produced moderately warm weather, but there was some snow falling in the mountains and in the country. It turned suddenly extremely cold and was quickly followed by a hard frost for some few days at least.<sup>72</sup>

On 20 October 1693, there was a plague of locust at Marthery in Pembrokeshire, *Wales*. A swarm of locust was seen in the air near Dôl-gelheu [Dolgellau] in Merionethshire [Merionethshire], *Wales*.<sup>212</sup>

In 1693, there was an epidemic of the cold in London, *England*, which was very severe in October lasting 4 or 5 weeks. It also occurred in Dublin, *Ireland* in November where it was very severe for 4 or 5 weeks. It was also present in *France*, Holland [now *the Netherlands*] and Flanders [now *Belgium*].<sup>212</sup>

On 19 October 1693 in Virginia in the *United States* there was a most violent storm, which stopped the course of ancient channels, and opened new ones, which never existed before.<sup>72</sup>

In 1693, a dreadful storm was experienced in Virginia and the neighboring region in the *United States*.<sup>174</sup>

In 1693, there was such a dreadful storm in Virginia in the *United States*, that some rivers were stopped up and channels opened for others that were so large as to allow them to be navigated.<sup>208</sup>

In 1693 and 1694, there were several occurrences of will-o'-the-wisp reported in *Wales*. About Christmas 1693 at Harlech in Merionethshire [Merionethshire], sixteen ricks of hay and two barns which were filled with corn [grain] and other hay were set on fire by the "kindled exhalation", which were often seen to come from the sea and lasted at least a fortnight or three weeks. It annoyed the country, as well by poisoning the grass, as firing the hay, for the space of a mile or thereabouts. Those that saw the fire, say it was a blue weak flame, easily extinguished, and that it did not the least harm to any of the men, who attempted to save their hay, though they ventured close to or sometimes into the flame. All the damage sustained occurred constantly during the night. There were three small tenements in the same neighborhood (called Tydthin Sion Wyn [Tyddyn Sion Wyn]) whereof the grass was so infected, that it absolutely killed all manner of cattle that feed upon it. The grass was so infected these three years but not thoroughly fatal till this last [year]. As of August 1694, the strange fires continued there. It was observed to come from a place called Morva Bychan [Morfa Bychan] in Caernarvonshire [Caernarfonshire], about eight or nine miles off (over part of the sea). Cattle of all sorts, as well as sheep, goats, hogs, cows, and horses still continue to die. The place where it comes is both sandy and marshy.<sup>234</sup>

In 1693, there was a dearth [scarcity] of all sorts of corn [grain] in *England*. Many poor people in Essex resorted to making bread from turnips.<sup>234</sup>

In 1693, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 5 February and 8 August, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Chia-hsing and Hai-yen. The drought damaged the crops.

— During the period between 3 July and 1 August, a drought engulfed Chekiang province at T'ung-hsiang.

— During the period 2-30 August, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chiang, K'un-shan, Chia-ting, Ch'ing-p'u [uncertain name] and Tan-yang. Rivers dried up.

In 1693 during the period 2-30 August, floods struck Shansi (now Shanxi province) in northern *China* at Yang-kao; Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu; Hopei (now Hebei province) in northern *China* at Pao-ting, Peiping and Ho-chien; and along the Wu-ting River in Shensi (now Shaanxi province) in central *China*.<sup>153</sup>

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**Winter of 1693 / 1694 A.D.** In 1693, in *Germany* and *Italy*, the frost was severe in November and December.<sup>47, 72, 93</sup>

In 1693 in *Europe*, there was great snowfalls and frost.<sup>72</sup>

In *Italy*, the winter was characterized by the most severe and scarcely to be paralleled cold frost and snow.<sup>72</sup>

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**1694 A.D.** In *Italy*, it was hot and dry.<sup>47, 72</sup>

In *Italy*, there was burning hot droughty summer in 1694, in which five months passed without one shower of rain. Then came rain in October 1694 and the weather did not become fair again before April 1695.<sup>72</sup>

In 1689, LaHire in *France* began taking observations using precipitation gauges. The rainfall in Paris in 1694 was 12.5 inches (318 millimeters). The year 1694 ranked just after 1689 as the driest year for thirty years.<sup>79</sup>

On 20 June 1694, there was a hailstorm in Lohja and Siuntio, *Finland* (about 60° 10' N, 24° 10' E). Window glasses were shattered. Window glass was thick in those days, so the hailstones could not have been small. The hailstones destroyed the crop entirely on 3 farms, 2/3 of the crop on another farm, 1/2 of the crop on 2 other farms and 1/3 of the crop on another farm.<sup>151</sup>

In 1694, the price of wheat [in *England*] averaged 64 shillings per quarter [quarter ton].<sup>212</sup>

On 1 August 1694, a tornado struck Warrington in Northamptonshire, *England*. It carried 80 or 100 shocks of corn into the air out of sight, to a distance of one, four and five miles.<sup>212</sup>

In 1694 at Topsham and Exeter, *England*, in Acremont Close, there was a waterspout. It lasted for 30 minutes and 3 or 4 wagonloads of corn [grain] were in the air at one time.<sup>212</sup>

On 7 August 1694 at Exeter, *England*, there was a land-spout [tornado], like those at sea [waterspout].<sup>72</sup>

On 27 September 1694, a hurricane struck offshore Barbados in the *Lesser Antilles* causing more than 1,000 deaths.<sup>141</sup>

Three weeks before 4 November 1694, a hurricane struck Barbados in the *Lesser Antilles* putting most of the ships in the road ashore.<sup>143</sup>

The severe sandstorm struck *Scotland* on 2 November 1694. The village Culbin was covered over and lost for 230 years.<sup>28</sup> [Culbin is now Culbin Sands on the River Findhorn, on the southern bank of the Moray Firth in northern *Scotland*.]

From 1694-1699 in *Scotland*, there was a famine. In *England*, there was a great dearth from rains, colds, frosts, snows; all bad weather.<sup>57, 72, 91</sup>

In 1694 during the period between 8 August and 8 November, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Hsing-kuo and Hupeh (now Hubei province) in central *China* at Wuchang, Huang-kang, Ch'i-shui, Huang-an, Kuang-chi, Ao-ch'êng and Ta-yeh.<sup>153</sup>

In 1694, there was a great drought in the vicinity of Shanghai, *China*. This resulted in a bad harvest and a scarce year.<sup>166</sup>

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**Winter of 1694 / 1695 A.D.** La Hire [Philippe de la Hire] has the cold from the winter of 1694-95 in northern *France* was among the most intense.<sup>79</sup>

The winter in 1695 was very harsh. La Hire's thermometer stood the whole time of the frost at 15° to 20° F (-12.1° to -8.5° C), except on 7 February, when it fell to 7° F (-17.9° C).<sup>62</sup>

In 1694, the frost [in *England*] was so intense that many forest trees and oaks were split by the frost.<sup>212</sup>

During the winter of 1694-95 in London, *England*, the frost was of 7 weeks duration.<sup>212</sup>

Sea ice completely surrounded the whole island of *Iceland*. *England* experienced a cold winter. There was continuous snow for 5 weeks. In Bohemia [now western *Czech Republic*] during June, the summer was very cold and 3 intense frosts occurred leading to famine.<sup>28</sup>

At Augsburg [Augsburg, *Germany*], from the middle of December 1694 to 11 March 1695, the wind was mostly east and exceedingly cold and cloudy. The harvest and beginning of winter were very wet.<sup>72</sup>

At Ulm in southern *Germany*, the winter of 1694/1695 was intensely cold and dry. The frost continued even to the spring then suddenly there was a cloudy, rainy thaw about the end of March.<sup>72</sup>

During the winter of 1694, there was ice in the Whangpu [Huangpu River, *China*].<sup>166</sup>

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### **1695 A.D. – 1697 A.D. Finland and Estonia. Famine**

In the years 1694 to early 1697, cold winters and cool and wet springs and autumns led to extreme famine in northern Europe, particularly in *Finland*, *Estonia*, and *Livonia*. It is estimated that in *Finland* about 25–33% of the population perished, and in *Estonia-Livonia* about 20%. The famines to a lesser extent also affected *Sweden* (especially in the northern region), *Norway*, and northwestern *Russia*. The famine decimated the population of *Finland* and *Estonia-Livonia* either through prolonged starvation, epidemics and other diseases promoted by undernourishment, or the reliance on unwholesome or indigestible foods, and the contamination of water supplies.<sup>151</sup>

The summer of 1693 was dry in *Finland* and then a frost destroyed the meager harvest, especially the crop of barley. The harvests of 1693 and of 1694 were below normal.

In *Finland*, the beginning of 1695 was the coldest winter since the year 1658. Wolves attacked people in their homes. Spring was late in coming and generally cold. Sowing of seeds could not be finished before midsummer, leaving too short a time for the crops to mature. The summer was also cold. The grains could not ripen before a killing frost came. The autumn was rainy and in most regions, it was impossible to plant the seeds for the winter crop. In the region of Uusimaa, *Finland*, the rye did not blossom before the end of July and a frost in September destroyed the half mature grain.

The summer in *Estonia* in 1695 was very rainy. It rained from Johann's Day (June 24) till Michael's Day (September 29). As a result, the lowlands were flooded which destroyed the hay and crops.

In *Finland*, the beginning of 1696 was deceptively mild. The extraordinary snowy early winter of 1695-96 halted the forest work and traffic. But this was interrupted by a thaw in January. Spring came very early and the fields turned green. But on 7 March, winter struck back with a vengeance. Lakes and bays froze thick, so thick that people were able to drive across them [with wagons]. When spring finally returned it was very late and summer was rainy. The crops were



slow in ripening. During the night of 17/18 August a frost struck. In the morning the grains were coated with a thick layer of ice. A second frost occurred which finished off the rest of the crops.

*Estonia* experienced a similar weather pattern in 1696. The first part of the winter of 1695-96 was very cold and the snow was very high. But early in 1696, a thaw came. This pattern also happened in *Sweden*. Winter returned with a vengeance in March and it was impossible to sow the seeds until the end of May. The heavy rains of summer ruined the crops. The harvest amounted to about one-fourth the seeds sown. Shortly after summer, there was no hay to be had for any price.

In *Estonia* in 1696, landlords could no longer feed their farmhands and servants and began dismissing them. Many of these recently unemployed along with destitute, hungry peasants turned to begging. Even some members of the nobility were reduced to this state. In the autumn of 1696, the famine became terrible. There was a pronounced rise in the death rates. "The peasants died like flies." Bodies of the dead were lying everywhere. The winter of 1696-97 was extremely harsh. The snow was very high so corpses were left unburied until springtime and then placed in mass graves. Cases of cannibalism were reported in *Estonia*.

In *Finland* in 1697, the famines, death and epidemics closely followed. This famine was so horrific that it brought on cases of cannibalism. In Ostrobothnia, *Finland*, "parents ate the corpses of their children, and children of their parents, brothers and sisters. In northern Karelia, *Finland*, court documents describe cases of cannibalism. In one township in Karelia, there were so many funerals that the church bell cracked. Storehouses and manor houses were plundered.

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**1695 A.D.** In *Ireland*, in the spring and summer of 1695, there were many stinking fogs in Limerick and Tipperary.<sup>72</sup>

In the cold-wet hunger years of 1695-99, *Scotland* lost between 5% and 15% of its people.<sup>151</sup>

In *England* in April 1695, the weather was extraordinarily fair for the most part and almost cloudless. May was remarkably wet, to the destruction of all fruits. All the dog-days [of summer] were exceedingly cold, like winter. The winter was warm and fair except two or three days of hard frost in the end of December.<sup>72</sup>

On 24 July 1695, there was a violent thunderstorm with hail at Aberdeen, *Scotland*.<sup>212</sup>

In 1695, the price of wheat [in *England*] averaged 53 shillings per quarter [quarter ton].<sup>212</sup>

In Lappee [present-day Lappeenranta, *Finland* at 61° N, 27° 35' E] on Petersmas day in 1695, there was an unusual hailstorm that quickly beat down the crops in all the fields.<sup>151</sup>

[In *Italy*], there were profound deluges in 1695.<sup>72</sup>

In 1695 the Po River in northern *Italy* overran meadows, fields, and destroyed crops, leading to a severe famine in the area. Lake Zurich (in *Switzerland*), Lake Constance (in *Germany, Switzerland* and *Austria*) and Lake Neuchâtel (in *Romandy, Switzerland*) froze completely and one could walk over them as one would travel over a bridge. There were ice flows in the River Thames in *England*.<sup>151</sup>

In 1695 a violent hurricane struck the Mauricius [*Mauritius*] Island [in the Indian Ocean off the coast of Africa].<sup>234</sup>

At Poson, [Poznań, *Poland*], the summer and harvest of 1695 was one continued winter of cold rain, raw frosts, mildew, etc.<sup>72</sup>

At Ulm, *Germany*, all August to 1 September, it was cold and rainy. September and October were very cloudy and excessively cold.<sup>72</sup>

On 4 October 1695, a hurricane struck the Florida Keys in the *United States*. The hurricane caused the loss of a 933-ton warship offshore.<sup>141</sup>

In October 1695, a hurricane struck offshore the *Caribbean Island* of Martinique causing greater than 600 deaths.<sup>141</sup>

At Poson, [Poznań, *Poland*], the summer began on 10 September and lasted till 10 December.<sup>72</sup>

Rivers over a great part of *Europe* were in heavy floods in 1695-1697. Many of the rivers and lakes remained frozen for comparatively longer periods of time and didn't thaw until the late spring.<sup>151</sup>

In 1695, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 15 January and 12 February, floods struck Hopei (now Hebei province) in northern *China* at Tung-ming and Kiangsu (now Jiangsu province) on the east coast of *China* at Suchow, Wu-chin and Kao-yu.

— During the period between 12 June and 10 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and T'ung-hsiang; Hupeh (now Hubei province) in central *China* at Kung-an; Shantung (now Shandong province) on the east coast of *China* at Kuang-jao; Kiangsu province at Wu-chiang; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ên-hai and San-shui [uncertain name].

In 1695 during the 9<sup>th</sup> moon, there were great rains; sudden rise of rivers and calamities [flood damage] in the vicinity of Shanghai, *China*. Then during the 12<sup>th</sup> moon [winter], there was thunder and lightning at night with great rain.<sup>166</sup>

In 1695 during the period between 6 May and 8 August, a drought engulfed Szechwan (now Sichuan province) in southwest *China* at Ch'ang-ning [uncertain name] and Shansi (now Shanxi province) in northern *China* at Shuo. During the period between 8 August and 8 November, a drought engulfed Shansi province at Li-shih and Lin.<sup>153</sup>

*Also refer to the section 1695 A.D. – 1697 A.D. for information on the famine in Finland and Estonia during that timeframe.*

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**Winter of 1695 / 1696 A.D.** During the winter of 1695 and the spring of 1696, strange dews fell upon *Ireland*. “We had of late in the county of Limerick and Tipperary, showers of a sort of matter like butter or grease; if one rub it upon one's hand it will melt, but lay it by the fire and it dries and grows hard, having a very stinking smell. Some of it fell here at Kilkenny on 14 November 1695, which I did see myself the next morning. Having very diligently enquired concerning a very odd phenomenon which was observed in many parts of Munster and Leinster, the best account I can collect thereof, is as follows: for a good part of the winter of 1695, and the spring following, there fell in several places a kind of thick dew which the country people called butter, from the consistency and color of it, being soft, clammy, and of a dark yellow; it fell always at night, and chiefly in Moorish low grounds, on the top of the grass, and often on the thatch of cabins; it was seldom observed in the same place twice, it commonly lay on the earth for near a fortnight without changing its color, but then dried and turned black. Cattle fed in the fields where it lay indifferently as in other fields. If fell in lumps, often as big as the end of one's finger; very thin and scatteringly. It had a strong ill scent, somewhat like the smell of a churchyard or graves. And indeed we had during most of that season very stinking fogs, some sediment of which might possibly occasion this stinking dew, though I will by no means pretend to offer that a reason of it. I cannot find that it was kept

long, or that it bred any worms or insects. Yet the superstitious country people, who had scalled [scabby] or sore heads, rubbed them with this substance, and said it healed them.”<sup>234</sup>

Early in 1696, the cold in *England, the Netherlands* and northern *Germany* was excessive. Doctor Derham reported that at the Gresham College, London, *England*; the thermometer indicated a temperature equal to 1.6° F (-16.9° C).<sup>62</sup>

On 26 January 1696, there was an intense frost in London, *England*. The temperature fell to 9 degrees below zero.<sup>212</sup>

At Posen, [Poznań, *Poland*], the winter continued to 10 March 1696.<sup>72</sup>

At Posen, [Poznań, *Poland*], after 10 December 1695, there came a great snow and a strong frost, which had no thaw or remission till 10 March 1696. All corn and herbs died and rotted under the snow.<sup>72</sup>

At Hildesheim in central *Germany*, up until 10 March there was warm moist winter weather. Following that was some weeks of severe winter weather.<sup>72</sup>

**1696 A.D.** In *England* in 1696, the first three weeks of January was like a summer, clear with gentle gales; no frost or rain. Snow drops, daisies and primroses the first week. The rosebush in leaves and trees budding. In February, gooseberries in London begin to have a body. In March, dull, gloomy cold weather, blasting all the buds and ruining the spring. From Easter to 26 June, there were cold, wet excessive rains and great inundations. The rains rotted the hay. The spring till then was at a standstill. In May, there was an extraordinary flood. From 26 June to 6 July, the weather was fair and then the rains returned. From 10 July, it rained incessantly 36 hours. From 12 to 17 July, the weather was fair. From the 17<sup>th</sup> of July to the 14<sup>th</sup> of August, both night and day, there were heavy showers daily. It laid all barley and oats. To the 23<sup>rd</sup> of August, the weather was fair. The remainder of August was mostly rainy. To the end of the year, the weather was variable. On 24 December, there were three tides in the River Thames in one day. From the 1st to the 11<sup>th</sup>, there was a hard frost. No snow this winter, two inches deep.<sup>72</sup>

On 3 February 1696 on the Isle of Portland in the *English Channel*, there was a landslip [landslide]. The great pier was demolished and much damage done, owing to excessive rain.<sup>212</sup>

In June 1696, there was an inundation of the River Nyne in Northamptonshire, *England*.<sup>195</sup>

In the cold-wet hunger years of 1695-99, *Scotland* lost between 5% and 15% of its people.<sup>151</sup>

In 1696, it was a bad year for the crops and food was very dear [scarce] [in *England*].<sup>212</sup>

In 1696, the price of wheat [in *England*] was high averaging 71 shillings per quarter [quarter ton].<sup>212</sup>

In *England*, there was a great storm on the east coast; 200 coasters and other vessels, and most of their crews, lost.<sup>57</sup>

In 1696, a strong gale struck on east coast of *England*: 200 colliers and coasters lost, with most of their crews.<sup>90, 212</sup>

In *England*, 200 sail of colliers and some coasters were lost, with all their crews in a great storm, in the bay of Cromer, in Norfolk.<sup>40, 41, 43, 56</sup>

In 1696, a hurricane struck northwest *Cuba*. An unidentified ship was wrecked at Playa de Sabarimar, 7 leagues east of Havana in 35 feet of water during the storm.<sup>141</sup>

The winter of 1696 was colder than had been known in New England in the *United States*, since the first arrival of the English. During a great part of the winter, sleighs and loaded sleds passed on the ice from Boston as far as Nantasket (Hull, Massachusetts). So great a scarcity of food, afterwards during the next year, had not been known; nor any grain ever been at a higher price.<sup>174</sup>

At Posen, [Poznań, *Poland*] went without rain in 1696; hence a great scarcity in 1697.<sup>72</sup>

Rivers over a great part of *Europe* were in heavy floods in 1695-1697. Many of the rivers and lakes remained frozen for comparatively longer periods of time and didn't thaw until the late spring.<sup>151</sup>

In 1696, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period 1-30 May, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Taichow.

— During the period between 31 May and 28 June, a drought engulfed Chekiang province at Ch'ü and Shansi (now Shanxi province) in northern *China* at Ching-yüeh.

— During the period between 8 August and 8 November, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Mêng-shan, P'ing-yüeh and Ts'ang-wu.

In 1696, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 29 June and 28 July, floods struck Shantung (now Shandong province) on the east coast of *China* at Chi-mo and Hopei (now Hebei province) in northern *China* at Kao-ch'êng and An-hsin [uncertain name, "Hsin-an"].

— During the period between 29 July and 26 August, floods struck Huang-t'u [uncertain name] and Hupeh (now Hubei province) in central *China* at Wuchang, P'u-ch'i, Chiang-ling and Chih-chiang. At Chih-chiang, most of the houses were damaged by the floodwaters.

— During the period between 27 August and 25 September, floods struck Hupeh province at Huang-kang; Hopei province at Jao-yang and Ch'ien-an; Kansu (now Gansu province) in northwest *China* at T'ien-shui; Anhwei (now Anhui province) in eastern *China* at Hsi; and Kiangsu (now Jiangsu province) on the east coast of *China* at P'ei. [P'ei is located at longitude 117.00° East and latitude 34.47° North.]

— During the period between 26 September and 25 October, floods struck Hopei province at Shen-tsê and Jung-ch'êng.

In 1696 during the summer, there were long rains, which injured the crops in the vicinity of Shanghai, *China*.<sup>166</sup>

*Also refer to the section 1695 A.D. – 1697 A.D. for information on the famine in Finland and Estonia during that timeframe.*

**Winter of 1696 / 1697 A.D.** In *England*, the frost was severe.<sup>47, 72, 93</sup>

At Posen, [Poznań, *Poland*], from the end of summer in 1696, then to the end of March 1697, there was cold rains by day and frost snow and severe cold by night.<sup>72</sup>

**1697 A.D.** In the *United States*, the winter was intensely cold in the American northeast. Boston harbor was frozen as far down as Nantucket. The Delaware River was closed with thick ice for more than three months so that sleighs and sleds passed from Trenton to Philadelphia, and from Philadelphia to Chester on the ice.<sup>1</sup>

At Mansfeld in central *Germany*, January and February were intensely cold. March and part of April were unsettled, cloudy, snowy, rainy, frosty and clear. April the 1<sup>st</sup> and May began with hot summer weather, but followed by great storms of hail, especially the 21<sup>st</sup>, which did much damage. On the 27<sup>th</sup> sleet snow and an east wind to the end. Summer was often cold with frequent rains and very changeable winds. August was clear, but very cold. September 10<sup>th</sup> to October, great rains and shifting winds. November was cloudy and snowy. December was mild and rainy, but ended cold.<sup>72</sup>

In the cold-wet hunger years of 1695-99, *Scotland* lost between 5% and 15% of its people.<sup>151</sup>

In London, *England* from 15 January to 11 February, there was a hard frost with some small remissions. From March to 11 April, there were cold northeasterly winds. The gooseberries not yet budded. On 13 April, there was rain; and by 18 April, there were trees green with leaves, though no spring before. From 29 April to 4 May, there was cloudless, intolerably, sultry, fainting, hot days. The heat was both day and night. From 4 to 25 May, it was cold. From 4 to 19 May, it was wet. On 19 May, it was a frosty night. The rest of May was fair and hot to the end, with a north wind. June was seasonable enough. On 20 June, there was high winds and rain. On the 21<sup>st</sup> of June, there was excessive cold. On 16 and 17 July, frost and mildew blasted the corn. August to the 10<sup>th</sup>, still calm; daily rain till the corn grew in the ear as it stood. 12 August frost to 10 September dry sun shiny weather, excellent harvest. On 28 September, there was great hail in the night. October was a pleasant month. On 8 October, there was a great wind.<sup>72</sup>

On 22 March 1697, the river near Noordwyck [now an abandoned town] on the Mauricius [*Mauritius*] Island [in the Indian Ocean off the coast of Africa] swelled in the space of 15 minutes to great heights. The sugar mill and sugar works and most of the ground were ruined. Most of the sugar canes were torn out by the roots by the violence of the currents. Then fifteen minutes later, the water was back to its normal level. The cause of this flood was unknown. There was only light rain at the time and no earthquakes.<sup>234</sup>

On 9 April 1697 in *Wales*, hailstones fell in Flintshire weighing 5 ounces.<sup>93</sup>

In 1697, a tremendous hailstorm struck the part of Denbighshire in northeast *Wales* bordering on the sea. All the windows on the weather side were broken by the hailstones. Poultry and lambs, together with a large mastiff [breed of dog] were killed. In the north part of Flintshire, several persons had their heads broken, and were grievously bruised in their limbs. The main body of this hailstorm fell on Lancashire in northwest *England*, in a line from Ormskirk to Blackburn, on the borders of Yorkshire. The breadth of the storm cloud was about two miles, within which it did incredible damage, killing all descriptions of fowl and small creatures, and scarcely leaving a whole pane of glass in any of the windows where it passed. What was still worse, it ploughed up the earth, and cut off the blade of the green corn [grain] utterly destroying them. The hailstones struck with sufficient force to bury themselves in the ground. These hailstones, some of which weighed five ounces, were of different forms, some round, others semi-spherical; some smooth, others embossed and crenulated, like the foot of a drinking glass, the ice being very transparent and hard; but a snowy kernel was in the midst of most of them, if not of all. The force of their fall showed that they descended from a great height.<sup>191</sup>

On 29 April 1697, there was a thunderstorm, which produced great hail at Snowdon in Denbighshire, *Wales*. It also struck Flintshire, Chester, West Kirkby [West Kirby], Ormskirk, and Blackburn. The cloud was 2 miles [3.2 kilometers] wide and the length of the track 60 miles [97 kilometers] long. Hailstones of 5 ounces [142 grams] and of various shapes, broke nearly all the window, killed many fowls, and destroyed the green corn [grain]. Some hailstones were 5 inches [13 centimeters] round. Scarcely any stones were as little as musket balls. But some were as large as hen's eggs and ½ pound [227 grams] in weight. Many sea fowl [sea birds] were killed. Poultry and sheep were also killed.<sup>212</sup>



In Cheshire and Lancashire, *England* on the 29<sup>th</sup> of April, “a storm of hail, which killed fowls and small animals, and knocked down horses and men; some of the stones weighing half a pound.”<sup>40, 41, 43, 56, 57</sup>

In Cheshire and Lancashire, *England* on the 20<sup>th</sup> of April, “a storm of hail, which killed fowls and small animals, and knocked down horses and oxen; some of the stones weighing half a pound.”<sup>93</sup>

On 29 April 1697 at Cheshire and Lancashire, *England*; on 4 May at Hertfordshire, *England* on 6 June at Monmouthshire, *Wales* on 9 June at Herefordshire, *England* fell shocking tempests of prodigious hail.<sup>72</sup>

On 29 April 1697 in *England* and *Wales* there was a hailstorm where the stones weighed three-quarters of a pound. The astronomer Hailey communicated a paper to the Royal Society on this storm.<sup>93</sup>

Toward the end of April in 1697, a hailstorm struck Cheshire in northwest *England*. The storm was 2-miles wide and traveled a path for 60 miles before it was dissipated. The hailstones were as big as eggs and some were the size of a man’s fist. They were pieces of clear, transparent, and very hard ice, with a white kernel in the middle, which seemed like a lump of snow. Some of these vast hailstones were smooth, others rough and sharp on the surface. They fell with a prodigious force, and killed fowls, lambs, and calves. They beat down the young crops of every kind. In some places where the wind drove them at a slanting angle, they plowed up the surface of the ground burying them an inch or two in depth. Trees were broken and shattered to pieces in many places. Houses were damaged. Many people who were outside during the storm were harmed.<sup>192</sup>

An extraordinary hailstorm struck *Wales* and *England* on 29 April 1697. The track of this storm was over 60 miles in length. The storm formed with southwest winds out of Carnarvanshire [Caernarfonshire], passing near Snowdon with a horrid black cloud attended with frequent lightning and thunder. It traveled as far as can be determined no further westward than Denbighshire, where it left St. Asaph to the right, and did much damage between it and the Sea, breaking all the windows on the weather-side, and killing poultry and lambs, and at Sir John Conway’s at Desert, a stout dog. In the northern part of Flintshire, several people had their heads broke, and were grievous bruised on their bodies. From Flintshire, *Wales* it crossed over the Arm of the Sea that comes up to Chester, *England* and was only felt in Cheshire, at the very northwest corner of the peninsula called Wiral, between Æfluaria of Chester and Leverpoole [Liverpool], at a town called West Kirby, where it hailed only 3 minutes. It was at Chester about 3 o’clock in the afternoon. The main body of the hail fell upon Lancashire, in a right line from Ormskirk to Blackburn [Blackburn], which is on the border of Yorkshire; but whether it crossed the ridge of hills into Yorkshire, we know not. The breadth of the cloud was about 2 miles within which it did incredible damage, killing all sorts of birds and small creatures. It scarcely left a whole pane of glass in any of the windows it passed. It plowed up the earth and cut off the blade of green corn [grain] so utterly destroying it. The hailstones buried themselves in the ground. On the bowling greens, where the earth was anything soft, they were defaced, so as to be rendered unserviceable for a time. Some of the hailstones weighed 5 ounces. They were of different forms. Some were round, some half round, some smooth, others embossed and crenulated, like the foot of a drinking glass, the ice very transparent and hard, but a snowy kernel was in the midst of most of them, if not all of them. Because of the force of the fall, the hailstones must have fallen from a great height. Near Bootle in Merseyside, *England* where the storm skirted, one of the hailstones measured 5 inches in circumference. At Bootle-Mill, the sea seemed to have risen to an extreme height and took on the appearance of a forest of woods. [As the hailstones struck with great force, they sent spouts of water up almost 5 feet high.] The hailstones were as big as Poot Eggs. Many sea-fowl and land fowl were killed by the hail. The storm was very violent at Linaker. It made holes in William Halsall’s barns, broke branches off his apple trees, and made wounds in the green brow [hill] by his house. The holes were generally an inch to an inch and a half deep. William Halsall said that these hailstones fell so violently into the marl-pit [a pit from which marl is dug] beside his house that the spouts of water rose a yard and a half high. The hailstones were as big as duck eggs at Aughton Common and at



Sephton [Sefton]. One of the hailstones at Sephton weighed a full half-pound. Two hailstones were weighed at Ormskirk. Each weighed  $\frac{3}{4}$  of a pound. The hailstones at Ince [in Lancashire, *England*] varied between the size of duck eggs and goose eggs. In a little town next to the sea, they gathered birds killed by the hail by the bushels. On the seaside, at least seven varieties of dead birds were gathered including curlew [curlew], sea-pye [oystercatcher, sea pie], sea swallow and gorre. At Bootle, a young woman who was running for shelter during the storm had her hat fall off and a hailstone hit her from behind the ear and made her tumble. A man was knocked off his horse. Another man pulled down his hat to save his face and a hailstone tore the brim from the crown, so far that he could put his hand through the hole. At Ormskirk, the hailstones rebounded 2 yards high. At Ince, two horses were knocked down in the plough and a man fell at the same time. At Crosby, some beasts were knocked down by the hail. Joseph Holland was found dead after the storm but it couldn't be ascertained whether his death was caused by hail or lightning. Two women were so badly beaten by the hail before they could find cover that the next morning, they could hardly turn them over in their beds.<sup>234</sup>

In Hertfordshire in eastern *England* on the 4<sup>th</sup> of May, hailstones fell 14 inches in circumference; destroyed trees and corn in a most dreadful manner.<sup>40, 41, 43, 56, 57</sup>

After a severe storm of thunder and lightning on 4 May 1697 in Hertfordshire, *England*, a shower of hail ensued " by which some persons were killed, their bodies beat black and blue, and oaks were split and fields of corn cut down as with a scythe. The stones measured from 10 to 14 inches in circumference; their figures are said to have been various—some oval, others picked, and some flat." Another source cites the hailstones in Hertfordshire as measuring 14 inches in circumference.<sup>93</sup>

In the beginning of May in 1697, a hailstorm struck Herefordshire in the West Midlands region of *England*. In this terrible storm, not only fowls and young animals of all kinds were killed, but some of the larger ones. Some persons laboring in the fields, who could not reach shelter, suffered the same fate. Their bodies were black and blue, as if beaten to death with clubs. Oak trees were split in two. The branches of many other trees were torn down. The fields of rye were, in some places, cut down as if mowed off with a scythe. Many of the hailstones measured fourteen inches round.<sup>192</sup>

On 4 May 1697, a hailstorm struck Hitchin, *England*. Hailstones were 7 or 8 inches [18-20 centimeters] about [in circumference]. At Sir J. Spencer's, 7,000 quarries [a square or diamond shaped pane] of glass were broken. The hail split great trees, and destroyed several hundred acres of wheat; and there were some stones 13 or 14 inches [33-36 centimeters] about. The ground was torn up, and there were at least 100,000 cartloads of hailstones. A southwest gale occurred at the same time. In Staffordshire, some of the hailstones were nearly 12 inches [30 centimeters] in circumference.<sup>212</sup>

On Tuesday, 4 May 1697, at Hitchin in Hertfordshire [Hertfordshire], *England*, about 9 o'clock in the morning, it began to lightning and thunder extremely, some great showers intervening. This continued until around 2 o'clock in the afternoon, when a black cloud appeared and there was a sharp shower of hail. Some of the hailstones measured 7 and 8 inches in circumference. But the most extreme part of this storm fell at Offley, where a young man was killed, one of his eyes stuck out of his head; his body was all over black with bruises. Another person nearer to Offley escaped with his life, but was much bruised. There was a house of Sir Joseph Spencer in which 7,000 quarries of glass were broken. The hail fell in such vast quantities, and so great, that it tore up the ground, split great oaks and other trees in great number. It cut down great fields of rye, as with a scythe, and destroyed several hundred acres of wheat, and barley. So much so that they ploughed it up and sowed the field with oats. The tempest was such when it fell that in 4 poles of land, from the hills near us, it carried away all the staples of the land, leaving nothing but chalk. The hail broke a vast number of pigeon's wings, crows, rooks, and other birds. The flood [of hail] came down, spreading 4 or 5 acres of land, [roaring] like the Bay of Biscay; and which is very strange, all this fell in the compass of one English mile. I was walking in my garden, which is

very small, perhaps about 30 yards square, and before I could get out, it took me to my knees, and was through my house before I could get in, which I can modestly say was within a minutes time. It went through like a sea, carrying all wooden things like boats on the water. The greatest part of the town experienced this misfortune. The surprise was so great, that we had scarcely enough time to save our children and wives. There fell some hundred thousand cartloads of hail. I saw them 4 days later, and if the beds of hail had not been broke by people coming and going or trampled by horses, it might have laid until Michaelmas. The hailstones were measured from one to thirteen and fourteen inches certain. Some people said they found hailstones that measured 17 and 18 inches. The hailstones had various shapes, some oval, others round, others picked, some flat. The damage done to our town was near 4,000 pounds. [In present currency, that would be equivalent to £463,000 using the retail price inflation index.]<sup>234</sup>

In 1697, there was a northwest gale in Lancashire, *England* with hailstones 6-9 inches [15-23 centimeters] in circumference. Rooks and hares [birds and rabbits] killed, and vast quantities of glass broken.<sup>212</sup>

On 6 June 1697, there was a hailstorm at Pont-y-pool [Pontypool] in Monmouthshire, *Wales*. The storm extended a mile and lasted half an hour. Some hailstones were eight inches [20 centimeters] about [in circumference] and very irregular. The hail broke all the beans and wheat.<sup>212</sup>

On 6 June [9 June] 1697, there was a hailstorm at Westhild, near Hereford, *England*. The hail fell in so great quantity that it destroyed all the poultry, garden stuff, corn [grain], grass and windows. Some stones were 9 inches [23 centimeters] about [in circumference].<sup>212</sup>

In 1697, there was a hailstorm in Herefordshire, *England*. "Hail stones 13 and 14 inches round [33-36 centimeters]." <sup>212</sup>

On 7 June 1697 in Charleville, *Ireland* near Limerick there had been a very wet spring, and as a result a bog moved over 40 acres of good ground, burying it sixteen feet [5 meters] deep.<sup>212</sup>

In 1697, it was a bad year for the crops and food was very dear [scarce] [in *England*].<sup>212</sup>

In 1697, the price of wheat [in *England*] averaged 60 shillings per quarter [quarter ton].<sup>212</sup>

Excessive heat reigned again in July 1697 in northern *France*.<sup>79</sup>

On 14 July 1697, in the region around the villages of Nummi and Pusula, *Finland* (at 60° 30' N, 24° E), there fell a "furious" shower of hail. The hailstones struck the cattle and made holes in the walls and roofs of houses. The crops on 19 farms was totally destroyed, 3 farms lost ½ of their crops, and another 3 farms lost 1/3 of their crops.<sup>151</sup>

In mid-July 1697 in Kalanti [present-day Uusikirkko, *Finland* (at 60° 50' N, 21° 35' E)], a hailstorm produced hailstones the size of hen's eggs causing great destruction on 5 farms.<sup>151</sup>

Universal rains during the summer of 1697, made all the rivers overflow in *France*. The rains lasted at least two months. The rain fell so hard for eight days from the Feast of Saint Peter [29 June], that in one night the Seine, the Loire and the Meuse rivers rose seven feet. The rivers continued to grow and overran their banks and flooded all the countryside, with the farmland, houses and their inhabitants.<sup>79</sup>

At Posen, [Poznań, *Poland*], May and June most unequal, the heavens were terrible with clouds and cold rains. In July and August, the heat was excessive but often mixed with cold showers.<sup>72</sup>

Rivers over a great part of *Europe* were in heavy floods in 1695-1697. Many of the rivers and lakes remained frozen for comparatively longer periods of time and didn't thaw until the late spring.<sup>151</sup>

In 1697, a drought engulfed several regions of *China* including:<sup>153</sup>

- During the period 5 February and 6 May, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Yang-chiang and Yang-ch'un; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Mêng-shan and P'ing-yüeh.
- During the period 18 July and 16 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Hsing-t'ai.
- During the period 15 September and 14 October, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at T'ung-lu and Sung-yang.

In 1697 during the 5<sup>th</sup> moon, there was a great drought in the vicinity of Shanghai, *China*. Then during the 6<sup>th</sup> moon on the 1<sup>st</sup> day in the vicinity of Shanghai, *China*, there was a typhoon that destroyed life and property.<sup>166</sup>

In 1697 during the period between 17 August and 14 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at K'un-shan and Hopei (now Hebei province) in northern *China* at Lin-yü.<sup>153</sup>

*Also refer to the section 1695 A.D. – 1697 A.D. for information on the famine in Finland and Estonia during that timeframe.*

**Winter of 1697 / 1698 A.D.** During the winter of 1697, there was a severe frost [in *England*].<sup>212</sup>

On 25 November 1697 in London, *England*, there was ice three inches thick. December 12<sup>th</sup> and 15<sup>th</sup> it was hot; the 12<sup>th</sup>, 18<sup>th</sup>, 19<sup>th</sup> and 20<sup>th</sup>, there was mist, hot and moist. From 10 to 30 December, it was as hot as in August; one could not bear the bedclothes. Yet there were frosts before and snow 12 inches deep. In January, there was much snow in deep drifts. All January, there was ice upon the water, which on the 26<sup>th</sup> was eight inches thick (i.e. within 2 ½ times as thick as at any time on the Canal of St. James's Park in 1740). Yet on the 29<sup>th</sup> of January, there was lightning and five claps of thunder. The winds were northeast almost the entire month of February with little sunshine, except for six days during the second week. On 14 February there was a great storm, and the lanes were blown up with snow several yards deep, that lasted the rest of the month. But the fields lay bare. [The winds blew the snow in from the flat fields into great snowdrifts.] On the 26<sup>th</sup> of February, the ice was four inches thick. On March the 24<sup>th</sup> and 26<sup>th</sup>, thunder and lightning, warm sunshine all day with sulfurous clouds and hot evenings. On April the 11<sup>th</sup>, there was thunder followed by showers. On April 22, it snowed hard from morning till noon, then a little sunshine; then snowed again very fast; then, sunshine followed with large hail (similar to the storm of April 1740). On April 25<sup>th</sup>, there were showers of fierce great hail with thunder and sunshine mixed. On April 27<sup>th</sup>, there was thunder and a storm of hail after. April was a cold month. On the 30<sup>th</sup> of April, the first cuckow [observed]. Gooseberries not yet blossomed. On 3 May, there was a great deep snow over all of *England*. On 15 May, the woods were like winter.<sup>72, 212</sup>

**1698 A.D.** In London, *England* on 17 May, there was a great hailstorm. On 31 May, the wheat very low; cold weather. On 3 June, it was cold with great lightning and thunder, loud and near, with fierce large hail three inches deep on the ground. On 16 June in a warm rich soil, the first wheat ear was seen near London. This was the backwardest spring in 47 years. On July the first part was wet. On the evening of 15 July, there was a great rain. From 18 to 26 July, there was cloudless sunshine. On the 9<sup>th</sup> there was a great deal of red lightning with unceasing thunder. There were no gooseberry tarts till July. On the 30<sup>th</sup> of July, the apple trees in small blossoms as in the spring. On 13, 14 and 15 August there were frosts. The latter half of August was the most pleasant time in this year. On the 6<sup>th</sup>, there was one clap of

thunder and then a shower of the biggest water droplets ever known. The four last months had scarce two days together without rain (and with the exception of the period from 18 to 26 July) the wettest season known. Whole fields of corn [wheat] spoiled even in Kent; much more [spoilage] in the north. Horses were turned into [fed] the peas and barley. The earliest wheat not cut till the middle of September. In Kent, September the 29<sup>th</sup>, barley standing uncut there; much lay in the swath till December. That which was brought in was soaked with wetness and almost useless. Much corn in the north was got at Christmas. And in *Scotland*, they were reaping in January and beating the deep snow off it, as they reaped the poor green empty crop. Bread made from what was harvested would not stick together, but fell in pieces, and tasted sweet as if made of malt. On 3 October, there was much lightning and pretty much thunder. On 15, 16 and 17 October, there were extreme cold nights with winds from the north-northwest. On 30 October, there was a great deal of rain and snow with the winds from the northeast. On 17 November, there was lightning and thunder. December was warm. On the 7<sup>th</sup> of December there was a hot steam. On 22 December, wheat was sown, which proved as forward in harvest as any. The seed time was so wet that there was hardly above half a crop sown this year.<sup>72, 212</sup>

In 1698, the price of wheat [in *England*] was low averaging 18 shillings per quarter [quarter ton].<sup>212</sup>

On 6 August 1698 in *England*, “Biggest rain-drops known. The most rain last four months known. Whole fields of corn [grain] spoilt. The first wheat cut in the middle of Sept., and much barley in swathe till December. In the North much corn ungot at Christmas, and in *Scotland* corn was reaped in January 1699, and the snow beaten off it. Bread made of it fell in pieces, and tasted sweet like malt.”<sup>212</sup>

On 5 November 1698, there was a terrible flood, which destroyed a great part of St. Werburgh’s Church in Derby, *England*.<sup>212</sup>

On 22 December 1698, there was a thunderstorm at Warley Town near Halifax in West Yorkshire, *England*.<sup>212</sup>

In the cold-wet hunger years of 1695-99, *Scotland* lost between 5% and 15% of its people.<sup>151</sup>

In 1698 during the period between 10 May and 7 July, a drought engulfed Honan (now Henan province) in central *China* at An-yang. During the period between 8 June and 7 July, a drought engulfed Anhwei (now Anhui province) in eastern *China* at T’ung-ling. Also during the period between 8 June and 7 July, floods struck Anhwei province at Wu-yüan, Fêng-yang and Wu-ho; Shantung (now Shandong province) on the east coast of *China* at T’ang-i [possible misprint] and Liao-ch’êng; Hopei (now Hebei province) in northern *China* at An-hsin [uncertain name “Hsin-an”]; and Kiangsi (now Jiangxi province) in southern *China* at Yung-hsiu [uncertain name, “Chien-ch’ang”].<sup>153</sup>

In 1698 during the autumn, there was a flood in the vicinity of Shanghai, *China*.<sup>166</sup>

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**Winter of 1698 / 1699 A.D.** The year 1698 [in *England*] was the coldest year between 1695 and 1742.<sup>212</sup>

The winter of 1698-99 was extremely cold [in London, *England*]. On 30 January, the River Thames was full of ice.<sup>227</sup>

In 1699, there was a severe frost [in *England*]. The price of wheat, which in preceding years had seldom reached 30 shillings per quarter [quarter ton], now rose to 713 shillings per quarter.<sup>212</sup>

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**1699 A.D.** On 7 February 1699, there was a tempest and hurricane [in *England*].<sup>72</sup>

On 7 February 1699, there was a west-northwest gale that struck Upminster, *England*. It was a terrible

gale that did much damage.<sup>212</sup>

In 1699, the price of wheat [in *England*] averaged 64 shillings per quarter [quarter ton].<sup>212</sup>

In *Britain*, the harvest was hottest and driest; drought until the following January.<sup>47</sup>

In *England* in 1699, there was plenty [plentiful harvest].<sup>72</sup>

*England* was hit with a stifling heat wave on 22 June 1699. The summer in Paris, *France* was characterized by:

Hot days	55 days
Very hot days	5 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

There were heavy rains in April and September. In Paris, the three summer months produced 130 mm (5.1 inches) of rain. In Burgundy the spring was late and wet. There were hot days in August. In Dijon, *France*, the grape harvest began on 5 September. It produced little wine but the quality was good.<sup>62</sup>

In Breslaw [now Wrocław, *Poland*], January was cloudy, rainy, windy and cold. The latter end of February was no better. March began terrible with snow and hoar frost, till the milder spring came in. [There was a famine at the time and many people were consuming unwholesome foods.]<sup>72</sup>

In Augsburg, *Germany*, in January, the winds were from the east or south. There were frequent snows, but they melted as they fell. But before the equinox [around March 20<sup>th</sup> or 21<sup>st</sup>] fell a great snow and the cold continued till May. The cold ended in long rains.<sup>72</sup>

Charleston, South Carolina in the *United States* was nearly depopulated by an awful tempest and inundation.<sup>1</sup>

In 1699, a powerful cyclone struck Sunderbans coast, *Bangladesh* causing 50,000 deaths.<sup>98</sup>

In *England* in January, some of the days were perfectly warm. Although on some mornings there was frost. Terrible storms struck on 7 and 12 February. On 24 March, there was a storm of thunder and lightning, high winds and hail. There was another violent hailstorm on 30 March with loud thunder and yet very cold. During the first half of April, the weather was very cold. People were forced to put on again their winter clothes, which they threw off in February. The last half of April had flying clouds and honey dews. [For the past 9 years, June and July have been so cold that they were difficult to distinguish from the winters] But this year, 1699, produced one of the first of several hot summers. June and July were so hot that wheat began to be harvested on 1 August. And though there was only a half a crop sown, the price of wheat fell from 9 and 10s. a bushel to a reasonable price, which continued for several years. June the 22<sup>nd</sup> and 23<sup>rd</sup>, it was sultry hot, like the summers of old. The 24<sup>th</sup> was sultry, and abundance of thunder, the sky being clear; only a few fleecy clouds, and sometimes a few small drops from one. It was intolerably hot to the end of June. The weather was kind to the wheat but not to oats and barley. Those crops were poor for want of rain. July was intolerably hot. There was little grass and no rain. On 11 August the nuts were full and on the 28<sup>th</sup> they fell out of the hulks. September was mostly sultry hot, beyond what any month had been for nine summers before this. On 18 September, the sown wheat was already green on the ground. In October, the weather was warm, cloudless sunshine and very calm; as pleasant summer weather as in any month. The year 1699 was not only the hottest, but driest harvest of many years. In *Scotland*, some of their mosses took fire from small sparks and burnt till after Christmas. In November and December it was all like summer; warm pleasant sunshine. On 26 November, there was



snow yet it was warm. On 30 November, the snow laid 8 or 9 inches deep. The middle two weeks of December were perfectly warm.<sup>72</sup>

In the cold-wet hunger years of 1695-99, *Scotland* lost between 5% and 15% of its people.<sup>151</sup>

In 1699 during the period between 5 February and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow and T'ung-hsiang. During the period between 31 March and 29 April, a drought engulfed Hupeh (now Hubei province) in central *China* at Huang-p'o. During the period between 8 August and 8 November, a drought engulfed Hupeh province at Ao-ch'êng and Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin.<sup>153</sup>

In 1699, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 27 June and 26 July, floods struck Yü-ch'êng [possibly a misprint]; Chekiang (now Zhejiang province) on the east coast of *China* at T'ai-shun and Chien-tê; and Hopei (now Hebei province) in northern *China* at Wu-chi and An-hsin [uncertain name "Hsin-an"].

— During the period between 25 August and 22 September, floods struck Chekiang province at Hangchow.

— During the period between 23 September and 22 October, floods struck Chekiang province at Taichow, Chin-hua, T'ang-ch'i, Ch'ü, Chiang-shan and Ch'ang-shan; Kiangsi (now Jiangxi province) in southern *China* at Kan; and Hupeh (now Hubei province) in central *China* at Mien-yang.

In 1699 during the 6<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was an overflow of the sea and lakes.<sup>166</sup>

**1700 A.D.** In *England*, January and February was no different than summer in warmth. There were some stormy days, some days with a little frost and rain and hail. On 8 and 9 March, the weather was burning hot and dry. On 18 March, the ground was chopped and dust was flying as in summer. There was no rain until the latter end of March. On 30 March, there was hail the size of small nuts. From 5 to 16 April, the weather was excessively hot. The month of April ended hot. On 9 May, there was thunder. The gooseberries were large and the peas were a week in blossoms. On 18 May, the hartichoaks [artichokes] were full and large. After a few days of cold rain beginning on 21 May, the month ended very hot. The first half of June was summer weather, but the latter half was uncertain rainy weather. July was fair to the 10<sup>th</sup> followed by stormy weather and much rain but the month ended very hot. On 1 and 3 August, there was wind and rain and then to the 16<sup>th</sup> of August it was glorious summer weather. The remainder of August was variable. After the rain on 31 August, the trees and meadows were as delightful as spring. September weather was variable. On 9 September, there was a hailstorm. On 18 September, there was a great frost, which was destructive to everything it could hurt, especially the grapes. On 23 and 24 September, there was much rain. The 26<sup>th</sup> was glorious sunshine and hot, then dreadful thunder and lightning at night with pouring rains. It was a tempest at first remote, then near, loud and long. October set in stormy, then fine sunshine weather to the 19<sup>th</sup>. After that there was various rain and frost. December had several pleasant days. On 11, 14 and 19 November, there was a hard frost. But on 20 and 29 November, there were summer days. December set in with frost and snow. On 7 December, ice bears; on the 8<sup>th</sup> a hard frost and then rains; on the 13<sup>th</sup> a dreadful storm; but from the 15<sup>th</sup> to the 18<sup>th</sup> it was mild; from the 24<sup>th</sup> to the 29<sup>th</sup> there was sunshine and fine weather; but on the 31<sup>st</sup> it was frost.<sup>72</sup>

The summer of 1700 in Paris, *France* was characterized by:

Hot days	29 days
Very hot days	2 days
Extremely hot days	2 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]



The peak temperatures occurred on 9 and 12 September.<sup>62</sup>

At Mulchus on the border of the Hessen region of *Germany*, the winter to 10 March was most inconsistent with cold winds from the north and winds from the south that brought great snow, fog, clouds and rain. Spring was more temperate and dry. The winds were from the east and there were a few showers. The weather of 1699 produced a crop of wheat with black spots. The wheat was unwholesome and caused nausea both in man and beast. There was a great scarcity and dearth. After the equinox [around March 20/21], there was a moist rainy season to the end of October. The weather then turned most inconstant until the winter solstice [around December 21/22].<sup>72</sup>

At Breslaw [now Wrocław, *Poland*], the summer, harvest and winter were pretty temperate.<sup>72</sup>

At Leeds, *England* on 27 April, there was a terrible storm of thunder and lightning.<sup>72</sup>

On 27 April 1700, there was a thunderstorm that was very violent at Leeds, *England*.<sup>212</sup>

In 1700, the price of wheat [in *England*] averaged 40 shillings per quarter [quarter ton].<sup>212</sup>

In 1700, there was a famine in *England* from the rain and cold of the previous year.<sup>57, 72, 91</sup>

In 1700, it was extremely warm [in *England*].<sup>212</sup>

On 14 September 1700, a hurricane struck Charleston, South Carolina in the *United States* causing 97 or 98 deaths.<sup>141</sup>

During the autumn of 1700, a dreadful hurricane damaged Charlestown [Charleston], South Carolina in the *United States*, and threatened its total destruction. The sea rushing in with amazing impetuosity, obligated the inhabitants to fly to the second stories of their houses, where they generally were secure. A large vessel, belonging to Glasgow, which had come from Darien with a part of the unfortunate Scotch settlers, and was riding at anchor off the bar, was driven from her anchor, and dashed to pieces against the sand banks; and every soul on board perished.<sup>174</sup>

In 1700 during the period between 21 March and 18 April, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou. During the period between 17 June and 15 July, a drought engulfed Hopei (now Hebei province) in northern *China* at Sha-ho. During the period between 8 August and 8 November, a drought engulfed Chekiang province at Ch'ang-shan. Then during the period between 15 August and 12 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu and Shantung (now Shandong province) on the east coast of *China* at T'an-ch'êng [probably a misprint, "Yen-ch'êng"] and Lin-i [Lin-i is located at longitude 118.24° East and latitude 35.07° North.]<sup>153</sup>

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**1701 A.D.** On the Feast of Candlemas [2 February] 1701, there arose in Paris, *France*, a furious hurricane. No one remembered having seen anything like it. The top of Saint Louis Church sank in on the assistants. This hurricane destroyed the kingdom.<sup>79</sup>

The summer of 1701 was the most remarkable since the year 1682 because of its long duration of the heat and its high temperatures. In *Italy*, it produced intolerable heat. In Paris, *France* the summer was characterized by:

Hot days	62 days
Very hot days	11 days
Extremely hot days	9 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperatures occurred on 10, 11, 13, 26, 27, 28 July, 17 & 31 August and 1 September. On 17 August the temperature almost reached 104° F (40° C). In Dijon, *France*, in Burgundy the grape harvest began on 22 September.<sup>62</sup>

The summer of 1701 was also very hot in Paris, *France*. The summer produced, sixty-two days of a heat of 77° F (25° C), eleven days of a heat of 87.8° F (31° C), and nine days of heat 95° F (35° C). The highest temperature was reached on August 17 with a reading of 104° F (40° C).<sup>79</sup>

In 1701, the price of wheat [in *England*] averaged 37 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1701 [in *England*], there was an excessively warm summer.<sup>212</sup>

At Breslaw [now Wrocław, *Poland*], January was changeable. February weather was quite frightful, with clouds, shifting winds, cold and snow. March was milder, but often rainy, stormy, cloudy with hail and shifting winds. April was the most inclement from the changes of wind, cold, hail, clouds, snow and rain. May was mostly foggy, cloudy and rainy. June had its rain and thunder.<sup>72</sup>

*Russia* suffered from a major famine in 1701. Many of the famines in *Russia* were accompanied by such horrors as eating of bark, grass, and dung, and cannibalism. In 1701 in Moscow, pies were made of human meat and sold openly in the streets.<sup>96</sup>

In 1701, floods struck many regions of *China* including:<sup>153</sup>

— Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh.

— Yunnan province in southwest *China* at Hao-ch'ing.

— Hopei (now Hebei province) in northern *China* at Kuang-p'ing.

— Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lien and Canton.

— During the period between 6 July and 3 August, a flood struck Hupeh (now Hubei province) in central *China* at Huang-kang and Kwangtung province at Ta-pu and Ch'ao-an.

In 1701 during the period between 6 June and 5 July, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at T'ang-i. During the period between 6 July and 3 August, a drought engulfed Kansu (now Gansu province) in northwest *China* at Lin-hsia and Lanchow. During the period 2-30 October, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ung-shan.<sup>153</sup>

In *England*, the frost that began on 31 December 1700 lasted until 8 January 1701. The ice [on ponds or lakes] was only two inches thick because it was covered [insulated] with snow six inches thick and later ten inches deep. The next few days produced a mixture of rain, snow, frost and fine days. On 17 and 18 January, it was windy, with flooding rains, a terrible storm with great loss at sea and damage to land. The weather to the 26<sup>th</sup> consisted of rain, wind and snow. There was frost to the end of January. From the quantity of snow and rain, and the suddenness of the thaw, came a great flood, which made low grounds like a sea. February weather varied with wind, hail, and rain in abundance and some pleasant days towards the end of the month. On 6 February, there was a dreadful storm with lightning and one clap of thunder. The first of March was a half rainy day. It was a sober and calm season to the 12<sup>th</sup> of March, and then the rest of the month was sunshine and still calm with no winds. But there were pretty hard frost from 20 March to the end of the month. Yet it was mixed in with heat in the mornings or evenings. April was a pleasant month but dry and frosty. So spring came but slowly on. On 10 April there was the first sighting of the cuckoo; on the 13<sup>th</sup> a nightingale. On 9 and 12 April, there was frost; but soon it was hot.

From 16 to 19 April, there was snow and hail every day and very cold. Only gooseberries were in blossom. On 1 May, the elm trees were just budding at London. On 10 May, there was a white frost. There was no rain since 29 April and the ground was very dry. From 16 to 22 May, there was thunder with fine showers. May ended with some stormy days. The month of June produced lovely weather. On 5 June, there was thunder. On 25 June, the thunder was long and loud and produced all flooding rains. On 30 June, there was continual rolling thunder with little or no rain. Several days in June were sultry hot. In general the weather in July was sultry hot with no rain. On the 15-18 July there was lightning with dreadful thunder and short outbursts of smart showers. August was intolerably hot both night and day, with much lightning and thunder. Even though it was a hot month with frequent showers, yet there was some white frost. September was hot still and a little remarkable. There was a mixture of hot sunshine and dull mists. There were some frost in October and periods of exceedingly cold weather, but the rest was pleasant glorious weather. There was ice at the end of October, 1 inch thick. The 16<sup>th</sup> of October was remarkable for a prodigious number of beetles driving in a great fog. November was generally warm and pretty dry. With the exception of 4 days, the first twelve days of December were dull days. From 15 to 21 December, there were hard frost and the ice was 4 inches thick. On 26 December, there was a terrible storm. This was followed by an abundant rainfall.<sup>72</sup>

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**1702 A.D.** In 1702, the winter was very mild in *Italy*.<sup>62</sup>

On 3 February 1702, there was a violent gale at Upminster in East London, *England* with a great depression of the barometer of 28.43 inches; at Townley 27.39 inches.<sup>212</sup>

In 1702, *England* suffered drought. March, April and May were very dry in Lancashire and the crops of grass very poor. From April 23 to May 29, Upminster had scarcely any rain. March had been a dry month but during April up to the 23<sup>rd</sup>, it had been wet. After May 29<sup>th</sup>, there was a great shower. In *England*, it was excessively hot during the summer.<sup>212</sup>

In 1702, there was a most destructive gale at Chester in Cheshire, *England*.<sup>212</sup>

In 1702, there was a flood that ruined the watermills at Congleton in Cheshire, *England*.<sup>212</sup>

In 1702, the price of wheat [in *England*] averaged 29 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

The summer of 1702 was again unusually hot. The summer in Paris, *France* was characterized by:

Hot days	47 days
Very hot days	5 days
Extremely hot days	3 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperatures occurred on 28 & 29 July and 5 August. In Dijon, *France*, in Burgundy the grape harvest began on 16 September.<sup>62</sup>

At Augsburg, *Germany*, the weather had a southerly moist constitution till after 11 March, then a clear east wind to 1 April. Then there was a strong south wind and often snow and sleet, succeeded by frequent rains till after the 1<sup>st</sup> of May. Then an east wind brought clear weather. But the spring was very dry, late and slow. June set in with a south wind and great rain, with the exception of a few clear days. July began very hot, but with thunder, lightning and cool rain soon followed. From the rising of the Dog-Star [Sirius], there was clear hot weather. August was mostly clear and hot. In November began an early winter with frost and often snow. But these were soon thawed by mild air and rain. This variety of frost, rain, and snow with south winds chiefly finished the year.<sup>72</sup>

In *England*, to the latter end of February it was very rainy and floody. On 3 February, there was a dreadful storm that did great damage. To the latter end of February, there was pleasant weather with a mixture of frost and snow. During 5 to 24 March in Hertfordshire, there was such unseasonable heat, normally the weather found in July. During March of this year, there were no clouds or rain; the ground was all dust. (There was no March like this from 1695 to 1741). On 24 and 25 March at night there were high winds and storms of hail. The 26<sup>th</sup> of March was so cold that it froze within doors. The weather was backwards until the middle of April. On 22 April, there were fine large dews, which brought spring on again. After this, there was perpetual dry weather. Hay harvest began in the beginning of May. All of June had fine weather. On 16 July, wheat was cut. There was an excellent summer until the beginning of October. Beginning on 6 October, there were some rainy days, a great deal of lightning and very loud thunder with a fierce storm of rain. To 8 November there was fine sunshine weather, with frosty nights. Then to the end of December, continual rains and wind, except some small frost that closed November.<sup>72</sup>

In Yorkshire, *England*, the first attempt at tillage was made on 10 April, when the weather was so intolerably sultry hot, that in about six miles compass, 37 or 38 draughts of oxen were killed. The likes of which occurred in severe other places.<sup>72</sup>

On 21 June 1702 at Hatfield, Yorkshire, *England*, there was a land-spout [tornado], like those at sea [waterspout].<sup>72</sup>

In 1702, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu. During the period between 27 May and 24 June, a flood struck Anhwei (now Anhui province) in eastern *China* at Ying-shan; Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ên-hai; and Kansu (now Gansu province) in northwest *China* at Ning.<sup>153</sup>

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**1703 A.D.** [In *Germany*], the south winds and mild weather continued to 18 January. Then there was severe cold cloudy weather that produced snow, which lasted until 26 January. Then gentle showers prevailed. The cold spring hindered vegetation till a mild season hastened on the fruitful year. The dog-days began clear and moist, but ended clear and hot, but rainy at last. After this the weather was inconstant. About 8 September, south winds brought in much rain and a frightful wind. A humid southerly constitution prevailed till after the solstice; then a clear east wind brought in severe cold, which prevailed until the end of the year.<sup>72</sup>

The River Thames in London, *England*, rose so high at Westminster, that the lawyers were brought out of the hall in boats.<sup>40</sup>

This was a very mortal summer in *England*. The rainy season, which began in November 1702, continued till far into February 1703. From the 14<sup>th</sup> to the 28<sup>th</sup> of February, there was fine sunshiny weather. But there was a hard frost from 17 to 23 February. It was the greatest frost this year with some little snow. With the exception of a few storms, all March and April was lovely mild sunshine weather, hot and dewy, often sultry hot, an early spring. From 4 to 11 May, there were continual cold rains. From 11 to 16 May, there was hot sunshine. On the 16<sup>th</sup>, it was excessively hot with much thunder and lightning and soaking showers. From 16 to 21 May, it was pleasant. Then to the 30<sup>th</sup>, there was an abundance of cold rains. From 1 to 5 June, the weather was pretty good. From 5 to 18 June, there was not a day free from rain. This was dark blustering dismal weather, like November. Bees were swarming in May, starved with cold and rains. All roads were flooded. From 18 to 20 June, the weather was good. But then to the 24<sup>th</sup> it was still worse with cold wet weather and much hail. The roads were never worse in any winter. Then to 28 July, there was fine summer weather and no rain. Then to the end of July all rain. On 31 July from nine o'clock at night to nine o'clock in the morning there was incessant dreadful thunder and lightning and much hail. August had no rain. Never was such a crop of hay and grass everywhere, except in the marshes. September began with nipping frosts. There was terrible thunder and

lightning on 11 September. After this was much rain. October was mild to the 23<sup>rd</sup>, then very wet and blustery weather to the end. On 22 November, there was calm sunshine but the thunder could be heard roar all day five miles distance from the shore. The 23<sup>rd</sup> was bright and the 24 & 25 there were steams, and then on the 26<sup>th</sup> began a memorable hurricane, or dreadful storm, which as far exceeded all others, as stormy were above a common gale. This Nation sustained more loss at sea by this storm, then ever it had by any engagement with an enemy. It was followed by a length of dry weather, which was happy. All the houses were striped, and only covered with deal boards, till tiles could be got. The demand for them was such, that they were 30s. per 1,000.<sup>72</sup>

In 1703, it was very wet from April to July and from September to November in Southern *England*. In Northern *England* it was not so rainy. July was dry.<sup>212</sup>

On 15 May 1703 in northern *France*, at Illiers [now Illiers-Combray] there were hailstones as large as a fist.<sup>93</sup>

In 1703, the price of wheat [in *England*] averaged 36 shillings per quarter [quarter ton].<sup>212</sup>

On 18 October 1703, an Atlantic hurricane struck Virginia and Maryland in the *United States*. Several vessels were driven to sea, and no more heard of.<sup>141</sup>

In 1703, a violent hurricane struck Virginia in the *United States* causing much damage to ships and plantations of the colonists.<sup>174</sup>

In 1703, several gales struck *England*. November 3 produced a violent gale. November 25 - 27 produced an extremely violent gale at Upminster. At Lewes, it caused great destruction; also at Norwich, Beccles, Sudbury and Colchester. From November 26 to December 1, there was the "Great Gale" that was so disastrous as to fill a volume of the "Philosophical Transactions of the Royal Society" with accounts of it. Probably surpassing all others on record. On December 8, there was a dreadful hurricane in *England*. On December 27 & 28, there was a violent gale at Leeds.<sup>212</sup>

From 26 November to 1 December 1703, a great gale struck *England*. Twelve men-of-war (with 1300 [1800] men on board) were lost in sight of land. London sustained a damage of £2,000,000. In Kent alone 17,000 trees were uprooted. Eddystone lighthouse was destroyed. The Lord Bishop of Bath and Wells and his wife were killed in bed in his palace. In the floods occasioned by it on the river Severn and river Thames and coast of Holland [now *the Netherlands*], 8000 persons lost their lives. In one place 15,000 sheep were drowned. It was called the Great Storm, and probably the most terrible that ever occurred in *England*. In Kent, 1107 houses and barns were destroyed, 500 grand trees in Penshurst destroyed, and 920 wherries, ships, boats, and barges sunk. Tiles rose from 50s. to £10. Defoe says, "Horror and confusion seized upon all, no pen can describe it, no tongue can express it, no thought conceive it, unless some of those who were in the extremity of it."<sup>212</sup>

On 26 November 1703, a destructive storm struck the coast of *England*, in which thirteen sail of British men-of-war were lost, and fifteen hundred and nineteen officers and seamen perished. A great many other vessels, with their crews, were also lost and an immense amount of other damage was sustained.<sup>1</sup>

In *England* on 26 November 1703, there was a great hurricane. "All the ships in the river, from London Bridge to Limehouse, with the exception of four only, were broken from their moorings and thrown on shore. Upwards of four hundred wherries were entirely lost, more than sixty barges were driven foul of London Bridge, and as many more were either sunk or staved above bridge. The loss of life was also very considerable."<sup>29</sup>



On 26 & 27 November in *England*, one of the most terrible storms on record; known as the “Great Storm” occurred. The devastation on land was immense, while on the coasts and in the harbors the loss of shipping was terrible. The loss of life was very large, and sheep and cattle were drowned by thousands from the floods occasioned, especially in the Severn and Thames valleys. The loss of property in London was estimated at 1,000,000*l*. Eddystone lighthouse was destroyed and its constructor (Winstanley) in it. On the coast of Holland [now *the Netherlands*] great damage was done.<sup>47, 57</sup>

On 26 November 1703, a great hurricane struck *England*. Several thousand persons were drowned in floods along the River Thames, in London. The hurricane destroyed property in London valued at \$10,000,000. [In present currency, that would be equivalent to \$272 million in damages based on the Consumer Price Index (CPI) inflation rates.] This tempest was known as the "Great Storm".<sup>197</sup>

The most terrible storm that had ever been known in *England*; attended with flashes of lightning occurred on November 27. The storm unroofed many houses and churches, blew down several chimneys and the spires of many steeples, tore whole groves of trees up by the roots, and the leads of some churches were rolled up like scrolls of parchment, and several vessels, boats, and barges were sunk in the River Thames – but the Navy suffered the greatest damage, being just returned from the *Mediterranean*, one 2nd rate, four 3rd rates, four 4th rates, and many other of less force, were cast away upon the coast of *England*, and over 1,500 seamen lost, besides those that were cast away in the merchants’ service – in London only, the damage was estimated at a million.<sup>40, 41, 43, 56</sup>

During the night of November 26, commenced the most dreadful tempest ever known in *England*, attended with vivid flashes of lightning. Houses were unroofed; steeples of churches blown down; while the largest trees were torn up by the roots. Several vessels were sunk in the Thames, and the royal navy in particular was seriously injured, and 1,500 seamen perished, besides those cast away in mercantile vessels. The loss sustained by London alone was computed at a million sterling, while Bristol lost 200,000*l*. Among the persons drowned was Admiral Beaumont.<sup>55</sup>

On 26-27 November 1703, the "Great Storm," was one of the most terrible that ever raged in *England*. The devastation on land was immense; and in the harbors and on the coasts the loss in shipping and in lives was still greater. The loss sustained in London alone was calculated at 2,000,000*l*. Sterling. The number of persons drowned in the floods of the Severn and Thames rivers in *England*, and lost on the coast of Holland [now *the Netherlands*], and in ships blown from their anchors and never heard of afterwards, is thought to have been 8,000. Twelve men-of-war, with more than 1,800 men on board, were lost within sight of their own shore. Trees were torn up by the roots; 17,000 of them in Kent, *England* alone. The Eddystone lighthouse was destroyed, and in it the ingenious contriver of it, Winstanley, and the persons who were with him. [The Eddystone lighthouse is located on the Edystone reef, 14 miles off Plymouth.] The Bishop of Bath and Wells and his lady were killed in bed in their palace in Somersetshire, *England*. Multitudes of cattle were also lost: in one level 15,000 sheep were drowned.<sup>90</sup>

Kinder, the Bishop of Bath, and his lady were killed in a great storm in *England* in 1703 from falling chimneys.<sup>40</sup>

In 1703, a dreadful tempest struck *England*.<sup>128</sup>

On the night of 26/27 November 1703, a tempest of extreme violence struck *England*. It was preceded by a very wet season lasting about 6 months. “About 10 o’clock [in the evening] the barometers informed us that the night would be very tempestuous – the mercury sunk lower than ever I had observed it on any occasion.” Because of the severity of the storm, between 1 and 2 o’clock in the morning, most people lying in their beds, expected the fall of their houses. The bricks, tiles, and stones, from the tops of the houses, flew with such force, and so thick in the streets, that no one thought fit to venture out, though



their houses were near demolished within. The fury of the wind was greater than was ever known; the noise had also something in it more formidable; it sounded aloft, and roared not very much unlike remote thunder. From 2 o'clock the storm continued and increased to 5 o'clock. Between 5:30 and 6 o'clock, the storm reached its peak. During this time several ships, that rode it out until now, gave up all – for no anchor could hold. Even ships in the River Thames were all blown away from their mooring, and from Execution-dock to Limehouse hole, there were but four ships that rode it out. The rest were all driven down into the Bight, as the sailors called it, from Bell wharf to Limehouse, where they were huddled together and drove on shore, heads and sterns, one upon another, in such a manner as any one would have thought it had been impossible. The storm continued for seven days but to a lesser degree. The storm spread over a great part of northern Europe. Over most parts of south *Britain* and *Wales*, the tallest and stoutest timber trees were uprooted or snapped in the middle. It was estimated that 25 parks in several counties each lost a thousand trees and those of New Forest, Hants above four thousand. Whole sheets of lead were blown away from the roofs of strong buildings. Seven steeples, over four hundred windmills and eight hundred dwelling houses were blown down in addition to barns, out-houses and a great number of orchards. About 120 persons lost their lives on land. At least eight thousand seamen perished. The estuary of the Severn suffered much by the breaking in of the sea. The country for a great extent was inundated, the vessels driven upon the pastureland, and many thousand sheep and cattle were drowned. The spray of the sea was carried far inland in such quantities, as to form little concretions or knobs of salt on the hedges; and 25 miles from the sea, in Kent, made the pasture so salty, that the cattle for some time would not eat it. The total damage was estimated to exceed that of the Great Fire of London.<sup>175</sup>

A vessel laden with tin, being left in a small port of Helford near Falmouth, *England*, with only a man and two boys on board, drove from her four anchors at midnight [26/27 November 1703], and went to sea. This vessel made such speed from the wind, almost without a sail, that by 8 o'clock in the morning, by the presence of mind of one of the boys, she was put into a narrow creek in the Isle of Wight, and the crew and cargo saved. This run may give us some conception of the velocity of the wind. For if we consider that the course of the vessel, even by the winds, could not have been direct, but in a large curve outwards from the coast; the rate at which she went exceeded 30 miles per hour on average. As a result the winds from this hurricane must have been three or four times greater.<sup>175</sup>

On 26 November 1703, a dreadful hurricane struck *Great Britain*. The great storm, set in at ten at night, and raged violently until seven the next morning. It extended its destruction to every part of the kingdom. In the capital [London], upwards of two thousand stacks of chimneys were blown down. The lead on the tops of several churches was rolled up like skins of parchment. Many houses were leveled with the ground, and by the fall of the ruins, 21 persons were killed, and more than 200 wounded. The ships in the River Thames broke from their moorings: four hundred wherries [a type of boat that was traditionally used for carrying cargo or passengers on rivers and canals in England] were lost, and many barges sunk, with a great loss of lives. At sea, the destruction was still greater: twelve ships of war, with upwards of eighteen hundred men onboard, were totally lost, together with many merchantmen.<sup>191</sup>

On 26 November 1703, a Great Storm of wind devastated *England*. The storm lasted from noon on Wednesday 24 November to noon on Wednesday 1 December with the storm reaching the intensity of a perfect hurricane on 26 November [Julian Calendar].<sup>209</sup>

— The *Paris Gazetteer* stated there were 30,000 seamen lost in several ports of *England* and 300 sail of ships [sailing ships] were destroyed in this great storm. [I have seen several estimates of the damage caused by this storm on the shipping and they vary significantly from one another. And the final count will never be known. I can understand the difficulties of coming up with an exact count of the number of seamen lost and the number of sailing ships destroyed in this great disaster. On the River Thames near London, almost 700 ships were smashed together in one great heap. In many cases these ships were manned by only a skeleton crew with most seaman on shore leave. Had they been fully manned, the casualties would be astronomical. Many of the ships that took shelter along the coast, were terribly

battered and suffered great damage during the storm and only then broke anchor in the final fury of the storm and drifted out to sea and were never seen again. The ships in British ports and along the coast hailed from around the globe. There was a Russian Fleet of nearly 100 sails. There was a great fleet of colliers, nearly 400 sails. There was a fleet of ships from the Royal Navy just arrived from the Mediterranean. There was a fleet of transports and tenders from Ireland and another fleet of victuallers, tenders, storeships and transports. These two fleets were set to accompany the King of Spain to Lisbon. There was the Grand Fleet of about 300 sails. There were hundreds of merchant ships including East Indiamen. There was a fleet of ships from America (the Virginia fleet). There was the Barbadoes [Barbados] fleet. In Holland [now *the Netherlands*] there was a fleet of 180 sails that included a fleet of transports, several English Men of War and the Dutch Fleet. Therefore an exact account of losses was left in historical obscurity. Although the original copy of the book contained a listing of the ships of the Royal Navy lost in this storm, they unfortunately were not in the copy I had access to; therefore I was unable to report on these vessels.]

— Many ships fled into British ports ahead of the advancing storm. Of the ships that could not make it into port, and rode out the great storm at sea, 43 sails [sailing ships] were lost. Captain Soanes was Commandore [Commodore] for a Squadron of Men of Wars located at Milford Haven, *Wales* when the storm struck. He reported that in that harbor, there were about 130 merchant ships. During the storm, 30 of the merchant ships were lost, and 3 additional ships went missing. At Grimsby Road [seaport on the Humber Estuary in Lincolnshire, *England*], of the eighty sails [sailing ships] at the seaport, only 16 remained, the rest were blown away. Three ships were cast ashore on Den Island at the mouth of the River Humber. One of these ships completely overturned. There were 26-27 ships driven out to sea from the River Humber and most of these ships were never heard of again. In the port in the county of Norfolk, 7 ships were lost in the storm and about 20 seamen perished. An account from Bristol related that the storm moved most of the ships in King Road a considerable way inland, some ships were much shattered and several seamen were lost. One large vessel broke all in pieces with nearly all the seamen lost. At Huntspill in Somersetshire, 5 vessels were driven ashore. In the harbor at Swanzy in *Wales*, 9 vessels were driven ashore and one vessel was staved to pieces, and 3 seamen drowned. BRIGHTHELMSTONE [now Brighton] in Sussex reported it lost 3 ketches [sailing ship with 2 main masts] and 1 pink [small ship with narrow stern, generally flat bottom, large cargo capacity and square rigged]. Of these ships all but 7 of the ships company were drowned. An additional ketch and pink were driven ashore and stranded. LYMINGTON reported that one ship was cast ashore, and 14 seamen perished. LYME reported one vessel lost and a privateer of 8 guns was cast ashore. The privateer lost 40 seamen. The Isle of Thanet reported that a ship *Latchford* was lost with all the men and women passengers aboard, along with a pink that was blown away. At Southampton, most of the ships on the river and of the keys were blown ashore, some partly torn to wrecks. A sailor at the Downs reported that four 3<sup>rd</sup> Rate ships, the *Mary*, *Northumberland*, *Sterling Castle*, and *Rejuvenation* were all sunk and the sailors drowned, over 1,500 seamen. He also reported that four other ships including 3 hospital ships were split, some sunk and most of the men drowned. Also there were 40 merchant ships that were cast away and sunk. In King Road at Bristol, the *Canterbury* store ship was driven ashore, and 25 seamen drowned. Also the *Richard*, *John*, *George* and *Grace* were sunk with many seaman lost. Overall, there were about 70 seamen lost at Kings Road. At Yarmouth Road, there was a great Fleet of about 330 colliers, and a great fleet from Russia and a reserve frigate convoy. There were 2 Men of War and about a hundred sails of coasters. Many of these ships sustained significant damage during the Great Storm and many broke anchor. The fate of many of these is not known. But at Yarmouth, one ship from the Russian Fleet was sunk, not one man saved. Another ship from the Russian Fleet broke anchor and smashed into a Collier and they both sank. The Reserve Frigate [Frigate] foundered in Yarmouth Roads and all her men were lost. A Man of War was lost off of Harwich but its crew was rescued. At Plymouth, the ships *Edystone* and *Winchelsea* were lost. Three other merchant ships were cast away in Plymouth Road and most of their men lost. At Portsmouth, several ships were blown out to sea and never heard from again. One of these ships, the *Newcastle* was lost off the Coast of Sussex with all their men but 23 drowned. The ships *Resolution*, *Eagle*, and *Litchfield* were also lost except their crews were saved. Several ships from Cows [Coves] were driven

out to sea. One of these ships full of soldiers ran aground in Stokes Bay. Two merchant ships that were driven out to sea were never heard from again. At Falmouth, 11 sails of ships were washed ashore. In Barstable Harbor, a merchant ship was overturned, and the expert advice boat was very much shattered, and the Key of the Town almost destroyed. Of the 11 or 12 ships that fled to the Coast of Holland [now *the Netherlands*], most were lost.

— The author of the book estimated that 8,000 men were lost at sea, counting those lost on the coast of *Holland*, those on ships that were blown away and never heard from again, those that drowned in the flood of the River Severn and in the River Thames. He also estimated around 123 people were killed on land in *England* during the storm. The author estimated that the losses from the Great Storm far exceeded the losses sustained in the Great Fire of London (which some have estimated at 4 million sterling [£571 million in present currency using the retail price index inflation rate]). The Great Fire was concentrated in the city of London, among the wealthiest part of the people. The Great Storm was spread out over the entire country affecting rich and poor alike, and almost everyone lost something in this storm.

— There were several great ships fast aground at Goodwin Sands. Many seamen off these broken wrecks managed to make their way ashore at Goodwin Sands during low tide but were trapped there and frantically signaled for help. But in the town of Dover in Kent, *England*, even though the townsfolk saw the signals, no one responded with a helping hand. Mr. Thomas Powell, the mayor asked the Custom House Officers to aid these seamen in their distress but they refused. He then rounded up several stout honest men from the village and offered them out of his own pocket, 5s per head for each sailor they saved. They then went to the Custom House and took their boats by force. As a result, the lives of 200 seamen were saved. Upon bringing these seamen, who were almost dead from cold and hunger, back to town, the mayor requested assistance from the Queen's Agent for Sick and Wounded Seamen, but the agent would not relinquish one penny. Mr. Powell then provided the seamen with meat, drink and lodging out of his own pocket.

— On the River Thames, all the ships, except 4, between the upper part of Wapping and Ratcliff Cross were blown away. They were all driven into the bay from Ratcliff Cross and Limehouse Hole. This great number of ships, around 700 sails of ships [sailing ships], was smashed into one large heap. Some vessels lay heeling off with the bow of another ship over her waist and the stem of another upon her fore-castle. The boltsprits [bowsprits] of some drove into the cabin windows of others. Some lay with their sterns tossed up so high, that the tides flowed into their fore-castles. Some lay so leaning upon others, that the undermost vessels would sink before the others could float. Near Gravesend, many ships were driven ashore below Tilbury Fort. There were also 500 wherries [a boat used for carrying cargo or passengers on rivers and canals] lost, dashed to pieces, along with 300 smaller ship boats. There were 60 barges and lighters that were driven foul of the Bridge and another 60 that were sunk or staved between the Bridge and Hammersmith.

— The city of London was devastated. The houses looked like skeletons and there was a universal air of horror on the people who emerged from their homes after the storm. The city streets were rubble heaps. About 2,000 chimneys were blown down. The chimneys in the city buildings were built of large stacks. The houses being so high, that when these chimneys fell, they demolished the houses they fell upon. The storm also destroyed the gable ends of houses, blew off some roofs and demolished 16-20 houses completely. In addition many garden walls came down. The lead on top the churches and other buildings were rolled up like a roll of parchment. These included Westminster Abby, St. Andrews Holbourn [Holborn], and Christ Church Hospital.

— After the storm, the streets of London were covered with [roof] tiles and slates that fell from the tops of houses. As a result, the price of tiles rose astronomically from 21s to £6 per thousand for plain tiles. Also the bricklayers increased their labor prices to extraordinary levels. As a result, many individuals refused to pay these exorbitant prices and instead resorted to wood (deal boards) to repair the roofs of their houses. Many houses were open to the elements and a rainstorm could easily destroy the contents of these buildings in this state. But the weather held for 3 weeks and in that time the roofs of many houses were covered with deal boards, old tiles, pieces of sail cloth, tarpaulin, and the like.

— Twenty-one people died on land in the storm in London and 200 were wounded or maimed; many of

these from falling chimneys. In addition there were 14 people drowned in a Wherry [a boat used for carrying cargo or passengers on rivers and canals] going to Gravesend and 5 in a Wherry from Chelsey [Chelsea]. Others drowned in the river but their bodies were never recovered.

— In the countryside, towns and villages reported damage similar to that seen in London in the counties of Oxfordshire, Berkshire, Somersetshire, Gloucestershire, Northamptonshire, Yorkshire, Wiltshire, Warwickshire, Hampshire, Hartfordshire, Herefordshire, Kent, Devon, Worcestershire, Southampton, Cambridge, Cornwall, Suffolk, Sussex and Surrey in *England* and in the cities of Cardiff, Laneloe and Monmouth in *Wales*. The storm was of greater intensity in the south of *England*. The River Severn rose to great heights and flooded inland over a mile. The storm destroyed seawalls. The storm blew down many trees by the roots, even large 80-foot [24-meter] tall trees. In the county of Kent, 1107 dwelling houses, outhouses and barns were blown down. Many cattle, sheep and other animals were drowned. The damage done by the tide on the banks of the River Severn, amounts to over £100,000; 15,000 sheep drowned. At North Marsh, the water broke with such violence that it drove 6 miles [10 kilometers] into the country drowning many cattle. Over 80 people drowned in the marshes and river at Bristol, several whole families perished together. The high tide at Bristol spoiled 1,500 hogsheads [approximately 95,000 gallons, or 360,000 liters] of sugar and tobacco. Throughout *England*, the storm took down many chimneys and roof tiles. There was incredible damage done to the churches, houses and barns. About 400 windmills were blown down.

— Throughout *England*, most of the high trees were broken down by the fury of the storm. The storm caused great destruction to the orchards throughout *England*. In Slimbridge, the storm took down a vast flourishing elm tree by the roots. The roots were 1 ell [3.75 feet, 1.1 meters] deep, and 18.5 feet [5.6 meters] in diameter. At Swanzy in *Wales*, one gentleman had 2,500 trees blown down. Many of the large trees were broken in the middle; others were uprooted. At White Larkington Park, 400-500 tall trees were blown down. In Brocket Hall Park, two miles outside Hatfield, about 1,000 trees were blown down. In her Majesty's forest called New Forrest near Limington, 4,000 trees, some of great bulk, were torn up by the roots. During a circuit through Kent, over 17,000 fallen trees were counted. Twenty-five parks scattered over several counties, had over 1,000 trees blown down. And 450 parks and groves, had between 200 and 1,000 large trees blown down.

— The force of the wind was great. At Ewell, it blew the lead off a flat roof, over a brick wall 10 feet [3 meters] high carrying it a distance of 6 rods [99 feet, 30 meters] from the house. The lead weighed 10 tons. At Whitstable, the winds lifted a boat out of the water and flung it 50 rods [825 feet, 252 meters] onto dry land, breaking the knee of a man to pieces, who was standing in its way. At Chartham, the lead from a church was rolled up and blown 20 rods [330 feet, 100 meters] distance. The lead weighed over 2,600 weight [about 2,910 pounds]. At Leamington Hastings, six sheets of lead were rolled up like cloth and hurled 151 feet [46 meters] away. The lead roll weighed 50 hundredweight [5,600 pounds]. It most likely would have traveled further except it flew into a tree.

— At Besselsleigh in Berkshire, this Great Storm spawned a tornado.

— The rainwater was brackish [saltwater] 25 miles [40 kilometers] from the sea to the windward direction. The cattle and sheep would not eat the grass for several days because of the salt.

— This storm reached beyond *England*. In Dunkirk, *France*, the 23-27 vessels in the road [roadstead] were dashed to pieces at Peer Heads. The effects of the storm were felt in Diepe [Dieppe] and in Paris and in the northeast countries such as Holland [now *the Netherlands*]. Her Majesty's ship *Association*, a second rate of 96 guns was anchored off Long Sand Head [in the Thames Estuary] during the hurricane. She was driven from her anchor and almost floundered taking in vast quantities of water. She was then driven north to the bank of *Flanders* [now *Belgium*], then the coast of *Holland* and *Friesland* [now the *Netherlands*] to the entrance of the Elb [Elbe] River where the storm was almost as violent as it was when they broke anchor in *England*. She was then driven to the coast of *Norway*.

In 1703, there was a famine in *India* in Thar and Parkar districts of Sind [now Sindh in southwestern *Pakistan*].<sup>57</sup>



In 1703, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

In 1703, floods struck many regions of *China* including:<sup>153</sup>

— Shantung (now Shandong province) on the east coast of *China* at Kao-t'ang, Tung-a, Ch'ing-ch'êng, Yang-ku, Lin-i, P'ing-yao and Ên. [Lin-i is located at longitude 118.24° East and latitude 35.07° North.]

— Hopei (now Hebei province) in northern *China* at Nan-yüeh, Ning-ching and Kuang-p'ing.

— Hupeh (now Hubei province) in central *China* at Chiang-ling and Chien-li.

— Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou.

— Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at P'ing-yüeh.

Houses were damaged by the floodwaters.

— During the period between 13 August and 10 September, floods struck Shantung province at P'êng-lai.

— During the period between 8 December 1703 and 6 January 1704, floods struck Shensi (now Shaanxi province) in central *China* at Nan-chêng and Shantung province at Tsinan.

In 1703 during the 3<sup>rd</sup> moon in the vicinity of Shanghai, *China*, there was an overflow of the sea. Then during the autumn, there was a flood.<sup>166</sup>

In 1703 during the period between 16 April and 15 May, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hsüan-p'ing. During the period between 14 June and 13 July, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Hêng. During the period between 14 July and 12 August, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lien.<sup>153</sup>

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**1704 A.D.** In *England*, it was the hottest and driest summer known for previous twenty years.<sup>47, 72</sup>

In *England*, January set in with a hard frost. Ice was three inches thick. On the 19<sup>th</sup> of January, there was stormy weather. On the 20<sup>th</sup>, there was a very great storm with a tempest of thunder, lightning and hail in Cornwall in extreme southwestern *England*. The grand fleet with the King of Spain driven back, and 11 lesser ships lost on the back of the Isle of Wight. There was warm weather. On 11 February, there was the first rain worth notice. Since the great storm, weather was exceeding dry. The shower of 11 February was succeeded by clear hard frosty nights and days of sunshine. There was no more rain until June and then only a little. July and August was exceedingly dry. This was the best salt [making] season, Yarmouth had in 20 years. September began still dry, and then there was much rain by stormy showers. The last four days of September was glorious summer weather. In October, there was a great scarcity of water for cattle. It was remarkably warm and no ice. On the second week, there was a little rain. On 21 October, there was a storm with extremely high tides. November began with dismal rain and wind, but the temperature was warm. On 8 and 9 November, there was a great storm. Then there were some fine days. On the 23<sup>rd</sup>, there was a little ice. December began dull, but from 4 to 14 December, there was warm sunshine. But there were frosts at night. Afterwards it was sunshine with blustery winds till Christmas, then good to the end of the year. This was a most droughty year. The grass was all burnt up.<sup>72</sup> [The grand fleet with the King of Spain was an Anglo-Dutch Fleet carrying Charles VI, Holy Roman Emperor, the Hapsburg claimant to the Spanish Throne as Charles III, against (French) claims to the Throne in the War of Spanish Succession. The Fleet, carrying Charles, sailed from Portsmouth for Portugal on January 5 but were driven back by a storm and remained until February 12 when it sailed for Lisbon.]

In July 1704, there was an inundation of the River Nyne in Northamptonshire, *England*.<sup>195</sup>

The summer of 1704 was remarkably hot and dry [in *England*]. “We had in this county [Northamptonshire] more lightning and thunder than ever I have known before or since.”<sup>195</sup>

In 1704 in Venice, *Italy*, the drought was so considerable that water had to be fetched five leagues [15 miles, 24 kilometers] off.<sup>212</sup>

In 1704, the price of wheat [in *England*] averaged 46 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

On 26 November 1704, a furious and destructive storm struck Northamptonshire, *England*. At Cranford, it caused great damage including breaking the steeple of St. John down to the battlements, which then caused the destruction of much of the church.<sup>195</sup>

The summer of 1704 in Paris, *France* was characterized by:

Hot days	41 days
Very hot days	11 days
Extremely hot days	9 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperatures occurred on 13, 24, 26, 27, 29 July and 23, 28, 29, 30 August. In Dijon, *France*, in Burgundy the grape harvest began on 12 September.<sup>62</sup>

At Augsburg, *Germany*, this was a temperate favorable year throughout.<sup>72</sup>

In 1704, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 6 March and 3 April, floods struck Hopei (now Hebei province) in northern *China* at Ching; the Han River in Shensi (now Shaanxi province) in central *China*; and Hupeh (now Hubei province) in central *China* at T'ien-mên, Mien-yang and Chien-li.

— During the period between 2 June and 1 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lien; Kiangsu (now Jiangsu province) on the east coast of *China* at Huai-an [uncertain name, “Shan-yang”]; Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu; Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou; Hupeh province at Hanyang, Han-ch'uan and Chien-li; and Hopei province at Hsing-t'ai.

In 1704, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Ch'ing-p'u, P'ei and Lin-ch'ü; and Shantung (now Shandong province) on the east coast of *China* at Lin-i and Kuang-jao. [P'ei is located at longitude 117.00° East and latitude 34.47° North and Lin-i is located at longitude 118.24° East and latitude 35.07° North.]

— During the period between 2 June and 1 July, a drought engulfed Kansu (now Gansu province) in northwest *China* at Ching-ning and Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ü.

— During the period 2-31 July, a drought engulfed Shansi (now Shanxi province) in northern *China* at Chiang.

— During the period 30 August and 28 September, a drought engulfed Yunnan province in southwest *China* at Yung-p'ing.

**Winter of 1704 / 1705 A.D.** The winter was intensely cold and stormy in the Philadelphia area in the *United States*. In December, snow fell to the depth of three feet (0.9 meters) on the level. The Delaware River was fast with ice two feet (0.6 meters) thick, from the 10 December 1704 to the 10 March 1705.<sup>1</sup>

In Philadelphia, Pennsylvania in the *United States* the winter of 1704 was long and severe, with many deep snows.<sup>1</sup>



Norris describes the cold winter in Philadelphia, Pennsylvania in the *United States*: “We have had the deepest snow this winter, that has been known by the longest English liver here. No traveling; all avenues shut’ the post has not gone these six weeks; the river fast; and the people bring loads over it as they did seven years ago. Many creatures are like to perish.”<sup>27</sup>

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**1705 A.D.** In *England*, it was very dry until the end of August.<sup>47, 72</sup>

In *England* from the winter to March, the weather was exceeding dry. Only February began with a little rain. In March to the 15<sup>th</sup>, the weather was mild and dark with fogs. On the 19<sup>th</sup>, there was a storm and continued cold. It was a time of extremity, several cold hails, no rain and a backwards spring. April was full of clear sunshine. On the 20<sup>th</sup>, there were two loud claps of thunder to the west without rain. The month ended with a few showers. From 1 to 8 May, there were some showers, but generally dry and calm all the month. On 1 to the 15<sup>th</sup> of May, there was exceedingly cold weather both day and night. It killed the fern. June was hot with little rain. July had fine weather with some thunder about the middle of the month. On 11 August, there was a dreadful storm or hurricane. There were 800 sailors lost. The news was full of losses by sea and by land. There was a great drought in some places. No rain since May-day, in other places no rain since Lady-day. But from August the 15<sup>th</sup>, all showery and wet. Much corn grown and spoiled. The month of August ends cold. September begins cold and rainy, yet generally every other day is hot. The middle of September was pretty dry and the hottest. On 24 September, there was a great tempest at Yarmouth of rain, lightning, thunder, loud and near. This was followed by fair weather and sunshine. From 1 to 4 October, there was fair weather and sunshine; the 6<sup>th</sup> was rain; from 7<sup>th</sup> to 19<sup>th</sup>, there was calm and glorious sunshine; to the 24<sup>th</sup> cold dry blustering weather, then clear cold airy, sunshine to the end of the month. November was extremely cold. There was frost and snow lying unthawed from the 15<sup>th</sup> to the 19<sup>th</sup>. On 19 November there was rain and stormy weather. November ended with sunshine, frost, sleet, and much rain by squalls (showers with a gust of wind). December was extremely wet. In general, more rain fell in the latter end of November and through December than in the entire year. Hence in December, there were great and frequent showers on 6, 7, 8, 9, 19 and 28 December. On the 29<sup>th</sup> of December, a dreadful storm struck *France*. Tides rose up in the Loire River, 25-feet beyond normal – 118 ships, 6 of them Men of War driven ashore. The same occurred in *Ireland*. Half of Limerick was drowned. The ships came onto the keys. Such a flood was never seen before.<sup>72</sup>

In 1705, gales struck Upminster, *England* on March 30, April 5, August 11 and September 29.<sup>212</sup>

In *England* in June, the weather was excessively hot and dry. The tempest of 11 August was followed by much rain; yet so great was the drought before, that in September, all ponds were dry, and grass burnt up.<sup>72</sup>

In *Ireland*, there was a flood in Limerick; half Limerick drowned.<sup>47, 92</sup>

There were great rains and floods over the continent of *Europe*.<sup>47, 92</sup>

In 1705, the price of wheat [in *England*] averaged 30 shillings per quarter [quarter ton].<sup>212</sup>

In *Germany*, to the 1<sup>st</sup> of June, it was very uncomfortable, cold, snowy, rainy, windy with a late spring. In June it was clear and cold to the 8<sup>th</sup>, then rainy to the 11<sup>th</sup>, hot to near the end of the month and then cooler. The dog days were excessively hot and dry, but these were followed by a moist cold season. The rest of the year was moist and the weather changeable.<sup>72</sup>

The summer of 1705 was extraordinary because of the unusual heat in southern *France*. In Montpellier in southern *France*, especially on the 30<sup>th</sup> of July. "In my memory," Francois de Plantade, an assistant of Cassini wrote, "is not to find similar to this day, the air almost as hot as hell, as that which emanates from

the furnace of a glass factory, and found no" other refuge than the basement. At several places, eggs were boiled in the sun. In Hubin's thermometer, the liquid broke through the top. Amontons thermometer, although it was attached to a place where the air had no free access, rose almost to the degree in which it melts the tallow. The greater part of the [grape] vines burned on that single day, a phenomenon that had not happened in living memory in this country.<sup>62</sup>

The summer of 1705 in Paris, *France*, hardly produced any rain. The rainfall during 1705 was equal to around two-thirds of the average annual rainfall. Lyon was also affected by the drought.<sup>79</sup>

The summer in Paris, *France* was characterized by:

Hot days	33 days
Very hot days	13 days
Extremely hot days	5 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperatures occurred on 30 June, 5 & 27 July, 2 & 6 August. On 6 August the tube of Cassini's thermometer completely broke when the liquid met the top of the instrument. La Hire's thermometer broke the same day as well. The highest temperature of 6 August, calculated from the specification of a Fahrenheit thermometer, would be 102.2° F (39° C). In *England*, in the month of August there was a period of short intense heat. In Burgundy, as well as in Lyon, *France*, the heat of summer was not very great. The grape harvest began only on 15 September.<sup>62</sup>

The summer of 1705 produced extreme heat. In Montpellier, *France*, the fearsome heat appeared July 17 and lasted until August 30, almost without interruption. The maximum occurred on July 30, and this occurred about three o'clock in the evening [afternoon], to a degree really frightening. The air seemed to come from a fiery inferno. Everyone was choking and took refuge in the cellars. We could cook eggs in the sun. The heat of the day scorched most of the grapevines and fruit trees. A famous academician measured the temperature at 107.6° F (42° C) degrees in the shade and 212° F (100° C) in direct sunlight, the temperature of boiling water. The summer of 1705 was not extraordinary in Lyon or Paris. The peak temperature occurred in Paris on 6 August with a reading of 93.7° F (34.3° C).<sup>79</sup>

In 1705, a hurricane struck Havana, *Cuba*. Four men of war with most of their crew were lost.<sup>141</sup>

In 1705, a hurricane or waterspout struck Havannah [Havana], *Cuba* and four men-of-war, with most of their crews, were lost in the harbor of the Havannah, though the period of its lasting was not more than twenty-four hours.<sup>244</sup>

In December 1705 in the north of *France*, the furious winds of the south and southwest blew two or three times. On the evening of 3<sup>rd</sup>, thunder joined the hurricane.<sup>79</sup>

In 1705, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Jehol province at Ch'ao-yang. Jehol (formally Rehe province) was located north of the Great Wall, west of Manchuria, and east of Mongolia. In 1955, the area was divided between Hebei province, Liaoning province and *Inner Mongolia*.

— During the period between 23 April and 22 May, a drought engulfed Hupeh (now Hubei province) in central *China* at Lo-t'ien and Kiangsu (now Jiangsu province) on the east coast of *China* at Shanghai.

— During the period between 18 October and 15 November, a drought engulfed Hopei (now Hebei province) in northern *China* at Chü-lu.

In 1705, floods struck many regions of *China* including:<sup>153</sup>

- Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang, Fêng-ch'êng, Chi-an and Chi-shui.
- During the period between 8 August and 8 November, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Ch'ing-p'u and Lu-ho; and Hopei (now Hebei province) in northern *China* at Pai-hsiang.
- During the period between 16 December 1705 and 14 January 1706, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing; and Hupeh (now Hubei province) in central *China* at Sui, Wuchang, Han-ch'uan, Ch'ien-chiang, T'ien-mên, Mien-yang, Chien-li and Tang-yang. At Sui, houses were damaged by the floodwaters.

In 1705 during the 4<sup>th</sup> moon [early summer], there was a great rain for ten days, as cold as winter in the vicinity of Shanghai, *China*. Then during the 7<sup>th</sup> moon, there was a great drought.<sup>166</sup>

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**1706 A.D.** In *England*, from 14 December 1705 to 3 January 1706, the sun was not seen three times. The 3<sup>rd</sup> of January was a fine day. The 3<sup>rd</sup> to the 7<sup>th</sup> was overcast. On 7 January, it was very cold. On the 8<sup>th</sup>, it snowed all day. On the 9<sup>th</sup>, there was frost with some snow. On the 10<sup>th</sup>, there was an inch and a half of snow. On the 11<sup>th</sup>, there was a cold thaw, sleet, various weather, but mostly cold. There was frost and snow to the 25<sup>th</sup>. Then it snowed all day, three inches deep. There was wet weather to the end of January. February was dry, with fine sunshine, and frosty mornings. March began the same. From 8 to 14 March, it was blustering and very cold. The latter end of March was more moderate with three foggy days, yet hot at noon and sunshine. In April to the 9<sup>th</sup>, it was exceedingly cold with squalls of wind and rain. From 9 to 23 April, there was sunshine but very cold. Not normal April weather. On April 23<sup>rd</sup>, there was a hot sun but a cold night. April was a very dry month. In May to the 4<sup>th</sup>, there were rains and some thunder. From the 3<sup>rd</sup> to the 20<sup>th</sup>, it was very dry. On the 20<sup>th</sup>, there were fine ground showers, then showery till 8 June. Then there was dry weather to 10 July. There was a perpetual drought (except for some showers near London) till near the end of August. The beginning of September was wet and stormy. From 15 to 22 September, there was thunder and lightning. There was rainy foul weather. The winds were southwest for 14 weeks, which kept the Fleet from sailing all while in the channel. From 28 September to 8 October, there was fine sunshine moderate weather. October 8<sup>th</sup> was rainy. From 8 to 20 October, the weather was mostly fine. It was misty to the 24<sup>th</sup>. On 25 October, there was a great storm. Eight or nine vessels at Yarmouth were washed ashore; most in a wreck. On 26 October, it rained excessively. So much rain fell before 4 November, that the roads were never worse. On the 5<sup>th</sup> of November, there was frost and sunshine. The 6<sup>th</sup> to the 10<sup>th</sup> produced much rain, except on the 8<sup>th</sup> there was sunshine. From 10 to 12 November, there were such rains, that the post could not get into Yarmouth till the 14<sup>th</sup>, and even then he was fetched in a boat. To the 17<sup>th</sup> of November, nothing but rains, great and long. Then to the end of November, the weather was fine. From the beginning of December to the 4<sup>th</sup>, there was calm winds, overcast or fog. From 4 to 17 December, it was very wet with all sorts of weather. From the 18<sup>th</sup> to the 31<sup>st</sup>, the winds were southerly, most partly overcast, but a few clear days. December ended very cold.<sup>72</sup>

During the summer of 1706, there was extreme heat and drought in *England* and *northern Europe*. The summer in Paris, *France* was characterized by:

Hot days	43 days
Very hot days	1 day
Extremely hot days	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperatures occurred on 8 August. In Dijon, *France*, the grape harvest began on 13 September.<sup>62</sup>

The year 1706 produced remarkable weather that was very warm, very dry and very long. The persistent heat lasted during the months of June, July and August. It reached its peak on 8 August when Father

[Père Louis] Cotte measured 97.2° F (36.2° C) [at Montmorency (a northern suburb of Paris), *France*]. Montpellier also felt this dry heat. There it lasted nearly four months, but with less intensity than in Paris.<sup>79</sup>

In *Germany*, January began tolerably well. February was cloudy. From 15 April to August, it was a very hot and dry year. There was a great drought that affected cows milk. The rest of the year was more temperate. Only the wind was very changeable.<sup>72</sup>

On 16 July 1706, a rainstorm began at 8 a.m. in Denbigh, *Wales*. It rained incessantly for 30 hours, with thunder and lightning. All the rivers in Denbighshire, Flintshire, and Merionethshire overflowed, and spoiled much corn [grain]. The stream was so choked with mown hay as to break down a dozen large bridges. Great oaks were uprooted and swept away.<sup>212</sup>

On 7 October 1706, there was a prodigious flood in the north of *Ireland*, which broke down several bridges.<sup>212</sup>

In 1706, the price of wheat [in *England*] averaged 26 shillings per quarter [quarter ton].<sup>212</sup>

In *England*, there was excessive heat and drought during the summer. In October, there was excessive rain and floods in Denbighshire, *Wales*.<sup>72</sup>

On 6 November 1706, an Atlantic hurricane struck the east coast of the *United States*. Fourteen ships foundered and other ships were given up for lost.<sup>141</sup>

In 1706 during the period between 5 February and 6 May, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ung-shan. During the period between 11 June and 9 July, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Huang-yen.<sup>153</sup>

In 1706, floods struck several regions of *China* including:<sup>153</sup>

— Kiangsi (now Jiangxi province) in southern *China* at Ch'ing-chiang, Hsin-kan [possibly a misprint, "Hsin-t'u"] and Shui-chin.

— Hupeh (now Hubei province) in central *China* at Ku-ch'êng, Chung-hsiang and T'ien-mên.

— During the period between 8 August and 8 November, floods struck Anhwei (now Anhui province) in eastern *China* at T'ung-ling and Fou-yang; and Kiangsu (now Jiangsu province) on the east coast of *China* at P'ei. [P'ei is located at longitude 117.00° East and latitude 34.47° North.]

In 1706 during the summer, there was a drought in the vicinity of Shanghai, *China*. Then in autumn, there were continuous rains and floods and a dearth and famine.<sup>166</sup>

**Winter of 1706 / 1707 A.D.** In *England*, the frost lasted from the 1<sup>st</sup> of January to April.<sup>47, 93</sup>

**1707 A.D.** In Dagenham (Essex) *England* in May, there was a great inundation, continuing over several years.<sup>47</sup>

In Dagenham, in Essex, *England*, on December 17, 1707; there was an inundation of the sea. These inundations continued until 1721.<sup>40, 41, 43</sup>

In *England* on 7 and 8 July 1707 was the greatest heat that had been observed in 46 years. In Paris, *France* the heat was very great and on 21 August was measured at 98.4° F (36.9° C).<sup>62</sup>

In Essex, *England*, the year began with very dry cold weather. Hay was very dear. June was cold and wet. Hay was ill got and much of it was lost or marred; hence it became dear, even though there was a great plenty of it. The 8<sup>th</sup> of July was a most memorable excessive hot day; many horses on the road died. In November and December, the air was moist and often cold.<sup>72</sup>

In *England*, there was moderate weather from the beginning of the year until the end of February. March was dry and cold on the whole. April was warm with fogs at first, often hazy yet often sunshine days. The only April showers occurred from 21 to 29 April. In May from the beginning of the month to the 22<sup>nd</sup>, there were gentle breezes, hazy air; often sunbeams. In the 3<sup>rd</sup> week of May, there was a little rain yet the ground remained dusty. June produced a little rain. From the beginning of July to the 6<sup>th</sup>, there were blowing winds and small showers. On the 7<sup>th</sup> and 8<sup>th</sup>, it was the hottest in 46 years. Many of Prince Eugene's Army died of heat in their march from *Italy* these two days. The heat continued to the 11<sup>th</sup> and there was lightning at night. From 14 to 17 July, there was much rain and smart showers. On 17 July, there was a tempest of thunder great and loud, lightning, rain and hail. On 31 July, there was thunder and lightning at Yarmouth. The first half of August was cold. It was stormy on the 5<sup>th</sup>. From 8 to 12 August there was a good harvest and calm sea. But on the 12<sup>th</sup>, there was a sudden shower of prodigious drops of rain. From the 18<sup>th</sup> to the 25<sup>th</sup>, there was a dead calm ending in a fog. On 27 August, there was dreadful lightning at night. During September the winds often blew hard. From the 3<sup>rd</sup> to the 5<sup>th</sup>, it was very cold. From the 6<sup>th</sup> to the 11<sup>th</sup>, it was hot. From the 11<sup>th</sup> to the 17<sup>th</sup>, it was most cold. From the 21<sup>st</sup> to the 26<sup>th</sup>, it was mild. From the 23<sup>rd</sup> to the 26<sup>th</sup>, there were almost continual rains with intervals of flying clouds of wind. On 27 September, the sea roared terribly. From 5 to 21 October, the winds were mostly blowing hard from the northeast with many dark nights. The 3<sup>rd</sup>, 6<sup>th</sup>, 23<sup>rd</sup>, and 30<sup>th</sup> of October were pretty much rain, with the rest of the month dry. November had alternating winds and periods of calm with dull and pleasant weather. It was dry to the 19<sup>th</sup>. Then there was some hail, snow and rain. The 23<sup>rd</sup>, 24<sup>th</sup> and 25<sup>th</sup> of November was calm with fogs. The 26<sup>th</sup> and 27<sup>th</sup> produced small showers. On 8 November, the high tide flooded all the deans [dunes?] like a sea; at the same time there was dreadful lightning with thunder and dark clouds to the northeast with great squalls. In December, the winds blew hard on the 3<sup>rd</sup> and 4<sup>th</sup>. The only frost was on the 14<sup>th</sup>. On 26 December, there was rain.<sup>72</sup>

In *Germany*, the weather from the beginning of the year was moist with mild temperatures until March. Then there was four days of snow. This was followed by an early spring. But that was checked by a cold east wind. At harvest time, there were south winds. December began with early cold and much snow. But a south wind melted it. The rest of December was cloudy and stormy.<sup>72</sup>

May, June, July and August was all very dry in *Italy*.<sup>72</sup>

On 3 and 26 July, there were great floods in *Ireland*. August the 9<sup>th</sup> in the county of Down in northeast *Ireland*, the day being calm, overcast, sultry and hot; there was a terrible thunder and lightning storm.<sup>72</sup>

On 3 July 1707, in the north of *Ireland*, there was a sudden great flood.<sup>212</sup>

On 26 July 1707 at Antrim in Northern *Ireland*, there was a flood. Two bridges were washed away on Six Mile Water. There was also a great flood on the River Roo.<sup>212</sup>

In 1707, the price of wheat [in *England*] averaged 28 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

On 9 August 1707, there was a violent thunderstorm at New Forge [Newforge] in Northern *Ireland*.<sup>212</sup>

In 1707 in London, *England*, there was an extraordinary fall of flies. These insects covered the clothes of persons and lay so thick that the impressions of the people's feet were visible on the pavement, as they are in a thick fall of snow.<sup>212</sup>



In August 1707, a hailstorm burst over the town of Como, *Italy*. Several of the hailstones weighed 10 ounces.<sup>205</sup>

In 1707, the inhabitants of the *Caribbean* island of Nevis were nearly ruined by a dreadful hurricane.<sup>143</sup>

In 1707 during the period between 31 May and 29 June, floods struck Yunnan province in southwest *China* at Hao-ch'ing; Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lung-mên and Ho-yüan; Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu; and Shantung (now Shandong province) on the east coast of *China* at Tsou-p'ing.<sup>153</sup>

In 1707, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 6 May and 8 August, a drought engulfed Anhwei (now Anhui province) in eastern *China* at Kuei-ch'ih; and Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou, Ch'ung-tê, Hai-yen and T'ung-hsiang. As a result, the rivers dried up.

— During the period between 8 August and 8 November, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Ch'ing-chiang; Anhwei province at Tang-t'u, Tung-liu, Han-shan and Wuhu; and Shantung (now Shandong province) on the east coast of *China* at Tsinan.

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**Winter of 1707 / 1708 A.D.** During the period between 8 November 1707 and 5 February 1708, floods struck Hopei (now Hebei province) in northern *China* at Pa.<sup>153</sup>

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**1708 A.D.** In *Germany*, this was a seasonable mild year until after the 1<sup>st</sup> of September. Then there were 16 clear days with little rain. Then after several changes of the wind, it settled down to 14 days of wind from the north. After this came a south wind and much rain. Then came an east wind with very great snow, followed by clear good weather. After that to 11 December; cold, snowy, cloudy weather. Then the rest of December was clear and cold.<sup>72</sup>

In *England*, January was a moist, wet, rainy, variable month. From 28 January to 12 February, there was frost. On the 9<sup>th</sup> and 10<sup>th</sup> of February, there was snow six inches deep. The ice was three to four inches thick before the snow. On the 12<sup>th</sup> began a thaw. On the 15<sup>th</sup> a little rain. From 26 January to 21 February, there was no more rain. February ended with spring weather. No more rain to 5 March and then on the 6<sup>th</sup> came showers. On the 8<sup>th</sup> and 9<sup>th</sup> of March, there was frost and ice. There was snow in the morning of the 10<sup>th</sup> and sleet in the afternoon. In March, there were no general rains but flying showers of rain, sleet, snow in many places. April was a glorious month though some cold days. On 1 and 2 April, it was rainy. From the 3<sup>rd</sup> to the 7<sup>th</sup>, the sun gleams hot. From the 4<sup>th</sup> to the 8<sup>th</sup>, there was hoarfrost. The 12<sup>th</sup> of April was hot like in July. There was no rain in April between the 2<sup>nd</sup> and the 28<sup>th</sup>. May was a dry month with very little wind. It was a dry cold month. In June from the 1<sup>st</sup> to the 22<sup>nd</sup>, there were cold easterly or northerly winds. The first week of June was dry. From the 16<sup>th</sup> to the 24<sup>th</sup>, there were claps of thunder with rain. On the 17<sup>th</sup> or 21<sup>st</sup>, there were cold rains. The month of June ended with small showers. On the 9<sup>th</sup> of July, there was thunder. On the 16<sup>th</sup> of July, there was dreadful thunder and lightning, especially in the night and much rainfall. Up to this time, there was no summer, just cold and wet weather. But the next week was very hot and it remained hot for the rest of July. The first three weeks of August were dry. On 2 and 3 August, it was very hot. After the 10<sup>th</sup>, the heat drops. There is a flying fog or mists but mostly sunshine. From the 13<sup>th</sup> to the end of August, the weather was moist. There was thunder and lightning from the 22<sup>nd</sup> to the 30<sup>th</sup>. On 30 and 31 August, it was very rainy. On the 1<sup>st</sup> and 2<sup>nd</sup> of September, the weather was temperate, yet faint. There were some small rains. On the 6<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> of September, there was loud thunder, lightning and rain. The last half of September was generally dry. October the 1<sup>st</sup> to the 20<sup>th</sup>, it was cold both day and night. The winds were northerly, but moderate, except for the 14<sup>th</sup>, 15<sup>th</sup>, 19<sup>th</sup> and 20<sup>th</sup>; thence to the end of the month, the winds were moist



and southerly. On the 1<sup>st</sup>, 11<sup>th</sup>, 16<sup>th</sup> and 18<sup>th</sup> of October, there was ice. The 30<sup>th</sup> was hot. From 1 to 11 November, the weather was dry with still winds. From the 11<sup>th</sup> to the 13<sup>th</sup> there were drizzles or squalls with little rain. The 19<sup>th</sup> and 20<sup>th</sup> was dry. From the 23<sup>rd</sup> to the end of November, the snow laid two inches deep. On the 25<sup>th</sup>, 26<sup>th</sup> and 27<sup>th</sup>, it was hard ice. In December to the 19<sup>th</sup> it was dry, blowing winds. On the 15<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 20<sup>th</sup>, 23<sup>rd</sup>, and 24<sup>th</sup>, there was misty foggy weather. On the 23<sup>rd</sup>, there was a halo with fog and a rainy evening. On the 25<sup>th</sup>, there was easterly misting rain all day, which blew hard at east-northeast in the night. With this wind began one of the most remarkable winters for cold that had been upward of 58 years. This last summer, spring and harvest, was the coldest of any summer since 1647 (except for the year 1698).<sup>72</sup>

Thunderstorms or rainstorms and an earthquake desolated Provence, *France* in 1708.<sup>79</sup>

On 16 July 1708, there was a violent thunderstorm at Ipswich and Colchester in *England*.<sup>212</sup>

In 1708, the price of wheat [in *England*] averaged 41 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1708, a hurricane struck the southwest *Caribbean Sea* causing 578 deaths.<sup>141</sup>

In 1708 during the period between 6 May and 8 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing, P'ing-yüan, Chan-hua and Lin-ch'ü. During the period between 8 August and 8 November, a drought engulfed Hupeh (now Hubei province) in central *China* at Huang-kang; and Shantung province at Ên, Shih-p'ing and Lin-ch'ing.<sup>153</sup>

In 1708, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 18 June and 17 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow; Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-ch'un, Nan-hui and K'un-shan; and Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing, Ch'ao, T'ung-ling, Wu-wei, Lu-chiang, T'ai-hu and Nan-ling.

— During the period between 18 July and 15 August, floods struck Anhwei province at T'ai-hu.

— During the period between 16 August and 13 September, floods struck Chekiang province at Ch'ü and Ch'ang-shan; Hupeh (now Hubei province) in central *China* at Chiang-ling; and Kiangsu province at Shanghai, Wu-chin, Tan-yang, and Soochow.

— During the period between 8 November 1708 and 5 February 1709, floods struck Anhwei province at Tang-t'u and Wuhu.

In 1708 during the summer, there was a great drought in the vicinity of Shanghai, *China*. This caused a very scarce year.<sup>166</sup>

**Winter of 1708 / 1709 A.D.** The winter in *Europe* was very severe and it lasted until March.<sup>28</sup>

Early January 1709 temperatures were dropping over most of *Europe*. The cold remained for three weeks, and was followed by a brief thaw. Then temperatures plunged again and stayed there. From *Scandinavia* in the north to *Italy* in the south, lakes, rivers and even the sea froze. At Upminster, shortly northeast of London, *England* temperature fell to 10° F, (-12° C) on 10 January 1709, while it sank to 5° F, (-15° C) in Paris, *France* on 14 January, and stayed at that level for the next 11 days. It has been estimated that the winter air temperature in *Europe* was as much as 13° F (7° C) below the average for 20th century *Europe*. Not only was January very cold, it also turned out to be unusually stormy.<sup>32</sup>

In *England* the winter of 1709 became known as the Great Frost, while it in *France* entered the legend as Le Grand Hiver. In *France*, even the king and his courtiers at the Palace of Versailles struggled to keep warm. In *Scandinavia*, the *Baltic Sea* froze so thoroughly that people could walk across the sea as late as

April 1709. In *Switzerland*, hungry wolves became a problem in villages. Venetians were able to skid across the frozen lagoon in *Italy*.<sup>32</sup>

The winter of 1708-09 produced a severe frost throughout *Europe*. In *England*, the frost lasted from December 1708 until March 1709. It was very severe throughout *Europe* but scarcely felt in *Scotland* and *Ireland*. At Uppminster, *England*, the coldest day was on 30 December when the temperature fell to 0° F [-18° C]. In London, the coldest day was on 3 January. The cold was very severe in southern *England* but much milder in Cumberland and Westmoreland; none of the lakes or rivers froze. The oldest man never recalled before having seen such extraordinary flocks of swans. There was much snow in the south of *England*, but very little in south of Yorkshire. In Edinburgh, *Scotland*, the frost lasted from early in October until the end of April. The cold was not severe but there was much snow. In Dublin, *Ireland*, the winter was harder than usual, but not so severe as it was in the south of *England*. The River Thames [at London, *England*] was full of ice, but not solid like 10 January 1684, when coaches drove over. In shallow ponds fish were destroyed; many birds and plants perished. In *Italy*, the cold was greater than for the past 20 years, and most of the oranges and lemons perished. The sea on the coast of Genoa and Leghorn was frozen. There were many deaths in Venice, *Italy*. At Namur, 80 soldiers were killed by the cold. At Pisa, many plants were destroyed. The winter was severe in *Switzerland*. At Paris, *France*, 60 men and many cattle were frozen to death. At Copenhagen, *Denmark* on 4 May 1709, the ice in Copenhagen harbor was 27 inches [69 centimeters] thick. On 9 April, people crossed the ice from *Denmark* to Schonen. The winter was very severe in Northern *Germany*.<sup>212, 231</sup>

During the great winter of 1708-09, in Lusatias [in *Germany*], many cows were frozen to death in their stalls. And many travelers on the road were frozen to death, or lost their hands, feet, noses, or ears, and others fainted, and were in great danger of life or limb, when brought to soon near the fire. Two gentlemen and a smith were frozen to death in *England*. Over 60 men and many cattle lost their lives near Paris, *France*. The same occurred at Venice, *Italy*. Eighty French soldiers were killed on the road by the cold near Namur, *Belgium*. On the Italian coast, several mariners on board a British man-of-war died of the cold, and several lost part of their fingers and toes.<sup>231</sup>

During the winter of 1708-09 [in London, *England*], the two coldest days were 30 December 1708 and 3 February 1709. This winter was great and universal.<sup>235</sup>

On 9 January 1709 [in *England*], it was extremely cold. The frost was so intense that in less than 24 hours rivers froze, so as to bear loaded wagons. Horses' feet were frozen to the ground. Cattle, sheep and birds perished. Great quantities of snow fell, and the storm continued for three months.<sup>212</sup>

During the winter of 1683 and 1708, coaches were driven over the ice [on the River Thames in London, *England*] and large fires were made on the ice.<sup>235</sup>

In *England* on 28 December 1708, there was a great storm at night. On the 29<sup>th</sup>, the winds blew hard from the northeast and froze water, urine and lakes and within doors with good fires in the rooms, it froze all liquors in the cellars. The sun and clouds alternated. On the 30<sup>th</sup>, it severely froze in the house with a dreadful cold. On the 31<sup>st</sup>, there was an unusual degree of cold. There was a storm with winds from the east, spitting snow and with the coldest wind with snow. Several ships were driven ashore. The wrecks with 5,000*l.* worth of cargo sold for 60*l.* In January 1709, the winds were often very high and stormy, as on 1, 3, 12, 15, 24, and 25 January and during the first and second weeks of February. This weather in 4 days time froze over the River Thames, notwithstanding the motion of the water by tides and stormy winds. Many booths were built upon it. The thermometer on 31 December 1708 was lower than it had been in the past 18 years. And the next day, it was a little less. It was much the same from the 12<sup>th</sup> to the 15<sup>th</sup> of February 1709. Several thermometers suck within the bubble; others at 90, or colder than the middle state of the air under the Pole. Urine froze under the bed, though there was a good fire in the

room. Bread and meal were all ice. Bottled beer in deep cellars froze. A nine-gallon barrel of small beer set in the chimney corner to thaw, afforded a gallon of ale; all the rest was dead water. Ships in great number came ashore in Yarmouth road, not merely by the violence of the wind, but from the impotence of the sailors to find their hands, and from the impossibility of sending the cables, which were cased thickly with ice.<sup>72</sup>

In *England*, the latter end of the second week, and the beginning of the third, countless thousands of geese by flights of five or seven minutes distance were continually making to the southward to find open waters. They crept low and slowly along the shore, as the weakest among them were able to fly, some of which were often dropping. But the moment they came to the mouth of any river, they ascended strong and swiftly in the air, whence they might take a view of the waters many miles into the land. And when they observed they were all ice, descended and crept again as before. The further south, the severer the winter. For this extreme cold reached not only the northern countries, but over *France* also and fiercer by their accounts than here [in *England*]. Even *Portugal* itself felt the severity of it. Ink froze in my pen, even though I was by a good fire, that I could not write a line at once. The ice was said to be a foot thick at land, but on the coast where it never freezes so hard, it was eight inches. On the 14<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup>, and 17<sup>th</sup> of January, there were thaws. But from the 22<sup>nd</sup> to the 28<sup>th</sup> there was frost again but less cold and milder, yet it froze two inches during the night. There was frost again from 8 to 20 February. From then till the end of February, there was a thaw. Yet the ice of the first frost still remained despite all these thaws. And indeed from February the 12<sup>th</sup> to the 15<sup>th</sup>, it froze five or six inches. From 26 February to 6 March, it was a hard frost. Thus far no appearance of spring, even in the south. From 25 December 1708 to 12 March 1709, above 50 days frost. This has not happened in many years. There were 50 days of wind somewhere in the east at most 30 days of northeast winds blowing hard, and above half of these dreadful storms or a scout of wind. The coldest weather was on 30 December and 12 February. In the end of the 4<sup>th</sup> week of May, it still continued cold, the Elm trees yet naked [without leaves] in Norfolk and Suffolk, *England*.<sup>72</sup>

In 1709, the winter began with wind, rain, snow and fog. From January to April was the greatest frost all over *Europe* that had been in the memory of man. There were only a few short breezes of south wind and temperate air between. In many places the earth had become quite barren. The husbandmen's [farmers] labor and sown seed were lost. The fruit trees were either blasted or brought forth little fruit. And the fruit that did come forth was either wormy, or blasted with red and black specks. The [grape] vines were dead to the roots. The very rocks and stones mouldered down to sand. The severity of the cold killed many cattle and many people were frozen to death.<sup>72</sup>

In 1709, the *Adriatic Sea* was frozen and the olive trees killed in *Southern Europe*.<sup>42</sup>

In 1709, the *Adriatic* and *Mediterranean Seas* were frozen at Genoa, *Italy*; Marseille, *France*; and Celle, *Germany*.<sup>60</sup>

1709 A.D. (Perhaps the most intense season which has ever occurred within the range of history), the *Adriatic Sea*, and the *Mediterranean Sea* from Genoa, *Italy*, by Marseilles, *France* to Celle [Cette now Sète, *France*], frozen. All the rivers and narrow seas of *Europe* frozen.<sup>38</sup>

The chill of 1709 broke out on 6 January and lasted until the 24<sup>th</sup>. The frost began again in February and the beginning of March. All the rivers in *France*, except perhaps the Seine in Paris and the Rhone to Viviers, were completely frozen. The large lakes and pond in the Languedoc and Provence also froze. The freezing up of the Thau Lake, very deep, very stormy, and was so complete and so solid that it opened an unknown road connected up with the Sea from Balaruc and from Bouzigues to Cete (now Sète) on the ice. Finally, even the sea froze off the coast of Cete (now Sète), of Marseille and in the

English Channel. Frosts and snows of 1709 almost ruined most of the crops. All the olive trees died from Perpignan to Nice in *France*.<sup>79</sup>

In 1709, in this memorable winter despite the continuing severe cold, left unfrozen the middle of the Seine River; however, large ice floes floated there. The *Adriatic* and the *Mediterranean Sea* were frozen at Venice, Genoa, Marseille, Cette, etc. The Garonne River in southwest *France* was frozen completely. In the Port of Copenhagen the ice was 73 centimeters (29 inches) thick, even in places where it was not at all piled up. The *Baltic Sea* was still frozen on 10 April.<sup>62</sup>

In *Italy* in 1709, the Venetian lagoon froze over allowing people to skate on the ice; this is illustrated by a painting of the time.<sup>33</sup>

Due to the extreme cold and hard frost, the Lagoons in Venice, *Italy* in 1709 froze to a depth of several inches in thickness. The freezing of the whole Venice Lagoon in 1709 caused a grave inconvenience to the city because the ice prevented the usual traffic by boat.<sup>81</sup>

In 1709 in *Italy*, the Port of Venice was frozen.<sup>58, 80</sup>

In 1709, the vines and fruit trees in *France* were killed [by the extreme cold].<sup>58, 80</sup>

According to a canon from Beaune in *Burgundy*, "travelers died in the countryside, livestock in the stables, wild animals in the woods; nearly all birds died, wine froze in barrels and public fires were lit to warm the poor". From all over the country came reports of people found frozen to death. Roads and rivers were blocked by snow and ice, and transport of supplies to the cities became difficult. Paris waited three months for fresh supplies.<sup>32</sup>

The winter of 1709 was one of the strictest, known to history. In *France, Italy, Spain, Germany* and all the northern countries there was a very severe cold. The most rapid rivers of *France*, even in the south were completely frozen over. The seas and gulfs, which bathe the southern coasts of *Italy* and *France* were covered with ice. Towards the end of January we drove across the ice of Lake Constance and Lake Zurich with loaded wagons/coaches.<sup>62</sup> [Lake Constance borders *Germany, Austria* and *Switzerland*. Lake Zurich is located in *Switzerland*]

At Paris Observatory, La Hire observed the following temperatures in Paris, *France*:  
on 4 January 1709 (18.5° F, -7.5° C); on 6 January (29.5° F, -1.4° C); on 7 January (18.3° F, -7.6° C);  
on 10 January (-0.4° F, -18.0° C); on 13 January (-9.6° F, -23.1° C); on 14 January (-6.3° F, -21.3° C);  
from 15 January the thermometer rose slightly but then fell again; on 20 January (-4.7° F, -20.4° C);  
on 21 January (-5.0° F, -20.6° C); in February the cold was less severe; and on March 13, the  
thermometer read (21.6° F, -5.8° C).<sup>62</sup>

At Montpellier in southern *France*, the following temperatures observations were recorded:  
on 10 January (23.4° F, -4.8° C); on 11 January (3.0° F, -16.1° C); on 12 January (9.5° F, -12.5° C);  
on 13 January (24.6° F, -4.1° C); on 14 January (14.7° F, -9.6° C); on 15 January (14.9° F, -9.5° C);  
on 16 January (14.7° F, -9.6° C); on 17 January (18.0° F, -7.8° C); on 18 January (19.6° F, -6.9° C);  
on 19 January (9.5° F, -12.5° C); on 20 January (17.2° F, -8.2° C); on 21 January (18.1° F, -7.7° C);  
on 25 February (21.9° F, -5.6° C).<sup>62</sup>

Seine River in *France* was frozen over completely. The Garonne River is covered with ice, and at Balaruc was travelled across on the ice.<sup>62</sup>

In Holland [now *the Netherlands*], *England and Prussia*, the cold was slightly less severe than in Paris, *France*. In London, *England*, the frost began at Christmas and continued until the end of March, the lowest observed temperature occurred on 14 January at Gresham College (1° F, -17.2° C). In Berlin, *Germany*, the observed temperature on 9 and 10 January was (2° F, -16.6° C). The ice of the River Meuse at Namur, *Belgium* was 1.6 meters thick, and the thermometer fell there to (-2° F, -19.1° C). The Ebro River was frozen over in *Spain*. [The Ebro River rises in northern *Spain*, flows southeast across *Spain* with its delta on the Mediterranean Sea.] On 8 April, the *Baltic Sea* was completely covered with ice as far as anyone armed with a telescope could see.<sup>62</sup>

The effects of this extraordinary cold on humans, animals, plants and seeds are described in various memoirs of the time. Some species of small birds and insects in *England* and the north of the *European* continent were almost destroyed. William Derham counted 20 species of birds from the cold zone, which were seen on the coasts of *England* and killed by the frost. Many travelers succumbed to the extreme cold, and in several provinces of the cattle died. Many forest trees froze down to the sapwood. Twenty of thirty years later, the scar from the 1709 cold year was distinctly visible in the tree rings. Laurel trees, cypresses. Holly oaks, chestnut trees and walnut trees were the oldest and strongest in large quantities as a basis. In *Provence* the orange and olive trees were destroyed. From 9 to 11 January the cold at Montpellier in southern *France* was (3.0° F, -16.1° C). After the thaw the leaves of the olive trees were wilted, withered branches and the bark had become gangrenous detached from the stem. The vine disappeared in several parts of *France*. Gardens were stripped of their fruit trees. Many apple trees, indeed, produced leaves and blossoms, as if they had not suffered, but died prematurely. Even the corn had been damaged so that an unprecedented famine occurred and mortality followed this winter.

The pastor of Feings, near Mortagne, *France*, discussed in his Church logs the extreme winter:

*On Monday, January 7, began a cold, most violent and intolerable, and which lasted until the 3rd or 4th February. During this time, there was a snowfall of about half a foot high. A few days after the snowfall there was a very cold wind from the north and northwest, which piled the snow to the deep-lying positions, exposing the grain, which then froze nearly all. Few people realized when it thawed; it was destroyed.*

Fortunately, some prudent farmers had plowed their fields and sown them with winter cereal fields and barley. These were the bread grains in times of scarcity. People ate aronswurzeln, couch grass and asphodel. The famine was so great that a regulation was issued in April, which directed kitchens under penalty, even capital punishment to all citizens without distinction and the communities in to state their stores of grain and food. Equally significant were the result of an unprecedented thaw floods. The Loire River broke through its embankments, rose to a height not seen in two centuries, burying everything in its course.<sup>62</sup>

During the winter in London, *England*, the River Thames was frozen below Gravesend. The winter was recorded as being intensely cold throughout *Europe*.<sup>1</sup>

[In *England*], a great frost for three months, with heavy snows, from December 1708 to March 1709.<sup>2, 41, 43, 90</sup>

In 1709 in *England*, there was a great frost for three months, with snow. Mr. Derham supposed that this frost was greater than any within the memory of man. There was very little frost in *Scotland* and *Ireland*.<sup>47, 93</sup>

The River Thames in *England*, was again frozen over at intervals, and some persons crossed on the ice, but the frost was not sufficiently permanent to allow another Frost Fair.<sup>29</sup>

On December 25, 1709 [it seems more likely the date is 1708], in *England*, a severe frost set in, after which there fell an immense quantity of snow, the frost continuing with scarcely any intermission for



three months. The River Thames was, in consequence, frozen over, and booths erected, while every species of pastime was carried on upon the ice.<sup>55</sup>

In *England*, the year 1709 was the coldest.<sup>72</sup>

In 1709, there was a severe winter in *Switzerland*.<sup>193</sup>

A description of the Great Frost in the winter of 1708-09 was provided in the Philosophical Transaction, number 324, page 454.<sup>282, 283</sup>

— In it Mr. Derham asserts that the frost of 1708-09 was greater (if not more universal) than any other within the memory of man. The frost that happened in 1683 was the longest frost, but the frost of 1708 though of shorter duration was more intense. The frost was more severe in the southern parts of *England* than the northern parts. The cold in Zurich, *Switzerland* was unusual and excessive. The cold in *Italy* was so great that for 20 years past, they had not felt greater. The ice in the harbor of Copenhagen, *Denmark* was 27 inches [69 centimeters] thick. On 9 April 1709, individuals had traveled between Schonen and Denmark on the ice

— The northern part of *Germany* experienced the same extreme cold as *Denmark*. “Such a frost had not been known in the memory of man in these countries.” In the book *Consideratio Physico-Mathematica Hyemis proximè præterlapsæ, &c.* published by the University of Hall on 13 June 1709, by G. Remus, a Dantzicker [one from Gdańsk, *Poland*?], the author divided up the winter into 5 periods.

\* The first period began [in *Germany*] on 19 October 1708. At which time the cold weather began, the northerly winds then blowing, and frosty weather accompanied it. (But at Upminster, *England*, it began sooner. For all the latter end of September, the winds were northerly. There were hoarfrost on Michaelmas [feast of Saint Michael the Archangel, 29 September], and the following days. A great part of October to the 23<sup>rd</sup> the weather was hoar-frosty, or frosty.) According to Mr. Remus, this period ended on 3 November. (The same with our 23 October. It appears Mr. Remus was using the new style Gregorian calendar while Mr. Derham was using the old style Julian calendar.)

\* The second period occurred in November and December. The weather alternated between warm and cold in both *Germany* and *England*, and the winds also were not very different. The furious wind, that blew the night before 13 December [Gregorian calendar] in *Germany* did not strike *England* until noon the next day on 3 December [14 December in the Gregorian calendar] at which time it had much spent itself, and was only a brisk easterly wind, but no storm.

\* The third period began on 5 January 1709 [Gregorian calendar] in *Germany*. The weather abruptly changed, and to the astonishment of all *Europe* a period began, which was very remarkable for its unusual cold. At the same time, 25 December 1708 [Julian calendar] the wind and weather began to change in *England*. The temperature fell dramatically sliding into intense cold. This third period ended on 25 January [Gregorian calendar] or 14 January [Julian calendar] with a westerly wind, and a thaw, which held for a few days. In *England*, the wind was southerly and the thaw accompanied it for a few days likewise.

\* The fourth period began on 31 January [Gregorian calendar] or 20 January [Julian calendar] in which both *Germany* and *England* observed similar temperatures, and those days on which he noted the westerly winds to have been strong.

\* The fifth period took place between February 17 and March 17 using the Gregorian calendar in *Germany*, which would correspond to February 6 to March 6 using the Julian calendar. In both *Germany* and *England* the cold weather returned and continued long. But *Germany* experienced more snow. And the force of the winds was more extreme in *England*. And the mild weather returned to *England*, 2 days sooner than in *Germany*.

— In *England*, the waters were the first things that felt the dire effects of this frost. And these were in many places frozen to an extraordinary depth, although not to the extent as in the Long Frost of 1683. Of which frost we have a sufficient instance in our River Thames; whose waters were so frozen, that above [London] Bridge, 'tis well known, many booths were erected, fires made, and meat dressed; and on 10



January 1684, I saw a coach and two horses drive over the river into Southwark, and back again, a great number of people accompanying it. But this last winter [1708-09] the case was greatly different, according to the account I received from Mr. Lowthorp, who says, "He saw several people cross the Thames at some distance above the Bridge, but that was only towards low-water, when the great flakes of ice that came down, stopped one another at the Bridge, till they made one continued bed of ice from thence almost to the Temple. But when the flood came, the ice broke, and was all carried with the current up the river. I was told the like happened between Westminster and Lambeth, a little above Whitehall."

— As for other waters, they also had their share; especially where they lay exposed to the northerly and northeasterly winds. The seawaters were covered with ice in many places near the shore, in harbors, and where they lay calm and still. Of this I have already mentioned an instance in the Harbor of Copenhagen, and the Sea between Denmark and Schonen. And in a letter from Dr. Newton, he tells me, "The Sea was frozen both on the Coast of Genoa and Leghorn [Livorno, *Italy*]."

— As for the northern parts of *Germany*, the last cited dissertation gives this account of its effects on fluids: water was frozen into ice beyond the usual depth, and other liquids appeared to be congealed, which in midst of winter are thought to be out of danger of freezing. A fountain in a certain village of *Silesia*, which though at other times was found to be cool in summer and warm in winter, yet this winter it was covered with pretty thick ice, to the great wonder of everyone. The public news has sometimes told us of hot baths converted into ice. Though this cannot happen to those that are very hot. At Hall [Halle now Saale, *Germany*] we saw icicles adhere to the salt fountains, which are reported not to have happened for an Age. D. Breynius assures me by letter, that the sea [Baltic Sea] itself was covered with ice on the 8<sup>th</sup> of April, as far as his eye could reach. The observations of Hall relate, that spittle hardly dismissed from a man's mouth became ice. The rivers were froze thrice, even those, which for their rapid flow were always proof against freezing.

— These effects, I am apt to think, the waters felt not only in *England, Denmark, Germany, France* and *Italy*; but in all the *Northern World* also, excepting *Scotland, Ireland*, and probably some other islands, or places near the Sea; although even some of these appear from the foregoing account to have been great sufferers too. This universality of the frost, I suspect from the multitudes of divers [diverse] kinds of birds (utter strangers to these parts, and many of them inhabitants of the northern colder countries), which were seen and killed [by the cold] in many parts of *England*. In our Essex-Marshes, we had many wild swans, brent-geese, many of the rarer gull-kind, and divers [diverse] other sorts of birds, utter strangers to these parts.

— Mr. Durham further mentioned that the fresh water fish were destroyed, that near Dantzick [Gdańsk, *Poland*] small birds dropped down for want of strength; that near Paris, *France* 80 men and several cattle were frozen to death, and 80 French soldiers all killed on the road from the extreme cold, near Namur [in *Belgium*]; that some marines in an English men-of-war ship on the coast of *Italy* died of cold, others lost their fingers and toes; that larks and small birds, which used to be numerous, became rarities in *England*. As to the vegetables, plants, garden herbs, and fruit trees, few escaped destruction or damage. That the frost in 1683 cleft oaks and the bodies of vines, but in this frost of 1708-09, there were intervals and falls of snow, which proved a good defense to the ground; but what is strange, that the wheat suffered more by the sun than the fruit, that is, the sun melting away the snow on the southern side of the furrows, and opening the ground, it was exposed to the nocturnal frost. But the snow lying thicker on the northern parts of the island, they had a plentiful harvest.

— Mr. Durham observed, that this severe cold did not destroy the noxious insects; that in *Switzerland*, though this frost had dismal effects on the vines and even the largest walnut trees, yet some places defended towards the north by very high ridges, namely at Vesena near the Lake Rivarius, the vines and trees were not only unhurt, but loaded with fruit the following season; and at Vettis, a village at the foot of the high mountain Galanda they had scarcely ever felt a milder winter, though in the next village, Valentia, the people felt the extremity of the cold, and thought their neighbors at Vittia had perished with it.

A New England writer in the *United States* recorded on 14 December 1708 that it was the coldest day ever known there up to that time! But he forgot to say how cold it was!<sup>1</sup>

During the period between 8 November 1708 and 5 February 1709, floods struck Anhwei (now Anhui province) in eastern *China* at Tang-t'u and Wuhu.<sup>153</sup>

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**1709 A.D.** After such a remarkable winter of 1708-09, the year 1709 produced a very cold summer. In Paris, *France* the summer produced only 6 hot days when the heat rose between 77° and 86° F (25° to 30° C); which is five times less days than average. The months of May and June were very rainy. The highest temperature of summer was 85.1° F (29.5° C) which occurred on 10 August. In Burgundy, *France*, the grape harvest began on 27 September.<sup>62</sup>

In 1709 [in *England*], there was a backwards [late] spring and a general scarcity.<sup>212</sup>

In 1709, the price of wheat [in *England*] was high, averaging 78 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In *France* in 1709, there was a severe famine throughout the kingdom.<sup>57, 91</sup>

In *England* in 1709, chiefly *Scotland*, there was a famine from the rains and cold.<sup>57, 72, 91</sup>

In *England* after a hard winter, on 19 May, the hawthorns just began to blow, and on the 21<sup>st</sup> the elm trees began to green. Wheat was 10s. a bushel. At the end of May, there was little appearance of spring in Norfolk and Suffolk. On 17 June, the wheat ear was breaking the enclosure. Hawthorne was still in blossom but fading. On the 25<sup>th</sup> of June, the wheat was not all eared. The first half of June was fine weather, but the latter half was wet with a great deal of rain during the last three days. The first half of July was wet. The last four days of July were summer. The month of August was a mixture. Part of the month was very hot and the other part as cold. On the 8<sup>th</sup> of August, barley and oats first cut in the south. On the 27<sup>th</sup>, wheat was cut. Wheat over the Kingdom was generally destroyed on the northeast side of the furrows. September had much wind and rain. October had some windy and many dead calm days in it. There were no great rains. November began and ended cold, but in general was a mostly mild month. November produced little rain. In December, the year concluded nearly as cold as the last, for on the 31<sup>st</sup>, it froze within doors. The first half of the year was as cold as any for the last 60 years. In 1698, the cold continued till September. This year the cold continued only to June or July at the farthest.<sup>72</sup>

In *Germany*, April was hot like summer. May was very cold with rain. Summer and harvest were more regular, temperate and healthy in Lübeck in northern *Germany*. In other places, from 20 March there were frequent cool rains mixed with clear warm days. From these morning showers came fruitfulness of the earth; the sky being clear, the sun hot, as soon as the showers were over with. This was a wet year in *England*.<sup>72</sup>

In 1709, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow and Anhwei (now Anhui province) in eastern *China* at Ying-shang and Fou-yang.

— During the period between 8 June and 6 July, floods struck Chekiang province at Ch'ing-yüan and Hupeh (now Hubei province) in central *China* at Chiang-ling, Chien-li, Ying-ch'êng, Ching-mên, Hanyang, Han-ch'uan, Hsiao-kan, Ch'ien-chiang and Kuang-hua.

— During the period between 7 July and 5 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Shan; Hopei (now Hebei province) in northern *China* at An-tz'ü [uncertain

name, “Tung-an”]; Chekiang province at Taichow; and Anhwei province at Wu-yüan. At Wu-yüan, houses were damaged by the floodwaters.

In 1709 during the summer, there was continued rain and floods in autumn in the vicinity of Shanghai, *China*. There was a famine. Rice was very dear, owing to flood.<sup>166</sup>

In 1709 during the period between 10 May and 7 June, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Li-shui. During the period between 8 August and 8 November, a drought engulfed Kiangsu province at Wu-chin and Hopei (now Hebei province) in northern *China* at Man-ch’êng. During the period between 8 November 1709 and 5 February 1710, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou.<sup>153</sup>

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**Winter of 1709 / 1710 A.D.** The Spaniards were the first who discovered *Canada*, but at their first arrival, having found nothing considerable in it; they abandoned the country calling it *il Capo di Nada*, that is, a Cape of Nothing. During this time, the region contained many vast nations and kingdoms; including the two Maqua’s, and the Kingdoms of the River Sachem and Ganajohhore, seated between the Lake of Hurons on one side, Virginia, Carolina, New England and New France on the other. The River Canada runs quite through the country, which bears between 42 and 55 degrees North latitude. The region encompasses the four great lakes: the Lake Huron, the upper Lake, the Lake of the Illinois, and the Lake Erie or of the Cat [Lake Huron, Lake Superior, Lake Michigan and Lake Erie]. In this region [now Quebec and Ontario, *Canada*], as reported in 1710, the winter is very long, by reason of the northwest wind, which blows most part of the winter season, and brings with it so thick a snow that it continues upon the ground most commonly ‘till after May.<sup>291</sup>

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**1710 A.D.** In *England*, the first week of January produced moderate weather from the 3<sup>rd</sup> to the 7<sup>th</sup>. The second week spits a little snow. The third week had dark easterly winds. On the 12<sup>th</sup> and 13<sup>th</sup> and from the 19<sup>th</sup> to the 24<sup>th</sup> of January, there was frost, and ice 1 ½ inches thick. Then the rest of the month, there were perpetual flying thicks and fogs, with calm weather and great dews. February began mild, mostly foggy. March begins wet, which brought on an early spring. On the 3<sup>rd</sup> of March, there were gooseberry leaves. On the 10<sup>th</sup>, all the bushes were green. Currants knot their flowers. The first two weeks were warm, but the third week was cold rain. Then there was pretty much rain to the end of March. April began hazy. The 6<sup>th</sup> was warm with frequent lightning in the evening. Spring was delayed because of cold days and extremely cold nights, especially between 16 and 19 April. The 24<sup>th</sup> to the 27<sup>th</sup> was hot. The 28<sup>th</sup> was a showery day. The currants were not yet out of flower. Apples blow not [had not blossomed]. In May, the ground was exceedingly dry and chopped [cracked]. Barley and peas were burnt. Vermin devoured all the fruits and the leaves of trees, so they were as naked as in winter (the same thing happened in 1741 and 1742). On the 1<sup>st</sup> of June, the wheat ears opened their enclosure. There was much thunder at noon on 13 June. There was an abundance of showers during the last two weeks. There were rains to the north of Norwich and dust to the south. The second week of June was very cold of which only the second day was only hot. July began dry and dusty, but on the 5<sup>th</sup> and 6<sup>th</sup>, there was a great deal of rain to lay the corn. On the 14<sup>th</sup>, there was thunder. The 20<sup>th</sup> of July was the first very hot day. This was followed from 24 to 26 July with overcast days. August began misty. There was significant rain on the 8<sup>th</sup>. There were several squalls on other days with some very fine days in between. The 16<sup>th</sup> of August produced thunder, the 23<sup>rd</sup> was sultry, and the 25<sup>th</sup> to the end of the month produced fogs with little wind. All September, there were clear nights. There was some rain from squalls. October was generally mild with several glorious days in it. On the 10<sup>th</sup> of October, there was a dreadful storm to the northward, high spring tides and wind. November was mostly warm and dry. From 30 November to 3 December, there was a continuous storm. And again from 6 to 10 December. This last storm reached its peak on the evening of the 9<sup>th</sup> with a dreadful storm of wind with floods of rain.<sup>72</sup>

The summer of 1710 was cooler than the previous summer. Paris, *France* had only one single hot day that occurred on 3 August with a temperature of 80.6° F (27.0° C). In *England* the summer was quite warm. In Burgundy, *France*, the grape harvest began on 25 September.<sup>62</sup>

In *Germany* in the end of March 1710, there were three insufferably hot days. From 7 to 11 April, there was a north wind, sleety and cold. Then came six days of excessive heat with east winds cooled by the rain. In June, there were several unseasonably sharp and cold storms. The harvest was less changeable. The year was fruitful and healthy; the winter late. In the latter end of October and November, there were great floods. The winds after were very variable, but mostly from the south, the air was foggy, thick, moist, often stagnant, long without sun and very unwholesome in Carniola [now *Slovenia*] and Augsburg, *Germany*.<sup>72</sup>

In 1710, the price of wheat [in *England*] was high, averaging 78 shillings per quarter [quarter ton].<sup>212</sup>

In 1710, there was an epidemic of smallpox in London, *England* that killed 1/8<sup>th</sup> of the population.<sup>212</sup>

[In *England*] on 1 December, there was a severe storm of thunder and lightning.<sup>72</sup>

On 5 & 12 December 1710, there were thunderstorms at Branham Moor in Yorkshire, *England*.<sup>212</sup>

In 1710, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 8 November 1709 and 5 February 1710, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou.

— During the period between 28 February and 29 March, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ên-hai and Chieh-yang.

— During the period between 28 May and 26 June, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Lin-ch'ü; Kiangsi (now Jiangxi province) in southern *China* at Li-ch'uan [uncertain name, "Hsin-ch'êng"]; and Hopei (now Hebei province) in northern *China* at Wu-ch'iang.

— During the period between 8 August and 8 November, a drought engulfed Chekiang province at Taichow, Hu-chou and Hsien-chü.

In 1710 during the period between 23 September and 21 October, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'êng and Anhwei (now Anhui province) in eastern *China* at T'ung-ling, Wu-wei, Shu-ch'êng and Ch'ao.<sup>153</sup>

In 1710 during the autumn, there were protracted rains in the vicinity of Shanghai, *China*.<sup>166</sup>

**Winter of 1710 / 1711 A.D.** During the period between 20 December 1710 and 18 January 1711, floods struck Hupeh (now Hubei province) in central *China* at Ch'ung-yang and Hopei (now Hebei province) in northern *China* at Tsao-ch'iang, Pa and Ch'ing-yün.<sup>153</sup>

**1711 A.D.** On 11 January 1711, a hailstorm struck near Rotherham in Yorkshire, *England*. The storm was about a half mile [805 meters] in breadth. The hailstones for the most part were as big as cherries, and some were from 3 to 5 inches [8-13 centimeters] in circumference. It cut off the corn [grain] in the fields as if it had been reaped. It killed pigeons, and broke windows and boughs [branches] from trees.<sup>295</sup>

In *England*, the frost was severe up to March.<sup>47, 72, 93</sup>

In *England*, there was moderate weather from the 1<sup>st</sup> to the 12<sup>th</sup> of January. From the 16<sup>th</sup> to the 18<sup>th</sup>, there were squalls of hail. From 18 January to 4 February, there was a most severe frost. It froze indoors

and in the [bed] chambers. Ice on the 5<sup>th</sup> of February was three inches thick on the coast. Then there was a thaw to the 8<sup>th</sup>, yet the old ice remained three inches thick. There were mixed days of frost and thaw to the 13<sup>th</sup>. The old ice was still ½ inch thick. On the 15<sup>th</sup>, there was a snowstorm that ended in rain. On the 16<sup>th</sup> of February, there was frost. On the 20<sup>th</sup> to the 27<sup>th</sup>, there was all frost. On the 24<sup>th</sup>, there was a very high tide and the winds blew hard producing a squall of hail. On the 17<sup>th</sup>, primroses were thick with blossoms. The first two days of March were rainy. There were small showers to 10 March with hazy sunshine and mild temperatures. Gooseberry leaves began opening on 10 March. There were winds from 10 to 18 March with some frosts, snow and sleet. From 22 to 24 March, the winds were variable with much rain. Rains continued to the 27<sup>th</sup> and the rest of March produced fogs. Gooseberries and currants began to bloom. In April the gooseberries and currants come into full bloom. During the last part of April, there were vast quantities of cold rain. Currants remained only in flower. The codlings in bloom and many of the blooms blasted. On the 18<sup>th</sup> of April at Norwich, there was a dreadful tempest of thunder, lightning and rain. On the 21<sup>st</sup>, there was thunder. Black thorn blown [destroyed]; white only budded. May was mostly calm, very fine spring weather, but not hot until the end of the month. Spring was in all its glory about the 19<sup>th</sup> of May, but apples not out of bloom till the 26<sup>th</sup>. June began as May ended, with cloudless sun, and starlight to the 7<sup>th</sup> of June. On the 7<sup>th</sup>, there was a dreadful tempest of thunder with prodigious hail. On the 18<sup>th</sup> was thunder and showers. On the 19<sup>th</sup>, there was a very high tide. It was a cold week. July began showery. The 10<sup>th</sup> to the 19<sup>th</sup> was fine weather. The first part was hot and the next 5 days cold. The 21<sup>st</sup> to the 28<sup>th</sup> of July was showery at London. August produced a variety of weather. September was the finest month since May. October produced squally weather. The 2<sup>nd</sup> to the 12<sup>th</sup> was warm; the 14<sup>th</sup> to the 16<sup>th</sup> – hot; on the 12<sup>th</sup> – wind and rain; on the 18<sup>th</sup> and 19<sup>th</sup> – gray dews or hard frost; on the 23<sup>rd</sup> – rain; on the 26<sup>th</sup> and 27<sup>th</sup> of October – rain, wind and darkness. November was mostly warm with a great deal of rain. On the 15<sup>th</sup>, there was a frost. In December, there was some fine weather. From the 9<sup>th</sup> to the 13<sup>th</sup>, there was fog with a little wind. The same from the 17<sup>th</sup> to the 19<sup>th</sup>. Then there was snow and frost to the 29<sup>th</sup>. The ice was three inches thick.<sup>72</sup>

[In *England*] in January and 7 October, there were severe storms of thunder and lightning.<sup>72</sup>

In France there was a flood. In March 1711, the Seine River in Paris, *France*, at the bridge “Pont de la Tournelle” reached a height of 7.55 meters (24.8 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

In Paris, *France*, the rainfall of 1711 was 26.8 inches (681 millimeters) water. This was 7.8 inches (199 millimeters) greater than the average rainfall. Marseille was not only affected by rainfall but also suffered from storms. Lyon felt a terrible flood. The Rhône River meets the Saône River at the end of the Mall. The gate of the church of Charity was covered by nearly two feet of water. The suburb of Guillotière was almost entirely submerged. The city communication with the countryside stopped, except by the Red Cross and Saint-Just. The rains fell mainly in January and February.<sup>79</sup>

The year 1711 again produced the same meteorological character as the previous year – a cool summer. The peak temperature in Paris, *France* reached 83.8° F (28.8° C) on 16 June and the whole summer produced only 11 hot days. In Burgundy, *France*, the year was rainy, and the grape harvest began on 24 September and ended in the snow.<sup>62</sup>

On 7 June 1711, there was a violent thunderstorm and hailstorm at Rotherham in Yorkshire, *England*. The hailstones were 3 to 5 inches [8-13 centimeters] in circumference, which broke a vast amount of glass, cut off ears of corn [grain] and small boughs [tree branches], and killed some pigeons.<sup>212</sup>

In 1711, the price of wheat [in *England*] averaged 54 shillings per quarter [quarter ton].<sup>212</sup>

In 1711 in *Silesia*, Pastor Herman, discovered fulgurites or lightning-tubes, caused by lightning strikes.



These are natural hollow glass tubes formed in quartzose sand, silica, or soil by lightning strikes. These tubes can reach a length of 10 yards [9 meters] or more.<sup>271</sup>

On 7 October 1711, there was a violent thunderstorm with great darkness at Samford-Courney [Sampford Courtenay] in Devon, *England*.<sup>212</sup>

On 5 November 1711, there was a thunderstorm at Southwell in Nottinghamshire, *England*. [The lightning] set fire to the south spire of the minster causing £4000 damage to the church. [Another account places the date as 11 November.]<sup>212</sup>

In 1711, there was a cattle plague in *England*.<sup>212</sup>

In the region of Carniola, Austria [now *Slovenia*] in 1711, there was a famine from rain and mildew.<sup>72</sup> This famine continued several years.<sup>57, 91</sup>

In 1711 in Mobile, Alabama in the *United States*, the city was almost destroyed by an inundation at the mouth of the Mobile River.<sup>92</sup>

The first known storm [hurricane], accompanied by a high flood [storm surge] in Mobile Bay, was in 1711, when the water overflowed the newly organized town [Mobile, Alabama in the *United States*] and caused its removal to the present site.<sup>117</sup>

On 11-13 September 1711, a hurricane destroyed churches and buildings in New Orleans, Louisiana in the *United States* and was felt at Mobile, Alabama.<sup>117</sup>

In 1711 during the period between 16 June and 15 July, floods struck Shantung (now Shandong province) on the east coast of *China* at I-shui. During the period between 14 August and 12 September, a drought engulfed Hupeh (now Hubei province) in central *China* at Ying-ch'êng, Chih-chiang, An-lu and Lo-t'ien. During the period between 10 November and 9 December, floods struck Shansi (now Shanxi province) in northern *China* at Lin-fên, where several hundred persons drowned.<sup>153</sup>

In 1711 during the summer, there were protracted rains and a flood in the vicinity of Shanghai, *China*.<sup>166</sup>

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**1712 A.D.** In *England*, January began mild. The evening of the 1<sup>st</sup>, there was southerly rains. To the 22<sup>nd</sup> of the month, there were overcast days and dark nights, mixed in with some fine days, and some frosts. January ended moderately. February began with hail and snow, and then variable weather with cold northerly winds with some snow and often squalls with rain and white frosts. February ended with rains. Gooseberry leaves were just beginning to open. On the 8<sup>th</sup> of February, there was small hail. Hoarfrost and snow laid on the ground. There was frost and snow on the 9<sup>th</sup>. February produced little rain. March began with wind. On the 4<sup>th</sup> to the 12<sup>th</sup>, there was a clear frost, with snow lying four inches deep, with a very cold thaw. On the 13<sup>th</sup> and 14<sup>th</sup>, ice not exposed to the sun was 1 ½ inches thick. On the 26<sup>th</sup> of March, it rained all day. April began with rain and sleet. From the 2<sup>nd</sup> to the 5<sup>th</sup>, there were some free showers. In the afternoon on the 16<sup>th</sup>, there were some fierce showers. On the 18<sup>th</sup> and 19<sup>th</sup>, there were hot days with much lightning. The rest of April was hot and fine weather to the end of the month. On the 26<sup>th</sup>, there were thunder and a shower. May was mostly a fine month both night and day. On the 4<sup>th</sup>, elm trees were in flower. There were evening showers from 14 to 16 May. On 9, 10 and 22 May, there were thunder. June produced fine weather. There was loud thunder and great hail on 1 June. There was thunder and rain on 16 June. There was thunder with fierce rain on 21 June. The 27<sup>th</sup> and the 29<sup>th</sup> were showery. July produced hot weather. It was a glorious month. July began on the 1<sup>st</sup> with thunder, wind and showers. On the evening of 8 July, there was great rain. On the 15<sup>th</sup>, there was great rain at Norwich. August the 1<sup>st</sup> rained hard. From the 2<sup>nd</sup> to the 6<sup>th</sup>, there was a hazy sunshine. On the



18<sup>th</sup> of August, there were fierce showers. On the 29<sup>th</sup>, it rained hard with thunder. On 3 September, it rained for 24 hours. On the 6<sup>th</sup>, it rained all morning. On the 20<sup>th</sup>, it rained all night. On the 26<sup>th</sup> and 29<sup>th</sup> of September, it rained until 2 or 3 o'clock in the afternoon. This produced a very wet and bad seedtime. October and November were very rainy months. On 14 November, there were great dews on the glass, yet some hard frost. On the 17<sup>th</sup>, there was lightning. From the beginning of December to the 8<sup>th</sup>, there was a hard frost. The ice was 1 ½ inches thick. December produced calm weather with little wind. The last half of December had fogs both night and day. On the 15<sup>th</sup> and 16<sup>th</sup>, there was frost with hail and rain. On the 17<sup>th</sup>, there was snow 1 ½ inches deep. On the 18<sup>th</sup>, three more inches of snow fell.<sup>72</sup>

It was noted that on 6 August 1712 in *low-Hungary*, the heat was excessive. [Lower Hungary during this period of time included parts of *Hungary*, *Slovakia* and *Croatia*.] The rain fell at the end of the month and the weather turned a bit fresher, but then heat came back quickly. In Paris, *France* there were:

Hot days            61 days

Very hot days    4 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperature was on 16 June. In Dijon, *France*, in Burgundy, the grape harvest began on 27 September. In the south there was high temperatures and a severe drought.<sup>62</sup>

The summer of 1712 was very hot in *France*.<sup>79</sup>

Drought and heat in southern *France* caused the sources [of water – springs, creeks, small rivers and lakes] to dry up in 1712 and destroyed crops.<sup>79</sup>

In 1712, the price of wheat [in *England*] averaged 46 shillings per quarter [quarter ton].<sup>212</sup>

On 28 August 1712, a hurricane struck *Jamaica*.<sup>124</sup> [Jamaica is an island in the *West Indies* in the Caribbean Sea.]

In 1712, a hurricane struck *Jamaica*. New colonist and old pirates and seamen were drowned in the hurricane waves and river floods. Many others were killed in the wreckage of the English houses built out of flimsy boards.<sup>141</sup>

On 28 August 1712, a terrible hurricane, attended with lightning and rain, struck *Jamaica*. It lasted 6 hours and destroyed several ships belonging to London and Bristol and fourteen ships belonging to the island. In the harbor of Port Royal and Kingston, four hundred sailors were drowned. Many people were killed by destruction of houses and the sugarworks. The canes and provisions of the Negroes throughout the island were generally destroyed.<sup>174</sup>

On 8 September 1712, a hurricane struck *Jamaica* causing greater than 400 fatalities.<sup>141</sup> [I wonder if the account of a hurricane was actually an account of the damage from a tsunami. On 28 August 1712, a massive earthquake struck *Jamaica*. This earthquake generated a tsunami. Savanna la Mar, a small seaport, was overwhelmed by the sea, which in a few moments swept both man and beast from the face of the earth. Not an individual survived to relate the calamity - not a single habitation escaped the deluge. The town, with its inhabitants and wealth was in the most literal sense of the word, washed away.]<sup>145</sup>

In 1712, a hurricane struck near Havana, *Cuba* drowning several men.<sup>141</sup>

In 1712 during the period between 4 June and 3 July, a drought engulfed Hopei (now Hebei province) in northern *China* at Ku-an, Ting, Ching-ching and Pao-ting. During the period between 30 September and

29 October, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Yai.<sup>153</sup>

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**1713 A.D.** In *England* from 1 to 5 January, there was frost. The ice was three inches thick. The rest of the month produced hoarfrost mixed with rain and showery weather. On the 25<sup>th</sup>, there was a storm. From the beginning of February to the 7<sup>th</sup>, there was wind and rain every day. The 8<sup>th</sup> to the 16<sup>th</sup> produced fine days and nights. From 19 to 23 February, there was rain, sleet and hail. The 22<sup>nd</sup> produced very great rain. The 24<sup>th</sup> to the 28<sup>th</sup> was mostly dry. Gooseberries began to look green and currant bushes were considerably started. On March the 3<sup>rd</sup>, gooseberry blooms appeared. The first week of March was showery. But then cold winds set in and the gooseberry blooms were blasted. At the end of March, spring made no progress. In April, the same northeast winds prevailed (except from the 15<sup>th</sup> to the 21<sup>st</sup>) so that spring was still held back. Both leaves and blooms were blasted by the end of April. The black thorn scarce blossomed. All the trees were naked [without leaves]. The first half of April was squally with hail and snow, and the last half was dry. The northeast winds continued to 6 May. But there were fine days and nights from 28 April to 8 May. The rest of May had variable winds and stirring weather; a wet month on the whole. On the 16<sup>th</sup>, there was thunder with rain and hail. On the 30<sup>th</sup> – thunder, and on the 31<sup>st</sup> - fierce showers. The hawthorns and pears were in bloom on the 9<sup>th</sup>. The apples and some gooseberries were in bloom on the 19<sup>th</sup>. The winter apples were in full beauty on May 29. June had little rain. On the 20<sup>th</sup> of June, the hawthorns were still blossoming. There were frequent showers from 2 to 16 July. From the 15<sup>th</sup> to the end of July, there were great rains lasting several whole days. August began with great rains and stormy weather. On the 13<sup>th</sup> to the 15<sup>th</sup>, there were fogs early and fine hot weather during the days. Then to the 23<sup>rd</sup>, there was the most glorious sunshine and moonshine. September began with squally blowing rain, hail and snow. From the 4<sup>th</sup> to the end of September, there was not much wind, but hot sunshine, glorious weather. From the 14<sup>th</sup> to the 18<sup>th</sup>, there were remarkable dews. The weather was squally at times from the 20<sup>th</sup> to the end of September. October was generally calm. October began showery. On the 8<sup>th</sup>, 10<sup>th</sup>, and 20<sup>th</sup>, it rained all day. There were great rains from the 17<sup>th</sup> to the 24<sup>th</sup>. There was showery weather to the end of the month. On 30 October, hail lay on the ground. On the 4<sup>th</sup>, 5<sup>th</sup>, and 16<sup>th</sup> of November, it rained all day. Towards the end of November, the rains tapered off. Some days produced hard frosts. From 1 to 7 December, there were fogs. From 10 to 12 December, the days were fine. There was a great fog on the 13<sup>th</sup>. The weather was so warm that primroses blossomed. There were great dews from the 20<sup>th</sup> to the 26<sup>th</sup>. The thermometer ended this year as high as it is mostly in May or June. Primroses, lettuce, and hartichoaks [artichokes] grown in the summer, their foliage cut down in the latter end of November, shot a foot in length in six weeks time. Gooseberry leaves were open.<sup>72</sup>

On 9 March 1713, there was a thunderstorm at Clogher, *Ireland*. The next day, there was a sinking of a hill, around 4¾ acres, probably owing to the constant great rains from the previous autumn and winter.<sup>212</sup>

In 1713, there was a flood on the River Trent in *England*.<sup>212</sup>

In 1713, the price of wheat [in *England*] averaged 51 shillings per quarter [quarter ton].<sup>212</sup>

In *England*, the years between 1713-1719 produced a moderate drought. There were few rains but there were rich dews. The years 1714, 1717, 1718, and 1719 produced very hot summers.<sup>72</sup>

On 4-5 September 1713, a hurricane struck the *Caribbean* island of Martinique causing 100 deaths.<sup>141</sup>

On 16-17 September 1713, a hurricane struck South Carolina in the *United States* causing 70 deaths.<sup>141</sup>

In 1713, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 24 May and 22 June, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ao-an; Yunnan province in southwest *China*

at Hao-ch'ing; and Kiangsi (now Jiangxi province) in southern *China* at Hsing-an, Shih-ch'êng [uncertain name] and Kan. At Shih-ch'êng, houses and fields were damaged by the floodwaters. At Kan, the city walls were damaged.

— During the period between 20 September and 18 October, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Taichow and Anhwei (now Anhui province) in eastern *China* at Ho-fei.

In 1713 during the period between 6 May and 17 December, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Taichow and Ch'ang-shan. During the period between 8 August and 8 November, a severe drought engulfed Anhwei (now Anhui province) in eastern *China* at Wu-ho.<sup>153</sup>

The year 1713 was a year of abundance in the vicinity of Shanghai, *China*.<sup>166</sup>

**1714 A.D.** In Philadelphia, Pennsylvania in the *United States* the winter of 1714 was very mild after the 15<sup>th</sup> of January; trees and shrubbery were in bloom the first week in February, and the spring was unusually mild.<sup>1</sup>

In *England* in January, the month was mostly cold but there were little frosts. On the 6<sup>th</sup>, there were some flights of small snow. Small showers occurred on 18, 25, and 29 January. The first half of February was generally fair and mild, like the month of May. There was squally weather with some white frosts from 14 February to the end of the month. On 17 February, gooseberries were in bloom. On the 19<sup>th</sup>, there was a dreadful storm, which was combined with the high tide, and overflowed all the deans. On 15 February, the winds were blowing hard in the morning, and then there was a small storm. A great number of ships were in the road sunk, shored, or driven from their anchors. And the houses were stripped [of their roof shingles]. In March, there were glorious days and nights from the 1<sup>st</sup> to the 12<sup>th</sup>, yet hard frost in the morning. This was followed by still warmer winds and showery weather, with clear nights. From 20 to 31 March, the weather produced sundry pleasant days. "Grass grew so fast, that my grass plot was mown the 13<sup>th</sup> and the 31<sup>st</sup>." By 16 March, the currants had grown to an inch long. From the 26<sup>th</sup> to the 31<sup>st</sup>, the leaves of the gooseberries were blasted. In the beginning of April, the weather set in so cold with hail and snow lying two inches thick. On the 3<sup>rd</sup> of April, it froze indoors. This frost lasted four or five days, and the nights were cloudless. From the 9<sup>th</sup> to the 12<sup>th</sup>, the 15<sup>th</sup>, and the 17<sup>th</sup> of April, the temperature was warmer than normally seen in May or June. The 12<sup>th</sup> was especially hot. From 19 to 28 April, there were showers and some fogs. The first days of May were warm. There was squally weather from the 4<sup>th</sup> to the 6<sup>th</sup>. It was mostly cold, very dry and clear to the 24<sup>th</sup>. Gooseberries and currants were not all out of bloom. On the 19<sup>th</sup>, there was distant thunder with hail and rain. On the 27<sup>th</sup>, it rained almost the whole day. The artichokes, which were fruited in winter, were now no bigger than large apples. June began dry from the 1<sup>st</sup> to the 3<sup>rd</sup>. It was stormy from the 6<sup>th</sup> to the 10<sup>th</sup>. The rest of the month was dry and not very hot. In July, the currants began to ripen and gooseberries the next week. There was remote thunder on 2, 10 and 20 July. The latter half of July was showery, with a great deal of rain during the last week. On 24 July, the new corn [grain] was brought to the mills. From 9 to 12 August, there were great fierce rains. At 7 p.m. on 2 August, there was very loud thunder with a prodigious shower of fierce rain, which flooded gardens in 5 minutes. This rain lasted all afternoon with much lightning. At the same time 17 miles to the southwest, there was a dreadful storm of hail with hailstones five inches about, with 20 icicles forming on some of them, some icicles nearly an inch in length. The last half of August was showery. There was no great heat. September produced variable winds and weather. On the 24<sup>th</sup>, the sea roared loud. Then on the 25<sup>th</sup> the winds blew hard. On the 26<sup>th</sup> there was a prodigious high tide that overflowed all the deans land left by the sea. October was all mild. Lettuce which sowed itself was now fit to be harvested on the 23<sup>rd</sup>, and it was very fine. On the 26<sup>th</sup>, lettuce was sown which by the end of the year was green and unhurt by the frost. November was one whole month of mild, calm, dry weather. The month began with vast dews all day seen on the glass, with low creeping morning and evening fogs, glorious sunshine days and clear nights. There were hard frosts

on 5, 13, 20, 26 and 27 November. On the 24<sup>th</sup>, the temperature was 30.5° F (- 0.8° C). December began mild. From the 7<sup>th</sup> to the 9<sup>th</sup>, there was a hard frost and the ice was 1 ½ inches thick. The 16<sup>th</sup> was rainy. From the 11<sup>th</sup> to the 18<sup>th</sup>, there was frost with some snow. On 20, and 26 to 29 December, there was a hard frost. On the 31<sup>st</sup> of December, there was green salad in perfection in common earth, which next week was killed with the very primroses that were almost in full blossom.<sup>72</sup>

In *England*, the years between 1713-1719 produced a moderate drought. There were few rains but there were rich dews. The years 1714, 1717, 1718, and 1719 produced very hot summers.<sup>72</sup>

In the region of Carniola, Austria [now *Slovenia*] in 1714, there was a famine from changeable, rainy weather.<sup>72</sup>

In the middle of July 1714, there was cattle distemper at Islington, *England*. By the end of September, there was an alarming increase. In October, it also appeared in Norfolk, Suffolk and Hertfordshire. It was violent for 3 months, and the loss to farmers was £24,500 [£3 million in today's currency using retail price index inflation rates]. In Holland [now *the Netherlands*], it had lasted two or three years, and 300,000 beasts had died.<sup>212</sup>

In 1714 in London, *England*, there was an epidemic of smallpox. One-ninth of the population died.<sup>212</sup>

In 1714 at Upminster, *England*, there was a remarkable drought. Only 11.2 inches [28 centimeters] of rain fell during the year.<sup>212</sup>

In 1714, the price of wheat [in *England*] averaged 50 shillings per quarter [quarter ton].<sup>212</sup>

In Mobile, Alabama in the *United States*, the city was almost destroyed by an inundation at the mouth of the Mobile River.<sup>47</sup>

In late June 1714, a hurricane struck the Florida Keys in the *United States*. Many ships sank and the bodies of many dead men and women floated away, but still many men somehow made it to land.<sup>141</sup>

On 29 August 1714, a hurricane struck *Jamaica*.<sup>124</sup>

In September 1714, a hurricane struck *Cuba*. The frigate *San Juan* was lost.<sup>141</sup>

In 1714, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Lin-ch'ü.

— During the period between 6 May and 8 November, a drought engulfed Hopei (now Hebei province) in northern *China* at Ching.

— During the period between 12 June and 11 July, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hsüan-p'ing and Hopei province at Tung-ming and Yüan-shih.

— During the period between 12 July and 9 August, a drought engulfed Chekiang province at Taichow and Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Wu-chiang and Wu-chin.

In 1714 during the period between 12 June and 11 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Shih-ch'êng [uncertain name] and Kansu (now Gansu province) in northwest *China* at Chiu-ch'üan.<sup>153</sup>

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**1715 A.D.** In *England*, from the beginning of the January to the 5<sup>th</sup>, there was a hard frost with winds blowing hard. On the 2<sup>nd</sup>, 3<sup>rd</sup>, and 6<sup>th</sup>, it froze indoors. On the 9<sup>th</sup> and 10<sup>th</sup>, there was a hard frost. The

rest of January produced moderate weather. There were some overcast days and many bright days mixed with fogs and rains. Lettuce sown in December came up thick. February began warm with a terrible storm of four hours duration. It untiled houses, threw down chimneys, gable ends and barns in abundance and forced ships from their anchors. The same day there was a dreadful hurricane at Dublin and Roan in *Ireland*; and Hamburg and Lübeck in *Germany*. On the 19<sup>th</sup> at noon to three the next morning, there was a storm especially on the North Sea that produced one of the highest tides at Yarmouth ever witnessed. It is said to be the highest tide at Hull in the past 32 years. February was a moderate month. There were frosts on 5, 8, 21, 22, and 28 February. On the 22<sup>nd</sup>, the ice was 1 ½ inches thick. March was variable with soft showers at times. On the 7<sup>th</sup>, the ground was dry to the diggers. Currants shot scarce an inch long. There were soft showers during the beginning of April. From the 16<sup>th</sup> to the 24<sup>th</sup>, it was dry. April ended with squalls or large rains. On the 11<sup>th</sup> of April, the hawthorn blossomed. On the 20<sup>th</sup>, currants shoot from 5 to 11 inches. This was the earliest spring in many years. There was lightning and thunder with some showers on 1, 9, 10 and 11 May. The first two weeks of May produced wind, rain, and some hail. The third week of May was variable. There were some showers in the fourth week. On the 28<sup>th</sup>, there was thunder, lightning and some showers in the evening. May ends dry. May as a whole was more temperate than hot. June produced many showers. There were some dry days followed by large rains. There was thunder sometimes with a great deal of rain on 11, 12, 20, 24, 27 and 30 June. On 11 June, currants began to ripen in Norfolk. There was thunder on 1, 3 and 9 July. From the 2<sup>nd</sup> to the 9<sup>th</sup> of July, there were vast rains and floods. On the 3<sup>rd</sup> and 9<sup>th</sup> of July began a kind of rain which was not usual so far north. The rain rather than falling by showers, fell by spouts from the sky, in such quantities and with so great a force that at particular spots of the ground, it carried away soil into the sea. In one place on the 3<sup>rd</sup>, the rain which fell on one field bore away 100 feet of ground to a depth of 30 feet into the Sea, and left on the beach the bed as it were of a deep river. The soil is sand and gravel. Some of these rains fell in showers of numberless minute spouts, with space in between. Others in single spouts more plainly seen, where they fell into the sea. And even as far north as Tinmouth Bar, they fell with such force into the Sea, as to dash the water of the Sea half mod high into the air. This type of rainstorm continued into the year 1716. The rest of July was showery. It was hot and dry about the middle of the month and cold at the end. August began with a showery weather. On the 2<sup>nd</sup> at Saxmundham in Suffolk in eastern *England*, there was showers of plentiful rain and in the afternoon it became exceedingly hot. The rest of the month had showers but more fogs towards the end of the month. September was a glorious month. There was little rain. There were some rokes or fogs from the 5<sup>th</sup> to the 7<sup>th</sup>. Then blowing weather from the 7<sup>th</sup> to the 10<sup>th</sup>. The middle of September was very hot with large dews. The month ended with showers on the 25<sup>th</sup> to the 27<sup>th</sup>. The first half of October was warm weather with a great deal of rain or large dews. The 17<sup>th</sup> was hot and faint. The 18<sup>th</sup> was sultry hot. The 20<sup>th</sup> was excessively hot. Thence there was rain and warm or hot weather to the end of October. From 2 to 8 November, it was warm.<sup>72</sup>

In *England*, the years between 1713-1719 produced a moderate drought. There were few rains but there were rich dews. The years 1714, 1717, 1718, and 1719 produced very hot summers.<sup>72</sup>

[Taine estimated that in the year 1715 more than one third of the population of *France* (6 million people) perished from hunger and destitution. The cause of this famine and those that followed was due to *taille* (land tax). *France* is a land of good soil and fine weather, almost like a Garden of Eden. But for over a hundred years leading up to the French Revolution in 1789, it became a land of dire want and famines. *Taille* robbed the peasants of even their meager existence. These oppressive taxes drained and crushed the agricultural might of *France*. This was obvious even in 1689 when La Bruvère wrote “Certain savage-looking beings, male and female, are seen in the country, black, livid and sun burnt, and belonging to the soil which they dig and grub with invincible stubbornness. They seem capable of articulation, and, when they stand erect, they display human lineaments. They are, in fact, men. They retire at night into their dens where they live on black bread, water and roots. They spare other human beings the trouble of sowing, ploughing and harvesting, and thus should not be in want of the bread they have planted.” Over the next several decades, they continued to be starved by “want of bread” and they died in herds.<sup>87</sup>]



In 1715, the price of wheat [in *England*] averaged 43 shillings per quarter [quarter ton].<sup>212</sup>

In 1715, there was a severe cattle plague [in *England*].<sup>212</sup>

In 1715, the River Ribble in Northern *England* was for a time dry, except in deep places.<sup>212</sup>

In 1715, there was a violent gale. As a result in London, *England*, the River Thames at London Bridge was emptied to the size of a brook of 10 or 12 feet over [across], and people walked on the bottom and found treasures there.<sup>212</sup>

On 30 July 1715, a hurricane struck the southern *Bahamas* and the Straits of Florida in the *United States*. The storm caused between 1,000 and 2,500 deaths.<sup>141</sup>

In 1715, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu and T'ien-pao; Kiangsu (now Jiangsu province) on the east coast of *China* at K'un-shan; and Hupeh (now Hubei province) in central *China* at Wuchang.

— During the period between 3 May and 1 June, floods struck Kwangsi province at Ch'üan.

— During the period 2-30 June, floods struck Shantung (now Shandong province) on the east coast of *China* at Ch'iu, Shou-kuang, Hui-min, Pin, Wu-ti, Yang-hsin and Ch'ang-shan; Hopei (now Hebei province) in northern *China* at Huo-lu and Hsien; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ên-hai. At Ch'ên-hai, the dikes were damaged.

— During the period 1-29 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow; Hupeh province at Chih-chiang; and Kiangsu province at Soochow. At Soochow, houses and fields were damaged by the floodwaters.

— During the period between 8 August and 8 November, floods struck Shantung province at Liao-ch'êng.

— During the period between 26 November and 25 December, floods struck Shantung province at Tê-p'ing.

In 1715, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Yang-chiang and Shansi (now Shanxi province) in northern *China* at I-ch'êng and Chieh.

— During the period 1-29 July, a drought engulfed Anhwei (now Anhui province) in eastern *China* at T'ung-ling and Ho-fei.

— During the period between 30 July and 28 August, a drought engulfed Yunnan province in southwest *China* at Hao-ch'ing.

— During the period between 29 August 1715 and 5 February 1716, a drought engulfed Kwangtung province at Hui-lai.

In 1715 during the summer, there was a great drought in the vicinity of Shanghai, *China*.<sup>166</sup>

**Winter of 1715 / 1716 A.D.** The winter was recorded as being intensely cold throughout *Europe*.<sup>1</sup>

The winter was cold in *Europe*. On 22 January 1716, the temperature in Paris, *France* was -4° F (-20° C). Frost fair was held on the River Thames in London, *England*.<sup>28</sup>

The winter was very cold. In Paris, *France*, the thermometer fell on 22 January 1716 to -3.5° F



(-19.7° C). During the course of this month, significant quantities snow fell. The severity of the cold was particularly noticeable in *England* where the River Thames in London froze so solid that stalls and booths were set up on the ice.<sup>62</sup>

In 1716 the cold temperature reached was -3.8° F (-19.9° C) in Paris, *France*. This compares to 1729 at 4.3° F (-15.4° C); to 1742 at -0.8° F (-18.2° C); to 1747 at 5.2° F (-14.9° C); to 1754 at 5° F (-15° C); to 1758 at 7.2° F (-13.8° C); and to 1767 at 2.8° F (-16.2° C). The Seine River totally froze over during most of these winters.<sup>79</sup>

In *England* in 1716, there was a great frost.<sup>72</sup>

On 7 January 1716, the temperature at Upminster [a suburban town in east London, *England*] fell to 11° F [-11.7° C].<sup>300</sup>

During the winter of 1716, the River Thames in London, *England* was frozen over for several miles and streets of booths were erected on the ice and an ox roasted on it, coaches driven, and many diversions exercised above the bridge. And so strong was the ice below the bridge, that people walked and skait [ice skated] at their pleasure on it. The coldest temperature was observed on 7 January. The river freezing that year was not so much caused by the extreme cold but rather the long duration of the cold.<sup>235</sup>

In *England* on the 10<sup>th</sup> and 11<sup>th</sup> of November 1715, there was frost. On the 13<sup>th</sup> and 14<sup>th</sup>, it was very cold. There were frequent rains to the 18<sup>th</sup>. The month ended with large rains, with hail and snow and colder weather. After and exceedingly mild autumn, December introduced a very severe winter. The 1<sup>st</sup> of December was mild. The 2<sup>nd</sup> produced a hard frost. On the 3<sup>rd</sup>, it rained all day. From the 3<sup>rd</sup> to the 15<sup>th</sup>, there was a hard frost. The 15<sup>th</sup> produced frost with a little snow. On the 16<sup>th</sup>, it spits snow. From 17 to 21 December, there was a hard frost. On the 21<sup>st</sup>, it snowed all day and all night. On the 22<sup>nd</sup>, it snowed all day. The snow was 4 inches deep on the level. On the 23<sup>rd</sup>, the winds moved the snow into drifts. The fields were now naked. To the 30<sup>th</sup>, there were severe frosts. On 30 and 31 December, the ice along the coast was six inches thick.<sup>72</sup>

On 24 November 1715, there was a great frost [in London, *England*]. There was a fair [on the ice] of the River Thames. The frost lasted until 9 February 1716, during the whole of which time the River Thames was frozen over, and in January strongly frozen. The coldest day occurred on 16 January 1716.<sup>212</sup>

In *England* in January 1<sup>st</sup>, it thawed a little; on the 2<sup>nd</sup> there was frost and snow; on the 3<sup>rd</sup> frost. On the 4<sup>th</sup>, it spits snow all day, there was frost and it snowed three inches deep at night. From the 6<sup>th</sup> to the 10<sup>th</sup>, there was a hard frost. On the 10<sup>th</sup>, there was frost and snow; the thermometer was nearly as low as it had been in 1709. On the 11<sup>th</sup>, there was frost, snow and the ice was 8 inches thick. From the 12<sup>th</sup> to the 15<sup>th</sup>, there was a hard frost, and snow at times. On the 18<sup>th</sup>, the frost relented but it snowed in the afternoon. On the 19<sup>th</sup> and 20<sup>th</sup>, there was frost and it snowed all day. On the 22<sup>nd</sup>, it thawed. On the 23<sup>rd</sup>, there was a hard frost and snow. On the morning of the 24<sup>th</sup>, there was frost, snow, and fog and then it thawed at night and rained. On the 25<sup>th</sup>, there was a small rain. On the 26<sup>th</sup>, there was fog, thaw and then frost. On the 27<sup>th</sup>, there was frost, fog and in the afternoon wetting fog. On the 28<sup>th</sup> fog; on the 29<sup>th</sup> frost. On the 30<sup>th</sup>, there was frost with much old ice. The new ice was 9 inches thick. On the 31<sup>st</sup>, there was frost and in the afternoon a thaw and wetting fog. (On the 16<sup>th</sup> of January, the spirits in the thermometer were as low as in 31 December 1709.)<sup>72</sup>

In *England*, from the beginning of February to the 8<sup>th</sup>, the weather was often foggy, cloudy and wet. On the 8<sup>th</sup>, there was hail, snow and a frost. There was a hard frost on the 9<sup>th</sup> and 10<sup>th</sup>. On the 11<sup>th</sup>, there was a frost with the old ice still thick on the water. From the 12<sup>th</sup> to the 14<sup>th</sup>, there were fogs, spitting snow or rain. The 15<sup>th</sup> was clear with most of the snow gone. The 16<sup>th</sup> and 17<sup>th</sup> were clear with some mist. The

18<sup>th</sup> and 19<sup>th</sup> produced a hard frost. The 20<sup>th</sup> to the 27<sup>th</sup> was mostly clear. The 27<sup>th</sup> produced snow, sleet, hail, and squally weather. The 28<sup>th</sup> was clear. And the 29<sup>th</sup> produced a small shower. The first half of this month was cold, the rest moderate.<sup>72</sup>

On the 1<sup>st</sup> of March in *England*, there was frost, squalls of rain and hail. On the 2<sup>nd</sup>, there was snow two inches and frost. On the 3<sup>rd</sup>, frost indoors, squalls of snow and small hail. The 4<sup>th</sup> and 5<sup>th</sup> was clear. The 6<sup>th</sup> and 7<sup>th</sup> were sweet days. The 8<sup>th</sup> was good. On the 9<sup>th</sup> and 10<sup>th</sup>, there were squalls of snow and hail. The gooseberry leaves were just opening, yet the trees looked naked. On the 11<sup>th</sup>, the weather was good. On the 12<sup>th</sup>, there were small rains. The 13<sup>th</sup> and 14<sup>th</sup> were clear. There was a hard frost on the 15<sup>th</sup>. On the 16<sup>th</sup> and the 17<sup>th</sup>, there were small showers. During the night of the 18<sup>th</sup>, there was rain. The 19<sup>th</sup> was smirry, yet clear. The 20<sup>th</sup> was clear. There were fierce squalls on the 21<sup>st</sup>. The 22<sup>nd</sup> was gray with some little hail. The 23<sup>rd</sup> was a little smirry. The 24<sup>th</sup> was a dull day. On the 25<sup>th</sup> and 26<sup>th</sup>, the weather spits small hail. From the 27<sup>th</sup> to the 31<sup>st</sup>, there was frost and thick ice. March was mostly cold. On the 24<sup>th</sup>, there were blooms on some gooseberries. The currants were open. On the 1<sup>st</sup> of April, there was frost and thick ice.<sup>72</sup>

In 1715-16 in *England*, a fair was held on the River Thames.<sup>2, 41, 43, 90</sup>

In *England* in 1716, the River Thames froze at London and many set up shops on the ice.<sup>58, 60, 62, 80</sup>

In *England* in 1716, a fair held on the Thames; oxen roasted.<sup>47, 93</sup>

In *England* there was a severe frost from 24 November 1715 to 9 February 1716, and as a result, a fair was held on the frozen River Thames and oxen roasted.<sup>90</sup>

In 1716 A.D., booths were erected on the ice on the River Thames at London, *England*.<sup>38</sup>

Dawkes' News Letter of the 14th of January says, "The Thames [in *England*] seems now a solid rock of ice; and booths for sale of brandy, wine, ale, and other exhilarating liquors, have been for some time fixed thereon; but now it is in a manner like a town; thousands of people cross it, and with wonder view the mountainous heaps of water that now lie congealed into ice. On Thursday a great cook's-shop was erected, and gentlemen went as frequently to dine there as at any ordinary. Over against Westminster, Whitehall, and Whitefriars, printing presses are kept on the ice."<sup>29</sup>

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**1716 A.D.** In *England*, the years 1716 to 1719 were exceedingly hot and dry.<sup>72</sup>

In *England* on the 2<sup>nd</sup> and 3<sup>rd</sup> of April 1716, the weather was clear. The morning of the 4<sup>th</sup> was misty. The 6<sup>th</sup> was clear. The 7<sup>th</sup> produced fog. The 8<sup>th</sup> and 9<sup>th</sup> was frost and clear. The 10<sup>th</sup> to the 12<sup>th</sup> were clear. The 13<sup>th</sup> was clear with some fog. On the 14<sup>th</sup>, it was clear with some fog in the valley. The 15<sup>th</sup> was clear. The 16<sup>th</sup> was clear, but produced 2-inch hail at Norfolk. The 17<sup>th</sup> produced small rain. The morning of the 18<sup>th</sup> produced small rain. To the 27<sup>th</sup>, the weather was clear, or cloudy with some smirrs. The 27<sup>th</sup> was hazy. The 28<sup>th</sup> was squally, rain and hail and in the afternoon small rain. On the morning of the 29<sup>th</sup>, it was rainy and then clear. The middle of the month was moderate, but the end of the month was warm.<sup>72</sup>

In *England* from the beginning of May to the 15<sup>th</sup>, the weather was cold, dry and mixed. On the 15<sup>th</sup> and 16<sup>th</sup>, there was thunder and rain. On the 17<sup>th</sup>, the weather changed from foggy, to clear, to rain, to great rain. On the 18<sup>th</sup>, there was thunder. In the morning of the 19<sup>th</sup>, there were showers and thunder. The 23<sup>rd</sup> had an overcast rainy night. The 24<sup>th</sup> was hot with small showers. The 25<sup>th</sup> was cloudy. The 26<sup>th</sup> was showery with thunder, hail and rain. From the 27<sup>th</sup> to the 29<sup>th</sup>, there was showers and thunder, often

cloudy. By the Journal from Holland, it appears, that the very wet and tempestuous weather at Yarmouth, on the 26<sup>th</sup>, 27<sup>th</sup>, and 28<sup>th</sup> did not reach Holland [now *the Netherlands*].<sup>72</sup>

In *England*, June began with northwest winds with small showers and then southwest winds to the 10<sup>th</sup> at Yarmouth. But there was not a drop of rain in *Holland*. Whirlwinds prevailed mostly all the rest of the month with moderate weather. On the 20<sup>th</sup> and 21<sup>st</sup>, there was loud thunder, and fierce rain at Yarmouth, with hard gales that damaged ships. Notwithstanding the rains of 17, 26, 27, and 28 May and the June showers; at the beginning of July, all the ponds near Yarmouth were dry. They had not been this dry in the 9 previous years. The year 1704 was remarkably dry and this drought began in 1714 and continued to 1719; dried up the very rivulet [very small streams], which rises at this springhead [natural springs].<sup>72</sup>

In *England*, the winds in July were westerly, most with showers and squalls. On the 6<sup>th</sup>, there was thunder. On the 11<sup>th</sup>, there was loud thunder.<sup>72</sup>

In *England*, in August the winds were variable. The first half of the month was dry with some sweet smirrs. On the 14<sup>th</sup> and 15<sup>th</sup>, there was much rain. On the 16<sup>th</sup> everywhere was dry; except Yarmouth had showers.<sup>72</sup>

In *England*, it was excessively dry until the end of August.<sup>47, 72</sup>

In 1716, the price of wheat [in *England*] averaged 48 shillings per quarter [quarter ton].<sup>212</sup>

In 1716, in consequence of a long drought and a west-southwest wind, the River Thames [in London, *England*] was blown so dry that thousands of persons passed across on foot, under the arches of the London Bridge.<sup>212</sup>

In *England*, the years between 1713-1719 produced a moderate drought. There were few rains but there were rich dews. The years 1714, 1717, 1718, and 1719 produced very hot summers.<sup>72</sup>

The River Thames in *England* on September 14, was dry both above and below the bridge (London bridge).<sup>40</sup>

In *England* on September 14, the River Thames lay perfectly dry both above and below the bridge, leaving only a very narrow channel, which extraordinary circumstances was occasioned by a strong westerly wind, that blew all the preceding day and night, which forced back the tide, and drove forward the ebbing water.<sup>55</sup>

In *England*, September was squally weather. The barometer dropped for the 1<sup>st</sup> to the 14<sup>th</sup> finally reaching 28.0. On the 5<sup>th</sup>, there were sudden furious rains and winds. On the 8<sup>th</sup>, there was thunder. On the 11<sup>th</sup>, there was lightning. The 12<sup>th</sup> was calm. On the evening of the 13<sup>th</sup>, there rose a [massive] storm on the east coast, which destroyed a vast number of loaded colliers [bulk cargo ships that carry coal] and other ships. This storm was most fatal to Leostoss, Ipswich and Yarmouth. There were terrible wrecks of fisher boats. The River Thames ran dry for the space of several miles. In London at Westminster and Limehouse, the people walked over the river on foot for 14 hours; there was only a narrow gutter in the middle. Grainger, an expert sailor, and others that rode the anchor beyond Southwold, observed that their ships never parted all night, and were lost by expecting more water on the sands than they found. In Yarmouth road, the ebb was observed to run 12 hours. (A similar event is mentioned by Hollingshead during the reign of King Henry the 1<sup>st</sup>.)<sup>72</sup>

In *England*, in October the weather was temperate during the first three weeks but often with quite a bit of rain. On the 2<sup>nd</sup>, it rained for 24 hours; but not a hard rain. The 4<sup>th</sup> was similar but with less rain. From the 14<sup>th</sup> to the end of the month, the weather was mostly dry. The 24<sup>th</sup> and 29<sup>th</sup> produced hard frosts.<sup>72</sup>

In *England*, from the beginning of November to the 17<sup>th</sup>, the weather was dry and calm. From the 19<sup>th</sup> to the 24<sup>th</sup>, there was abundant rain and fierce squalls.<sup>72</sup>

In *England*, from the 1<sup>st</sup> to the 9<sup>th</sup> of December, there were flights of hail, which made the ground white. On 2, 3, 5 and 11 December, the weather produced all frosts with overcast skies. Then there were some thicks and fogs till the 18<sup>th</sup>. The weather to the end of the month was variable.<sup>72</sup>

In 1716, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 23 February and 23 March, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hai-fêng and Jehol province at Ch'ao-yang. Jehol (formally Rehe province) was located north of the Great Wall, west of Manchuria, and east of Mongolia. In 1955, the area was divided between Hebei province, Liaoning province and *Inner Mongolia*.

— During the period between 20 June and 18 July, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Fu-shan; Kwangtung province at Chieh-yang; and Hopei (now Hebei province) in northern *China* at Mi-yün and Huai-jou.

— During the period between 6 May and 8 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-shan.

In 1716, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 22 April and 20 May, floods struck Hupeh (now Hubei province) in central *China* at Huang-mei, Kuang-chi, Chiang-ling and Chien-li.

— During the period between 20 June and 18 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-hua and Ch'ang-shan; Shansi (now Shanxi province) in northern *China* at Ning-wu; Jehol (formally Rehe province) in *China* at Ling-yüan [uncertain name, "Chien-ch'ang"]; Shantung (now Shandong province) on the east coast of *China* at Kuang-jao, Ning-yang, Chi-ning and Wên-shang; Hupeh province at Ch'ung-yang and T'ien-mên; Hunan province in south-central *China* at Hsiang-t'an [uncertain name, "Huang-ling"]; and Anhwei (now Anhui province) in eastern *China* at T'ung-ling and T'ai-hu.

— During the period between 15 October and 13 November, floods struck Shantung province at Tsinan and Hupeh province at Ch'ien-shan.

In 1716 during the spring and autumn, there were continuous rains in the vicinity of Shanghai, *China*. During the 7<sup>th</sup> moon, there was a typhoon. These events led to a bad harvest and a year of scarcity.<sup>166</sup>

**Winter of 1716 / 1717 A.D.** The winter near Philadelphia, Pennsylvania in the *United States* was long and severe, and there were the deepest snows remembered by the oldest inhabitants. In the Carolinas in February, the snow fell to the depth of six feet (1.8 meters). In New England it fell to a much greater depth. A Salem, Massachusetts's newspaper published immediately after the storm, said, "the snow was blown into banks from fifteen to twenty feet high (4.6 to 6.1 meters)."<sup>1</sup>

Winter started early in 1716 in New England in the *United States*. By December there was already 5 feet (1.5 meters) of snow on the ground. Snow fell considerably several times during the month of January 1717. By February 6, there were drifts twenty-five feet (7.6 meters) in some places, and in the woods a yard (0.9 meters) or more on the level. The month of February was 'very ordinary' at first. But a snowstorm continued for a couple of days and the farmers commenced to think that perhaps it would be a severe one. A week went by and still the snow fell. It had not stormed continuously all of that time but

there was no clearing of the skies. It stopped for a few hours perhaps and then more clouds gathered and then came the snow. Storm after storm swept down on the country and village until two weeks had elapsed. Finally when the sun did come out and the skies became clear, what a sight was before people! Snow lay at a depth of ten to fifteen feet (3-5 meters) on the level, and in some places for long distances it was twenty feet (6.1 meters) deep. Indians, who were almost a hundred years old, said that they had never heard their fathers tell of any storm that equaled this.<sup>24, 25</sup>

In the *United States*, at that time the forests were near at hand. Bears and wolves were numerous then. Due to the great storm, they became desperate in their cravings of hunger, and as soon as night fell, in their ravenous state they followed the deer in droves into the clearings, at length pouncing upon them. In this way vast numbers of these animals were killed, torn in pieces, and devoured by their fierce enemies. It was estimated that nineteen out of every twenty deer were thus destroyed. The snowstorm also drove wolves, foxes, bears and wildcats into the settlements. These animals made nightly raids on the sheep pens and hog pens. In many places the cattle and sheep were allowed to roam about in the large yards during the winter and such was the fall of snow that scores of these were buried and then of course they froze to death before help could reach them. In the spring some of the cattle were found standing erect, frozen solidly in their tracks. In other places the sheep had huddled together for mutual warmth and had succumbed in that way. On the farms of one gentleman upwards of eleven hundred sheep were lost in the snow. Twenty-eight days after the storm, while the search for them was still in progress, more than a hundred were found huddled together, apparently having found a sheltered place on the lee side of a drift, where they were slowly buried as the storm raged on, being covered with snow until they by sixteen feet (5 meters) beneath the surface. Two of the sheep were alive, having subsisted during the four weeks of their entombment by feeding on the wool of their companions.<sup>24, 25</sup>

In the *United States*, many a one-story house was entirely covered by the snow, and even the chimneys in some instances could not be seen. Paths were dug under the snow from house to barn, to enable the farmers to care for their animals, and tunnels also led from house to house among the neighbors if not too far apart. Most of the houses in fact were covered to the third story windows on the wind shaken side, and the barns were entered through the windows or traps to the haylofts, the doors being so deeply buried that they could not be shoveled out.<sup>24, 25</sup>

Every village organized searching parties to hunt for widows or elderly people who could not care well for themselves. Among the inhabitants of Medford, Massachusetts in the *United States* was a widow, with several children, who lived in a one-story house on the road to Charlestown. Her house was so deeply buried that it could not be found for several days. At length smoke was seen issuing from a snow bank, and by that means its location was ascertained. The neighbors came with shovels, and made a passage to a window, through which they could gain admission. They entered and found that the widow's small stock of fuel was exhausted, and that she had burned some of the furniture to keep her little ones from suffering with the cold.<sup>24, 25</sup>

In New England in what was to become the *United States*, the winter of 1716-17 was remembered for its great snowfalls. In December 1716, snow fell to a depth of 5 feet [1.5 meters], rendering travel very difficult, and almost impossible except for snowshoes. The temperature throughout the winter was moderate, but the amount of snow that fell has never been equaled in New England. Snow fell in considerable quantities several times during January. On 6 February, the snow lay in drifts in some places 25 feet [7.6 meters] deep and in the woods 3 feet [0.9 meters] on the level. A great storm struck on 18 February, which continued to pile snow until the 22<sup>nd</sup>. Snow fell so violently on the 24<sup>th</sup> that all communications between houses and farms ceased. During this storm, snow buried the earth to a depth of 10-15 feet [3.0 – 4.6 meters] deep on the level and in some places over long distances it was 20 feet [6 meters] deep. Indians, who were almost 100 years old, said that they had never heard their fathers tell of any storm that equaled this.<sup>199</sup>



— Many cattle were buried in the snow, where they were smothered or starved to death. One farmer lost 1,100 sheep in the snow. Almost a month after the storm, he found a hundred of his sheep huddled together buried under 16 feet [5 meters] of snow. Two of the sheep were alive by feeding on the wool of their companions. A couple hogs buried alive dug their way out of a snow bank, 27 days later. Poultry survived several days after being buried alive. Hens were found alive after 7 days, and turkeys from 5 to 20 days.

— Wild animals were common in the forest of New England during this time. But during this storm, they were deprived of food. Bears and wolves were numerous then, and as soon as night fell, in their ravenous state they followed the deer in droves into the clearings, at length pouncing upon them. In this way vast numbers of deers were killed, torn to pieces, and devoured by their fierce enemies. It was estimated that nineteen out of every twenty deer were thus destroyed.

— Bears, wolves and foxes nightly assaulted the sheep in the farmer's sheep pens. Many ewes that were about to give birth to young, were so frightened at these assaults, that most lambs born the next spring were of the color of foxes, the dams being either white or black.

— This snowstorm damaged the orchards. The snow was above the top of trees, and when it froze, it formed a crust of ice, which broke most of the branches to pieces. The crust was thick enough that cattle grazed on its surface feeding on the tender twigs that poked through the ice and snow.

— Many one story houses were completely covered with snow even the chimneys. The farmers dug tunnels in the snow between their house and the barn in order to care for their animals. In places where houses were close together, tunnels were dug between houses.

In February 1717, snow fell in such great quantities in New England in the *United States* that it was called "The Great Snow". The Boston Gazette on February 25 stated, "the snow lies in some parts of the streets about six foot high."<sup>174</sup>

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**1717 A.D.** In *England* in January, there were few frosts. It was a dry month with variable winds; some thick and foggy days; many days of sunshine. In February from the 2<sup>nd</sup> to the 9<sup>th</sup>, there were frosts. The five weeks up to this point had been dry and calm. From the 9<sup>th</sup> to the 16<sup>th</sup>, there were rain and shifting winds. From 17 to 28 February, the weather was calm and dry with fogs and rokes. March produced variable frosts, fogs, sleet and small rains. On the 29<sup>th</sup> of March, some gooseberries began to bloom. The month of April began dry and cold. The cold continued to the 12<sup>th</sup> with squally weather. On the 12<sup>th</sup>, it rained. On the 20<sup>th</sup>, gooseberries and currants blossomed. It was squally through April. May began as April ended. May was a temperate month. On the 4<sup>th</sup> of May, codlings bloomed. From the 16<sup>th</sup> to the 19<sup>th</sup>, there was much rain. From the 20<sup>th</sup> to the 25<sup>th</sup>, there were smirrs at times and cold northerly winds. On the 26<sup>th</sup>, there was rain; on the 28<sup>th</sup>, there was thunder. June began dry and sultry hot. From 7 to 21 June, it was dry. On the 9<sup>th</sup>, there was thunder and lightning with a free shower. On the 15<sup>th</sup>, there was a shower. On the 29<sup>th</sup>, there was thunder. The latter end of June produced a few free showers; but the ground remained dry. The first week of July produced a few showers. On the 9<sup>th</sup>, there was rain in the evening. The rest of the month was hot and dry.<sup>72</sup>

West Friesland and Groningen in *the Netherlands* were laid under water in consequence of a great inundation, when several villages were lost, and numerous persons and cattle perished. Part of Zealand, *Denmark* was also overflowed, and 1,300 inhabitants were drowned. The city of Hamburg [Hamburg], *Germany* and all the flat country near the Elbe, at the same period, sustained great damage in consequence of that destructive overflowing of the water.<sup>55</sup>

An inundation in Holland [now *the Netherlands*] and Zealand, *Denmark* caused 1,300 inhabitants to be drowned. The inundations also struck Holstein, *Germany* the same year.<sup>40, 41, 43</sup>

In 1717, there was an inundation from the sea in Zealand, *Denmark*; 1,300 inhabitants were drowned. There was incredible damage done at Hamburg, *Germany*.<sup>47, 90, 92</sup>



In *England*, during three years (1717-19) there was little rain but rich dews.<sup>47</sup>

In *England*, the years 1716 to 1719 were exceedingly hot and dry.<sup>72</sup>

In *England*, the years between 1713-1719 produced a moderate drought. There were few rains but there were rich dews. The years 1714, 1717, 1718, and 1719 produced very hot summers.<sup>72</sup>

In 1717, the price of wheat [in *England*] averaged 45 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In *France*, there was not a cloud in the sky between the 11<sup>th</sup> and 22<sup>nd</sup> of July. On the 22<sup>nd</sup> at Versailles, there was loud thunder at noon. The thunder was dreadful in Paris. It is said that the thunder arrived earlier at London. On the 27<sup>th</sup> of July, there was great thunder and rain between Paris and Clermont. On the 30<sup>th</sup>, it rained. In the first of August at St. Omers in northern *France*, it was showery. The same at Dunkirk in northern *France* early on the 2<sup>nd</sup>.<sup>72</sup>

In *England*, there was rain at a distance in Dover on the 3<sup>rd</sup> of August. On the 5<sup>th</sup>, it was squally. There was dry cloudless sunshine till the 16<sup>th</sup> of August. On 16 August at Ipswich, there were evening showers. It was the same on the 17<sup>th</sup>. On the 18<sup>th</sup> at Leostoss, it was showery. On the 19<sup>th</sup> at Yarmouth, there was lightning followed by rain. On the 20<sup>th</sup>, there was rain and wind at night and by the next morning a vast flood and furious rivers running over all Yarmouth Key into the Haven; the alleys were running like rivers. By noon the sky cleared. But then latter during the 21<sup>st</sup>, from 3 to 10 p.m., there was furious rains. In this dreadful storm 14 ships were stranded in 8 or 9 miles. Many were blown out of the road, and great numbers unmastered. September began hot for the season. There were little wind, with fogs and overcast skies. On the 3<sup>rd</sup> of September, there was continual loud thunder with intermittent lightning and rain. On the 7<sup>th</sup> it was squally and then smirry to the 21<sup>st</sup>. On the 21<sup>st</sup>, it rained early and then it was mostly dry to the 29<sup>th</sup>. On 30 September there was rain by squalls. October was a warm month, and the roads were dry; notwithstanding the rains of September. There was a great deal of rain on 26 and 27 October. It rained for 30 hours. Yet the ground was as dry as before. In November, there was little wind until the last week. From the 6<sup>th</sup> to the 9<sup>th</sup>, there was rain. On the 21<sup>st</sup>, 28<sup>th</sup> and 29<sup>th</sup>, there was frost. On the 21<sup>st</sup>, there was small or thick rain all day, then hail in the evening and a great dew on all the glass. On the 23<sup>rd</sup>, there were dreadful squalls of rain, flashes of lightning. December was a mild month. There were some days of hard frost with a little snow. On the 14<sup>th</sup> was the highest tide in the past 35 years doing a great deal of damage. The night tides were worse than the day tides. Most of the last three weeks of December were stormy and rainy.<sup>72</sup>

“In autumn 1717, a most terrible hurricane arose, which extended all over California [the unexplored territory on the North American west coast] and its gulf [Gulf of California], accompanied with such violent rains as swept every thing away before it. The church and Father [Juan] Ugarte’s house were laid level with the ground, and he himself saved his life under a rock, where he stood exposed to all the severity of the weather for twenty-four hours. The channel for conveying the water away was choked up, the sluice [water channel controlled at its head by a gate] at San Xavier [San Javier mission located on the peninsula in Baja California, *Mexico*] carried away, and the land which had been sown both there and at Mulege [a town located on the peninsula in Baja California, *Mexico*] was utterly destroyed, and covered with stones. Such was the force of the blasts, that at Loretto [a mission located on the peninsula in Baja California, *Mexico*], a Spanish boy, called Matheo, was taken up by one of its gyrations [winds], and never seen more, though the strictest search was made after him. Several barks [a sailing ship of three or more masts having the foremasts rigged square and the aftermast rigged fore-and-aft] belonging to the divers [sundry], on the coast of California, were also lost, and two belonging to [the city of] Compostella [Compostela, *Mexico*], in which four persons perished; but the rest saved themselves in two large bilanders [a small merchant ship with two masts, used on the coasts], which happened to lie near them,

and were strongly moored under the shelter of a rock.”<sup>201</sup>

Near the end of August 1717, a hurricane struck the Isle of Dauphin (Dauphin Island, Alabama) in the *United States* and laid the whole island underwater.<sup>174</sup>

In 1717, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Fu-shan.<sup>153</sup>

### Winter of 1717 / 1718 A.D.

The winter of 1717-18 in New England in what was to become the *United States* was unusually cold and the spring that followed was late, windy and uncomfortable. On 26 April 1818, a violent easterly storm struck along the coast of Massachusetts. The storm wrecked the notorious pirate ship *Whidah*, which was driven ashore near Cape Cod. A great number of the crew were drowned. One hundred and two bodies washed ashore and were buried. A vessel captured by the pirates also was driven ashore on the back of Cape Cod near Truro.<sup>199</sup>

In December 1717, the weather was very mild at London, *England*.<sup>212</sup>

**1718 A.D.** In *England*, during three years (1717-19) there was little rain but rich dews.<sup>47</sup>

In *England*, the years 1716 to 1719 were exceedingly hot and dry.<sup>72</sup>

In *England*, the years between 1713-1719 produced a moderate drought. There were few rains but there were rich dews. The years 1714, 1717, 1718, and 1719 produced very hot summers.<sup>72</sup>

On 14 April 1718, a flash of lightning struck Conesnon [Coesnon], in northwestern *France* near Brest. The lightning overthrew the roof and walls of the church as if done by the explosion of a mine. Stones were thrown in all directions to the distance of sixty yards [55 meters].<sup>271</sup>

On 3 June 1718, a waterspout [tornado] struck in Emmot Moor [Emmott Moor] in Lancashire, *England*. Within a few minutes, the water in the brook rose 6 feet [1.8 meters] and flooded the meadows. Ten acres of ground was destroyed. Sixty feet [18 meters] above the brook was torn up 7 feet [2.1 meters] deep down to solid rock.<sup>212</sup>

In 1718, the price of wheat [in *England*] averaged 38 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

The summer of 1718 was hot and dry in *England*, especially in July and August. The heat in *Italy* was excessive. The summer in Paris, *France* was characterized by:

Hot days	29 days
Very hot days	5 days
Extremely hot days	4 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperatures occurred on 22 August and rose to 100.6° F (38.1° C) as determined by Cassini. According to La Hire the four very hot days occurred on 11, 21, 22 and 23 August and reached 95.9° F (35.5° C). In Dijon, *France*, in Burgundy the grape harvest began on 2 September.<sup>62</sup>

The years 1718 and 1719 produced dry heat that was violent [extreme], long and sustained. In Paris, *France* on 7 August 1718, the thermometer of Lahire [Philippe de la Hire], despite its adverse exposure, measured a temperature of 95° or 96.8° F (35° or 36° C) about three o'clock in the afternoon. These temperatures were again observed on the 11<sup>th</sup>, 21<sup>st</sup> and 23<sup>rd</sup>.<sup>79</sup>

In 1718 during the period between 5 February and 6 May, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang. During the period between 30 April and 29 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Lin-ch'ü. During the period between 8 August and 8 November, a drought engulfed Hupeh (now Hubei province) in central *China* at Ch'ung-yang and Shantung province at Ning-yang.<sup>153</sup>

In 1718, floods struck many regions of *China* including:<sup>153</sup>

— During the period 1-29 April, floods struck Chahar province (now eastern *Inner Mongolia*) at Wan-ch'üan and Hupeh (now Hubei province) in central *China* at Kuang-hua.

— During the period between 30 May and 27 June, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ta-pu.

— During the period between 28 June and 27 July, floods struck Shantung (now Shandong province) on the east coast of *China* at Wu-ti; Kwangtung province at P'u-ning and Mei [possibly a misprint, "Chia-ch'ing-chou"]; Hupeh province at Ch'ung-yang and Huang-an [possibly a misprint, "Huang-ting"]; and Anhwei (now Anhui province) in eastern *China* at Ching-tê. At Ching-tê, innumerable people drowned.

— During the period between 8 August and 8 November, floods struck Hupeh province at Huang-p'o.

**Winter of 1718 / 1719 A.D.** This winter was very mild in *France*. Most trees were covered with flowers from the months of February and March 1719.<sup>79</sup>

The winter in 1719 in *France* and *Italy* was remarkable for its mildness. In Paris, *France*, the thermometer was often only 36.0° F (2.2° C) in January (as the lowest temperature of 24 hours). Only in a single day did the temperature fall below zero; on 2 January it fell to 28.4° F (-2.0° C). Most of the trees in February and March were flowering. But the blooms were destroyed by the cold at the end of March and the frosts of April. At Marseille, *France*, the trees continued to flourish since the previous October, and bore new fruit (which was small but drove to maturity). On 18 December one could pick perfectly ripe cherries and apples. In most parts of Genoa, *Italy*, the same was true for plums, cherries, figs and peaches. The orange and lemon trees in the open field were blooming since November and bore fruit. In January in Provence, *France*, the olive tree were as far advanced as during ordinary years in April and May.<sup>62</sup>

In 1718 in *England* there was a short severe frost.<sup>47, 72, 93</sup>

In 1719, there was a great frost in London, *England*.<sup>212</sup>

[In February 1719 approximately] 7,000 Swedes perished in a storm of snow upon the mountain of Rudel or Tydel, in their march to attack Drontheim (the city of Trondheim located in *Norway*).<sup>40, 41, 43, 56</sup>

In *Sweden*, a great snowstorm, wherein 7,000 Swedes, on their way to attack Drontheim, perished on the mountains.<sup>47, 57, 90</sup>

[Another account places this event in 1715] In February 1715, "seven thousand Swedish soldiers and their officers perished from the cold on the mountain of Ruden, which separates Jempteland [Jämtland] in *Sweden* from Drontheim [the city of Trondheim located in *Norway*]. Charles XII after his departure from Bender, sent a body of 10,000 men to clear a passage for his main army to Drontheim. They learned that Count Sponeck was in full march towards them, and at the same time received orders to retreat over the mountains. This they immediately attempted, but just as they had reached the confines of their own country, they were overtaken by an enemy more formidable than those from whom they had fled. A dreadful storm of wind arose, attended with the most intense frost, and driving before it a thick snow; in this fatal mist they were soon bewildered, being able to see nothing before them, nor to trace any path upon the ground, the cold was every moment converting some of them into statues, whose attitudes

expressed the utmost distress, and whose countenances were fixed in the agonies of death. The last efforts of life were employed in cutting their muskets to pieces, and burning whatever was combustible about them. When this scanty portion of fuel was exhausted, they sunk under the fate of their companions, and some Norwegian sledgmen [a sledge is a sled or sleigh] who were ordered out to observe their retreat, found them frozen to death, some sitting, others lying, and some in a posture of prayer.”<sup>301</sup>

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**1719 A.D.** On 3 July 1719, a hailstorm struck Seighford in Staffordshire, *England*. A most dreadful tempest of hail, of various curious shapes, most of which were 5 or 6 inches [13 or 15 centimeters] in circumference, and some 9, 10 and 11 inches [23, 25 and 28 centimeters] in circumference.<sup>212</sup>

On 3 July 1719 in Seighford in Stafford County, *England*, it was a hot and clear day. At about 2 o'clock in the afternoon clouds suddenly began to rise in the west. A soft shower followed, after which storm came from the north about 4 o'clock. Hailstones of various shapes and sizes, some 11 inches in circumference. "They seemed to be fragments of some cylindrical body of ice broken and dashed to pieces in the fall.”<sup>93, 294</sup>

In *England*, during three years (1717-19) there was little rain but rich dews.<sup>47</sup>

In *England*, the years 1716 to 1719 were exceedingly hot and dry.<sup>72</sup>

In 1719, the price of wheat [in *England*] averaged 35 shillings per quarter [quarter ton].<sup>212</sup>

In 1719, there was a violent epidemic of smallpox in London, *England*. One-ninth of the population died of it.<sup>212</sup>

In *England*, the years between 1713-1719 produced a moderate drought. There were few rains but there were rich dews. The years 1714, 1717, 1718, and 1719 produced very hot summers.<sup>72</sup>

Severe heat reappeared with the month of June 1719. The heat was more intense than the previous year, and lasted a lot longer. In Paris, *France* the thermometer of Lahire observed a maximum temperature 98.6° F (37° C). Cassini recorded forty-two days of a temperature of 87.8° F (31° C). The heat persevered for three and a half months, from June until the middle of September. As a result of the heat at Marseille the trees bloomed for a second time in October, and began to grow new fruits. But the cold during December prevented these fruits from growing as usual, but it did not prevent them from reaching a perfect ripeness. Cherries and apples were gathered on December 18 and they were completely ripe.<sup>79</sup>

The summer of 1719 was one of the driest summers that had ever been observed in *Europe*. In *England* in the county of York from 1 May to the end of autumn, the region experienced unprecedented heat and drought, with the exception of a break lasting 15 days. The summer in Paris, *France* was characterized by:

Hot days	42 days
Very hot days	4 days
Extremely hot days	2 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperatures occurred on 16 July and 7 August. The heat lasted from early June to mid-September. In Dijon, *France*, in Burgundy, the grape harvest began very early on 28 August. In Marseille, *France*, the heat was very persistent and summer was without rain. The peak temperature occurred on 15 August. The wheat dried up and produced no grain.<sup>62</sup>

In 1719 in Paris, *France*, the rainfall measured 10 inches (253 millimeters). This resulted in the extreme lowering of the water level of the Seine River at Pont de la Tournelle. This year was very dry. The low level of the river became the zero mark standard for comparisons of future water height measured at the bridge.<sup>79</sup>

In 1719, the Spaniards sailed from Havana, *Cuba* with a fleet of 14 ships and a force of 1,200 men against South Carolina, in the *United States*. The greatest part of this fleet was lost in a storm.<sup>174</sup>

In 1719 during the period between 19 February and 20 March, floods struck Hopei (now Hebei province) in northern *China* at Ching-ho. During the period between 21 March and 19 April, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ch'ü-fou. During the period between 6 May and 8 August, a drought engulfed Shantung province at Fu-shan and Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-shan, Chin-yün and Hsia-chiang. During the period between 16 August and 13 September, floods struck Shantung province at Fu-shan, Jih-chao, Wei and Chiao. At Chiao, the city walls were damaged by the floodwaters and innumerable houses were damaged. During the period between 14 September and 12 October, a drought engulfed Chekiang province at I-wu.<sup>153</sup>

In 1719, there were protracted winds and rains in the vicinity of Shanghai, *China*. This produced a bad year.<sup>166</sup>

In 1719 during the 9<sup>th</sup> moon on the 19<sup>th</sup> day, there were three tides in one day at Lau, *China*.<sup>166</sup>

**1720 A.D.** In Northampton, *England*, a great flood did considerable damage.<sup>47, 92</sup>

In 1720, the price of wheat [in *England*] averaged 37 shillings per quarter [quarter ton].<sup>212</sup>

In 1680, 1720, 1739 and 1740 [in *Europe*], storms of hail of one foot thickness fell.<sup>190</sup>

In 1720, a hurricane struck offshore *Puerto Rico* causing greater than 500 fatalities.<sup>141</sup>

In 1720, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 6 May and 8 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing; Shansi (now Shanxi province) in northern *China* at An-tsê, Ch'ü-wo and Lin-fêng; and Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou, T'ung-hsiang and Ch'ung-tê.

— During the period between 8 August and 8 November, a drought engulfed Shansi province at Ch'in and Shantung province at Lin-ch'ü.

In 1720, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 6 June and 4 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lung-ch'uan, Ch'ao-an and Ch'ên-hai; Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ing-yüan and T'ung-hsiang; and Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu.

— During the period between 5 July and 3 August, floods struck Hupeh (now Hubei province) in central *China* at P'u-ch'i, Hanyang, Han-ch'uan, Mien-yang and Shih-shou. At Shih-shou, almost all the houses were damaged by the floodwaters.

— During the period between 4 August and 1 September, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Hêng, Lung-an [possibly a misprint, "Chiang-an"], Yung-ch'un, Ts'ang-wu and Nanning.

**1721 A.D.** In Adige in northern *Italy*, terrible floods occurred in the valley through which this river (the ancient Athesis) runs.<sup>47, 92</sup>

In 1721, the price of wheat [in *England*] averaged 37 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1721, there was a dry fog [in *England*].<sup>212</sup>

It was cold, moist and rainy to September in *England*.<sup>72</sup>

Towards the end of August 1721, a strong storm passed near the Bay of Conception [Bahía Concepción] on the peninsula in Baja California, *Mexico*. This storm generated a waterspout.<sup>201</sup>

In 1721, a drought engulfed many regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-hua, T'ung-hsiang and Hai-ning. The rivers dried up.

— During the period between 28 January and 20 September, a severe drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at I-shan. The drought damaged the crops.

— During the period between 5 February and 6 May, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hsing-ning; Kwangsi province at Ch'üan; Hopei (now Hebei province) in northern *China* at An-hsin; Shantung (now Shandong province) on the east coast of *China* at P'êng-lai; Chekiang province at Hangchow; and Shensi (now Shaanxi province) in central *China* at Sian, Fu-shih and Fêng-hsiang.

— During the period between 5 February and 8 November, a drought engulfed Yunnan province in southwest *China* at Hao-ch'ing.

— During the period between 5 February and 24 June, a drought engulfed Hopei province at Huai-jou. The drought damaged the crops.

— During the period between 6 May and 20 September, a drought engulfed Chekiang province at T'ung-lu. The drought damaged the crops.

— During the period between 23 August and 20 September, a drought engulfed Chekiang province at Hsüan-p'ing; Kiangsi (now Jiangxi province) in southern *China* at Ning-tu; and Hupeh (now Hubei province) in central *China* at Huang-kang and Fang.

— During the period between 25 June and 18 November, a drought engulfed Kwangsi province at Hêng.

— During the period between 21 September and 20 October, a drought engulfed Shantung province at Hsia-ching.

**1722 A.D.** In Yorkshire, *England*, extensive rains caused great damage; known as “Ripponden Flood” occurred on May 18, 1722.<sup>40, 41, 43, 47</sup>

Ripponden is situated on the River Riburn in *England*, and is memorable on account of the immense flood that took place on the sudden swelling of the river, on the 18<sup>th</sup> of May, 1722, called the Ripponden flood, which commenced between the hours of three and five in the afternoon; the water rose seven yards (21 feet, 6.4 meters), destroying several bridges, mills, and a number of houses; many people lost their lives on this melancholy occasion. The church at Ripponden was very much damaged, part of the churchyard washed away, the graves laid open, and a coffin was lodged in a tree at a considerable distance.<sup>59</sup>

[Another source places this event in 1771] In 1771, in Yorkshire, *England*, there was a dreadful inundation, called Ripon Flood.<sup>90, 92</sup>

On 18 May 1722, there was heavy rainfall at Ripponden in Yorkshire, *England*. The beck [River



Ryburn?] raised 6 feet [1.8 meters], destroying several houses, six stone bridges, eleven wooden bridges, and drowned 15 people.<sup>212</sup>

On 18 May 1722, a violent rainstorm caused a massive flood in Riponden [Ripponden] near Halifax in West Yorkshire, *England*. The inundation was caused by the dashing (as they call it) of two large watery clouds upon the hills. “Whatever was the more immediate cause, the effects were dismal and so sudden, that tho’ it happen’d in the day-time, between the hours of four and five o’clock in the afternoon, the people could not save their lives. By the modestest [most modest] computation the [River] Beck was rais’d at least two yards in perpendicular height above what was ever known before [this was corrected to “a rise of water above 20 feet”], which may be easily conceived by the situation of the place, implied in the termination *den*, which signifies a deep valley between pretty steep hills on each side. *Fontes in convallibus*, Ps. [Psalm] 103.2 is in the Saxon version render’d *pillar on denum*; and *valley of tears*, Ps. 83.6 *dene teowa*. Several houses, four mills, (according to some six) 9 stone, and 10 or 11 wooden bridges were carried down by the flood and the wheels, dams and sluices (or goits as they call them in Yorkshire, from the verbal noun *geotan, funacre*) of most of the mills, that were left standing, broken and damaged, and a great deal of cloth gone. Fifteen persons were drowned; 7 out of 8 in one house were either kill’d by the fall of it or drowned. The rapidity of the torrent was so violent, that it took down the north side of Riponden chapel, and carry’d off most of the seats. The rector of Castleford inform’d Mr. Thoresby, that several goods were carried down so far, tho’ upwards of 20 miles [32 kilometers] off. It tore up the dead out of their graves. It swept away all the corn-land [grain fields], as deep as the plough had gone. Some persons sav’d themselves by forcing a way out at the roofs of their houses, and sitting upon the ridges, till the flood abated.”<sup>295</sup>

In 1722, the price of wheat [in *England*] averaged 36 shillings per quarter [quarter ton].<sup>212</sup>

In *England*, it was cold moist and rainy to Midsummer.<sup>72</sup>

On 28 August 1722, a hurricane struck *Jamaica*.<sup>124</sup> [Other accounts give the date as 20 August. A hurricane struck *Jamaica* on August 20, 1722.<sup>40, 41, 42</sup>]

Port-Royal in *Jamaica* destroyed by a hurricane on August 28, 1722.<sup>40, 41, 43, 56</sup>

The hurricane of 28 August 1722, left only six out of fifty ships afloat in Kingston Harbor and caused the water to rise 5 meters above the usual mark at Port Royal, *Jamaica*. The Rio Cobre river flowed at the time of the European discovery of *Jamaica* in 1494 at the foot of the White Marl Hill, winding at the base of the mountains and entering the sea by way of the Fresh – now known as the Ferry-River. The hurricane of 1722 changed the course of the Rio Cobre and opened a more direct route to the harbor.<sup>152</sup>

On August 28, twenty-six ships were cast away by a dreadful storm at Barbados and a great part of Port Royal in *Jamaica* destroyed. Many families were swept away and perished by the breaking in of the sea, and much damage was done to the plantations. The dreadful tempest wrecked 26 ships at *Jamaica* and a great part of Kingston was destroyed. A dreadful hurricane also happened at the same time in Georgia and Florida in the *United States*.<sup>55</sup>

On 28 August 1722, the town of Port Royal, *Jamaica* was overwhelmed by the sea: twenty-six merchant vessels and 400 persons perished in the harbor. Mr. Atkins, purser of his Majesty's ship *Weymouth*, gives the following description of the hurricane:<sup>143</sup>

The hurricane came about a week after our arrival. It began at eight in the morning, two days before the change of the moon. It gave at least forty-eight hours notice, by a noisy breaking of the waves upon the Kays, very disproportioned to the breeze, a continued swell without reflux of the water — and the two nights preceding, prodigious lightning and thunder; which all the old

experienced men foretold would be a hurricane, or that one already had happened at no great distance.

I was ashore at Port Royal, and found all the pilots returned from the windward part of the island (where they customarily attend the coming down of ships), and observing upon the unusual intumescence of the water, so great the day before, and beat so high, that our boats could not possibly put on shore at Gun Kays, to take the men off that were set there, to the number of twenty, for trimming up our casks; themselves making signals not to attempt it. Betimes next morning, the wind began in flurries at N.E. and flew quickly round to S.E. and S.S.E., where it continued the stress of the storm, bringing such quantities of water that our little island was overflowed four feet at least: so that, what with the fierce driving of shingles (wooden staves, used instead of tiling upon their houses) about our ears, and the water floating their boats, empty hogsheads, and lumber about the streets, those without doors were every moment in danger of being knocked on the head or carried away by the stream. Within it was worse; for the waters sapping the foundations, gave continual and just apprehensions of the houses falling, as in effect half of them did, and buried their inhabitants. Nor indeed, after the storm had began, was it safe to open a door, especially such as faced the wind, lest it should carry the roofs off; and escaping thence, there was no place of retreat, we remaining in a very melancholy situation, both from wind and water.

It may be worth notice, what became of the purser in this common danger. I was regardless at first, as suspecting more of timidity in the people — till finding myself left alone proprietor of a shaking old house, the streets full of water and drift, with shingles flying about like arrows, I began to meditate a little more seriously upon my safety, and would have compounded all my credit in the office, my hoops and bags, for one acre (as Gonzalo says in the *Tempest*) of barren ground, long heath, or brown furze, to have trod dry upon!

Our neighbors had retreated towards the church, as the strongest building and highest ground, which I was luckily too late to recover; but endeavoring to stem upwards for a safer station, was taken into a house in the lower street, with an old woman wading in the same manner from her ruined habitation. We were no sooner in, but new fears of this also falling, thrust us into the yard (the water then at eleven o'clock breast high), where we helped one another upon a low brick-built out-house, that being more out of the wind, and surrounded by others, kept the waters still. The unhappiness of those who suffered in stronger houses was their facing the wind, which brought the sea upon them with violence. A platform of one and twenty guns and mortars were drove, some of them, to the market place: the two lines of houses next the sea, with the church, were undermined and leveled with the torrent; and in their ruin was our safety; for although we had a greater depth, they were by such a bank made motionless. The whole rise of the water was computed at sixteen or eighteen feet, very admirable, at a place where it is not ordinarily observed to flow above one or two. At five in the evening the waters abated, and with so quick a retreat as to leave the streets dry before six; when every one was congratulating his own safety, in condolences upon the loss of their friends.

Of fifty sail in this harbor, only four men-of-war and two merchant ships rode it out, but with all their masts and booms blown away. All the men we left at Gun Kay were washed off and perished, except one Indian that drove into harbor, upon a broken gallows that had been there erected. Wrecks and drowned men were everywhere seen along shore; general complaints of loss at land (least at St. Jago [now called Spanish Town]), which made it a melancholy scene; and to finish the misfortune, the slackness of the sea-breezes, calms, and lightning, stagnating waters, broods of insects thence, and a shock or two of earthquake that succeeded to the hurricane, combined to spread a baneful influence, and brought on a contagious distemper, fatal for some months throughout the island.

On 28 August 1722, a tremendous hurricane reduced Port Royal, in *Jamaica* to a heap of rubbish. About 400 persons lost their lives from an irruption of the sea. Of 26 sails of vessels and 10 sloops in the

harbor, only 10 were seen after the hurricane and half of these were irreparably shattered. The inhabitants of Port Royal moved to the opposite side of the bay and built the town of Kingston.<sup>174</sup>

On 28 August 1722, a violent storm and inundation [hurricane] destroyed Port Royal, *Jamaica*. The sea was raised by the wind to a much greater height than ever was known before, broke over its ancient bounds, and suddenly overflowed a large tract of land; carrying away, with irresistible fury, men, houses, cattle and everything that stood in its way. At Port Royal, “the sea broke in upon us from all quarters with an impetuous force, concurring with the violence of the wind to cut off all hopes of safety; for we had no other choice but to perish in the waters if we fled from our houses, or of being buried under the ruins if we remained in them. In this dreadful suspense we were held for several hours; for the storm began about eight in the morning and did not sensibly abate till between twelve and one; during which time the wind and sea together demolished a considerable part of the town, laid the church even with the ground, destroyed above one hundred and twenty of the white inhabitants, and an hundred and fifty slaves; and ruined all the store-houses, with the goods and merchandise in them. The situation of the place, it being surrounded on all sides with the sea, rendered it more exposed than any other to the fury of this element; for our only defense against the sea, is a great wall running all along the eastern side of the town, where we used to apprehend most danger. This wall is raised about nine foot above the surface of the water, and is about seven foot thick, and for twenty years had proved a sufficient security to the town; but in this storm it broke over the wall with such a force as nothing was able to withstand. Two or three rows of houses that run parallel to the wall were entirely washed away, among which the church, a handsome building, and very strong, was so perfectly demolished that scarce one stone was left upon another. Great part of the castle also was thrown down, though’ it was of a prodigious thickness, and founded upon a rock: And the whole fortress was in the utmost danger, the sea breaking over the walls which stood thirty foot high above the water. In the highest streets of the town, most removed from the sea, the water was five foot deep, and so rapid that the strongest man could not stem it, so that we were obligated to keep in our upper-rooms, though’ we were in danger of perishing every minute by the fall of houses, which shook in a very terrible manner, and the roofs were generally blown off.” The morning, in which the storm struck, there was a great fleet of merchant ships riding in the harbor. Most of these had taken a full load of freight and were to have returned home in a few days. The storm left only one vessel in the harbor, besides four sail of men of war; and all of these had their masts and rigging blown away. The most sensible proof of the irresistible force of the storm was the vast quantities of stones that were thrown over the town wall, of which such a prodigious number were forced over, that a hundred Negroes were employed six weeks in throwing them back into the sea. Some of these stones were so large that nine or ten men could not heave one of them back again over the wall. The town of Kingston also received great damage. Many houses were blown down and many more shattered and unroofed. An abundance of rich goods were spoiled by the rain, which fell at the same time. Some people were killed onshore. All the vessels, which rode in Kingston harbor, which were between forty and fifty sails, were either driven ashore or overset and sunk. An abundance of seamen were lost. Some of the large ships with all their cargo were thrown upon dry land.<sup>227</sup>

Carolina in the *United States* was greatly damaged by the storms in August 1722.<sup>40, 41, 43, 56</sup>

On 8-9 September 1722, a hurricane struck *Jamaica* and the Cayman Islands in the *Caribbean Sea* causing 400 deaths.<sup>141</sup>

On 12-13 September 1722, a hurricane struck Louisiana in the *United States*. A large number of ships were sunk at or near New Orleans.<sup>141</sup>

In September 1722, a terrible hurricane struck from Biloxi, Mississippi to Natches in the *United States*. In New Orleans, Louisiana, it overthrew the church, the hospital and 30 houses and the barracks of New Orleans. It destroyed a great number of boats, canoes and other small craft in the harbor. Three vessels

were driven ashore on the banks, where the water rose eight feet. All the houses above and below the town were overthrown. At Biloxi, all the houses and magazines were beaten down and the fortifications were inundated.<sup>174</sup>

In 1722, a drought engulfed many regions of *China* including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Sung-yang.

— Hupeh (now Hubei province) in central *China* at Chung-hsiang, Chiang-ling and Ching-mên.

— During the period between 17 March and 15 April, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tsinan.

— During the period between 6 May and 8 November, a drought engulfed Hopei (now Hebei province) in northern *China* at An-kuo.

— During the period between 13 July and 11 August, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin; Anhwei (now Anhui province) in eastern *China* at Wu-wei and Han-shan; Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning and Hu-chou; Shantung province at Ch'ing-ch'êng; and Hopei province at Ning-ching.

In 1722 during the period between 13 July and 11 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Tung-hai and Shantung (now Shandong province) on the east coast of *China* at Tung-a, I-shui, Ho-tsê, Shan, P'u and Ch'i-ho.<sup>153</sup>

In 1722, there was a famine in the vicinity of Shanghai, *China*.<sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

February 5<sup>th</sup> – moderate weather. February 12<sup>th</sup> – fine weather. February 28<sup>th</sup> – wet, stormy weather. March 5<sup>th</sup> – fine weather again. March 16<sup>th</sup> – charming day. April 9<sup>th</sup> – thunder and lightning, rain and hail. April 30<sup>th</sup> – thus far it was a very cold, dry spring. May 31<sup>st</sup> – fair weather concludes the month. July 30<sup>th</sup> - the hottest day that has been this year. An exceeding dry time, as ever was. September 30<sup>th</sup> – very hot for this time of year. October 20<sup>th</sup> – very cold. October 27<sup>th</sup> – excessively cold. December 2<sup>nd</sup> through the 9<sup>th</sup> – very hot indeed for the time of year, more so than ever was known before.<sup>78</sup>

**Winter of 1722 / 1723 A.D.** The winter in 1723 was mild in *England*. In December 1722 and the following January in Algarve, *Portugal* and Lisbon, *Portugal*, the trees were green and full of flowers, as in the springtime. Plums and pears were as ripe as they were in June. Figs were as great as normally in the months of April and May. And so were the grapevines; even the unripe grapes contributed.<sup>62</sup> [Algarve is located in the southernmost region of mainland *Portugal*.]

In December 1722, the weather was very mild at London, *England*.<sup>212</sup>

In 30 January 1723, snow crystals were observed at Petworth in Sussex, *England*, similar to those described by Descartes, Dr. Grew, and Mr. Morton. [René Descartes described these ice crystals as "These were little plates of ice, very flat, very polished, very transparent, about the thickness of a sheet of rather thick paper...but so perfectly formed in hexagons, and of which the six sides were so straight, and the six angles so equal, that it is impossible for men to make anything so exact." Today, we would describe these snow crystals as "diamond dust".]<sup>212</sup>

**1723 A.D.** In *England*, it was cold and dry after February.<sup>47, 72</sup>

On 24 February 1723, a great storm struck New England in what was to become the *United States* causing a great tide. The most severe damage was in Massachusetts and New Hampshire. Although in Rhode Island several wharves were broken into pieces, cellars and warehouses inundated. On the inside of Cape Cod, Massachusetts, the tide rose 4 feet [1.2 meters], and on the outside, it was said to have risen from 10

to 12 feet [3.0-3.7 meters] higher than ever was known. At Plymouth, Massachusetts, the tide was 3-4 feet [0.9-1.2 meters] above the highest watermark. The inundation in Boston, Massachusetts “looked most dreadful”. The tide at Boston was 20 inches [51 centimeters] higher rise than ever was known before. The water rose and flooded the street of Boston. A boat could sail from the south battery to the most elevated part of King Street and then to the hill where the North church stood. In Salem, Massachusetts, the tide flowed inland several miles and people were compelled to climb trees for safety. At Hampton, New Hampshire, the storm caused the great waves to break over the banks and flow inland for several miles. This flooding continued for several hours. The tide also did damage in Piscataqua, New Hampshire and Falmouth, Massachusetts, where it destroyed wharves and articles in cellars and warehouses.<sup>199</sup>

In Madrid, *Spain*, there were great floods; many persons of distinction drowned.<sup>47, 92</sup>

In 1723, at Madrid, *Spain*, several of the Spanish nobility and other persons of distinction perished from an inundation.<sup>90</sup>

In 1723, a mission church was under construction at St. Anne, lying 30 leagues [90 miles, 145 kilometers] from La Paz [on the peninsula in Baja California, *Mexico*] and 5 leagues [15 miles, 24 kilometers] from the gulf [Gulf of California]. The church was finished to the level that the beams and rafters were laid for a roof. A terrible hurricane arose and blew down the church killing several Indians who were sheltering inside from the storm.<sup>201</sup>

The drought of 1723 in Paris, *France* surpassed that of any recorded year. The year produced only 8.2 inches (207 millimeters) of rainfall; a little over a third of the annual average. In April particular, only 0.08 inches (2 millimeters) of rainfall fell in that month. The Seine River descended lower than in 1719. The south of *France* experienced very abundant rains during the spring.<sup>79</sup>

The year 1723 was a very dry at Lyndon in Rutland, *England*.<sup>212</sup>

In 1723, the price of wheat [in *England*] averaged 34 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1723, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Yüan-shih.

— During the period between 6 May and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning, Hu-chou and T’ung-hsiang; Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin; Shantung (now Shandong province) on the east coast of *China* at Chü, Mêng-yin and Liao-ch’êng; and Hopei province at Ching-ching and An-kuo.

— During the period between 8 August and 8 November, a severe drought engulfed Hopei province at Chi-tsê; Chekiang province at Chia-hsing; and Kiangsu province at Soochow, Kao-ch’un and K’un-shan. The drought caused rivers to dry up.

In 1723 during the period between 6 May and 8 August, floods struck Anhwei (now Anhui province) in eastern *China* at Tung-lui; Hupeh (now Hubei province) in central *China* at Fang and Pao-k’ang; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch’ao-an [uncertain name, “Hai-yang”]. During the period 1-30 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Shanghai and Kwangtung province at Ta-pu.<sup>153</sup>

In 1723 during the summer, there was a great drought in the vicinity of Shanghai, *China*. This was a scarce year.<sup>166</sup>



In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: January 3<sup>rd</sup> – raw, cold weather. February 1<sup>st</sup> – a summer day. February 24<sup>th</sup> – the greatest storm and highest tide that has been known in this country. April 30<sup>th</sup> – it is thought this was the forwardest [earliest] spring that was known in the country, inasmuch as the blossoms have dropped from the trees, and the 1<sup>st</sup> of the month, a man in Cambridge mowed a quantity of English grass. May 2<sup>nd</sup> – cooler weather. May 25<sup>th</sup> – cool weather throughout the month. October – it was for a month past very stormy and uncomfortable weather as ever was known this time of the year. November – this was a very cold month; snowed but once.<sup>78</sup>

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**1724 A.D.** In Adige, *Italy*, there were great floods in the valley.<sup>47, 92</sup>

In *England*, the summer of 1724 was hot and dry. In *Italy* the summer produced very hot days. In Paris, *France*, the summer was hot and dry. The summer in Paris was characterized by:

Hot days	40 days
Very hot days	4 days
Extremely hot days	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The heat began in June and lasted until September. The peak temperatures occurred on 11 August and was measured at 98.4° F (36.9° C). In Burgundy, the winter and spring had been moderate with a very hot mid-summer. In Dijon, *France*, in Burgundy, the grape harvest began early on 9 September. The wine was abundantly and quite good.<sup>62</sup>

[In *England*] on 10 June, there was a severe storm of thunder and lightning.<sup>72</sup>

On 10 June 1724, there was a thunderstorm at Worcester, *England*.<sup>212</sup>

In 1724, the price of wheat [in *England*] averaged 37 shillings per quarter [quarter ton].<sup>212</sup>

In August 1724, there was a smallpox epidemic in Plymouth, *England*, that lasted till June 1725.<sup>212</sup>

The heat of the summer of 1724 followed a spring and a very temperate winter. In Paris, *France* the heat began in June, and increased in the months of July, August and into September. The temperature reached its peak on September 1. The southeast [wind] almost always accompanied [the heat].<sup>79</sup>

In 1724, several regions of *China* experienced flooding.<sup>153</sup>

During the period of 24 February – 24 March, the following areas were affected:

— Hopei (now Hebei province) in northern *China* at Jao-yang, Su-ning [possibly a misprint, “Su-hsüan”], Hsin-yüeh, San-ho and Ning-ho.

During the period of 23 April – 22 May, the following areas were affected:

— Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Jao-p’ing.

During the period of 21 June – 19 July, the following areas were affected:

— Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch’ên-hai experienced flooding. The dikes were damaged.

— Hupeh (now Hubei province) in central *China* at Kuang-hua, Fang, Ku-ch’êng, Chien-chiang, T’ien-mên, Chung-hsiang, Mien-yang and Chiang-ling experienced flooding. At Kuang-hua, people and cattle were drowned and crops damaged. At Fang, many houses were damaged. At Chung-hsiang, the dikes were damaged.

— Chekiang (now Zhejiang province) on the east coast of *China* at Ch’ing-yüan experienced flooding.

During the period of 20 July – 18 August, the following area was affected:

— Shantung (now Shandong province) on the east coast of *China* at Tung-a experienced flooding.

During the period of 19 August – 16 September, the following areas were affected:



— Kiangsu (now Jiangsu province) on the east coast of *China* at T'ai and Nan-hui experienced flooding. At T'ai, over 13,000 acres of land were damaged. At Nan-hui, there was a great storm. The sea overflowed. Houses and fields were damaged. People and cattle were drowned.

— Anhwei (now Anhui province) in eastern *China* at T'ai-hu experienced flooding.

— Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning, Yü-yao, Hai-yen, Ting-hai, Chên-hai, Ningpo, Tz'ü-ch'i, Fêng-hua, Hsiang-shan, Shang-yü, Hangchow, Hai-ning, P'ing-hu, Shao-hsing, Ch'êng, and Wên-chou experienced flooding. At Hai-ning, all the dikes were damaged. At Yü-yao, over 2,000 persons drowned and houses were damaged. At Ting-hai, there was a typhoon and the houses were damaged. At Chên-hai, there was a great storm.

During the period of 17 September – 16 October, the following areas were affected:

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow experienced flooding.

— Chekiang (now Zhejiang province) on the east coast of *China* at Yüeh-ch'ing experienced flooding.

— Shantung (now Shandong province) on the east coast of *China* at Chi-mo experienced flooding. Houses were damaged.

In 1724, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 24 February and 16 October, a drought engulfed Yunnan province in southwest *China* at Hao-ch'ing.

— During the period between 6 May and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning and Chia-hsing.

— During the period between 19 August and 16 September, a drought engulfed Hopei (now Hebei province) in northern *China* at Ching; Shantung (now Shandong province) on the east coast of *China* at Hsia-ching [possible misprint, "Ching-ching"]; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ch'üan. Wells and springs dried up.

In 1724 during the 4<sup>th</sup> moon on the 8<sup>th</sup> day in the vicinity of Shanghai, *China*, there was a great hailstorm. The hailstones in lumps of fifty catties (approximately 67 pounds) killed one and wounded many persons. Then during the autumn, there was a great drought.<sup>166</sup>

On 12 September 1724, a hurricane struck the *Caribbean* island of Hispaniola causing 121 deaths.<sup>141</sup>

In 1724, a great storm accompanied by a very uncommon tide struck New England in the *United States*. At Boston, Massachusetts, the tide rose two feet higher than it had ever been known to rise before. At Hampton, the sea broke over its natural limits and inundated the marshes for many miles.<sup>174</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 11<sup>th</sup> – the peach trees now begin to blossom. July 23<sup>rd</sup> – a very great drought, everything burnt up. December 14<sup>th</sup> – first snow fell today. December 29<sup>th</sup> – considerable snow but followed and consumed by rain. This month we have had something like winter weather.<sup>78</sup>

**1725 A.D.** In Philadelphia, Pennsylvania in the *United States* the whole winter of 1725 was mild, but the spring was very cold. In March, snow fell to the depth of two feet in one night.<sup>1</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 30<sup>th</sup> – it is has been a very cold month. May 29<sup>th</sup> – this has been a cold month, and no rain.<sup>78</sup>

In 1725, there was a drought that lasted from the middle of January until the middle of April at Ketton in Rutland, *England*. The spring had been very warm. It was drier than ever known in this country. Then from the middle of April till August 27, it was cold and very wet. On 11 & 12 June, there was a great flood. On 23 August, there were 24 hours of heavy rain at Ketton, which caused a flood in the meadows for 4 or 5 days. The garden produce was one month later than usual. There were scarcely any kidney

beans, no caterpillars or flies. The fruit trees scarcely ripened, and corn [grain] was very dear [scarce]. In August, wheat sold for 5 to 6 shillings per strike, and barley for 4 shillings 6 pence.<sup>212</sup>

In 1725, the price of wheat [in *England*] averaged 48 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

The average temperature during the summer of 1725 in *France* was very low. The maximum temperature in Paris was 86.9° F (30.5° C) on 13 July. There were only 9 hot days. The sky was always overcast with frequent rains. This caused delays in the harvest. The harvest, which usually falls in the northern parts of the Kingdom [of *France*] in August, could not take place until September and October. Because of the rains, the grains when harvested were not dry and part of it germinated in storage in the barns. The heavy rains of May and June caused many grapes to fall. In August, September and October rains also prevented the full ripening of the remainder. In Burgundy, the grape harvest began on 10 October; the yield was plentiful, but the quality was poor. The grain harvest was bad in *France*.<sup>62</sup>

The cold, cloudy skies and continual rain filled almost the entire year of 1725. These cold rains delayed the harvests. In Paris, *France*, since the beginning of May, there were a few days without rain, but as the drops were small and slender, the rainfall sum of the year did not reach the average amount.<sup>79</sup>

In 1725, floods struck many regions of *China* including:<sup>153</sup>

- During the period between 14 January and 12 February, the Han River flooded in Hupeh (now Hubei province) in central *China*.
- During the period between 13 February and 13 March, floods struck Hopei (now Hebei province) in northern *China* at Pao-ti.
- During the period between 14 March and 12 April, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan, Ch'i-ho, Chi-yang and Tê.
- During the period between 12 May and 10 June, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Canton.
- During the period between 11 June and 9 July, floods struck Kwangtung province at Jao-p'ing.
- During the period between 10 July and 7 August, floods struck Shantung province at Lin-i; Hopei province at Wu-ch'iang; and Kwangtung province at P'u-ning [possibly a misprint, "P'u-hsüan"] and Ch'ên-hai. At Ch'ên-hai, the dikes were damaged. At Wu-ch'iang, the crops were damaged by the floodwaters. [Lin-i is located at longitude 118.24° East and latitude 35.07° North.]
- During the period between 7 September and 5 October, floods struck Kwangtung province at Ta-pu; Hopei province at Ch'ü-yang, Wu-ch'iang, Chi-tsê, Hsing-t'ai, Tsao-ch'iang, Chi, Pao-ting and Tsun-hua; and Honan (now Henan province) in central *China* at Hsin-an [uncertain name]. At Hsin-an, the dikes were damaged. [Chi is located at longitude 117.24° East and latitude 40.03° North.]

In 1725, a drought engulfed several regions of *China* including:<sup>153</sup>

- During the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Chan-hua and Chü. Rivers dried up.
- During the period between 5 February and 8 August, a drought engulfed Shantung province at Hsia-ching.
- During the period between 8 August and 6 September, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ch'üan and Shantung province at Ch'iu.

In 1725 during the 7<sup>th</sup> moon on the 18<sup>th</sup> day in the vicinity of Shanghai, *China*, there was a typhoon. There was a sudden torrent of rain from morning till night; it whirled about; next month the sea overflowed.<sup>166</sup>

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**Winter of 1725 / 1726 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1726 on January 23<sup>rd</sup> and 24<sup>th</sup> – very severe cold. The river froze over. January 31<sup>st</sup> – this has been a very smart, close [overcast] winter. February 3<sup>rd</sup> – the river froze over last night. February 9<sup>th</sup> – more moderate, the river breaking up. February 16<sup>th</sup> – the river froze over again. February 28<sup>th</sup> – here (with this month) ends the winter. It has been all along a closed [overcast] and hard winter as has ever been remembered. There has been good sledding all winter. Never one thaw. It was observed that even though the winter had been so very severe, there had not been anything like a storm the whole time.<sup>78</sup>

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**1726 A.D.** In *Europe*, there were great inundations and floods “all over Europe.”<sup>47, 92</sup>

On 8 March 1726, there was a great tide in *England*. The River Thames was four inches [10 centimeters] higher than had been known for the previous 40 years.<sup>212</sup>

The summer of 1726 in Paris, *France* was characterized by:

Hot days                      62 days

Very hot days                10 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The heat began in May, accelerating the maturity of the fruit for a month. In *France*, the heat was extraordinary in Béziers on 12 July; in Orange on 13 July; and in Toulon on 14 July. In Burgundy, the three months of summer were hot. In Dijon, *France*, in Burgundy, the grape harvest began early on 9 September. The harvest was extremely weak, but the wine pretty good.<sup>62</sup>

The summer of 1726 began in late May, then continued during the months of June, July and August. The highest temperatures in Paris, *France* was observed on 27 and 28 August with a reading of 93.2° F (34° C). The fruits ripen a month earlier than usual. The maximum heat was much earlier in Provence. At Toulon and Aix, the peak was observed on 13 and 14 July. Deslande from Brest in Brittany in northwestern *France* indicated his barometer was perfectly still from 2 February until 1 September of 1726.<sup>79</sup>

During the whole summer of 1726, there were terrible thunder and lightning storms [in *England*].<sup>72</sup>

In 1726, the price of wheat [in *England*] averaged 46 shillings per quarter [quarter ton].<sup>212</sup>

On 2 August 1726, there was a subterranean fire at Flinx Hall in Kent, *England*, 10 miles southwest of Canterbury. A moist turf burnt over 3 acres, and was hot 4 feet [1.2 meters] deep. It never flamed unless stirred. The ground was quite dry from the hot season. This fire was still burning on 4 September.<sup>212</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 2<sup>nd</sup> – more moderate. March 14<sup>th</sup> – the fish had not come upon the usual ground here. April 27<sup>th</sup> – people generally planting. This month has been wet and uncomfortable weather. 'Tis thought in these parts to be a very backward spring. May 20<sup>th</sup> – the peach and apple trees but now began to blossom. May 27<sup>th</sup> – there was very little pleasant weather this month. June 20<sup>th</sup> – there was a very great drought this spring. September 30<sup>th</sup> – this month had been cool, but no great frost yet. October 30<sup>th</sup> – several days past were pretty cold.<sup>78</sup>

On October 22, 1726 a tremendous hurricane occurred at *Jamaica*, which destroyed several plantations and a great fleet of ships.<sup>55</sup>

On 22 October 1726, a hurricane struck *Jamaica*.<sup>124</sup>

On 22 October 1726, about 9 in the morning, a hurricane came on in *Jamaica*. The storm continued till 12:30. The houses at Kingston, Spanish Town, and Port Royal, suffered very much; many were thrown

down. The east end and middle of the island suffered most. The hurricane hardly touched the west side. In the harbors of Kingston, Port Morant, Port Royal, and St. Anne's, above fifty vessels were destroyed.<sup>143</sup>

On 2 November 1726, a hurricane struck *Jamaica*. Many lives were lost [on land] and at least 18 at sea.<sup>141</sup>

The summer of 1728 in Carolina in the *United States* was uncommonly hot. The earth was parched. The pools of water dried up. The cattle were reduced to the greatest distress. Then during the last of August, there was a dreadful hurricane that caused an inundation of the sea, which overflowed Charlestown [Charleston], South Carolina and the low lands. The hurricane did incredible damage to the fortifications, houses, wharves, shipping, and the cornfields. The streets of Charlestown were covered with boats, and lumber. The inhabitants were obligated to take refuge in the upper stories of their houses. Twenty-three ships were driven ashore, most of which were either greatly damaged or dashed to pieces. Two men-of-war, stationed at Charlestown for the protection of trade, were the only ships that rode out the storm. The hurricane leveled many thousand trees in the maritime parts of the province; but it was scarcely perceived a hundred miles from the shore.<sup>174</sup>

In 1726 during the period between 5 February and 6 May, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Shou-kuang. During the period between 31 May and 29 June, a drought engulfed Anhwei (now Anhui province) in eastern *China* at Ying-shan.<sup>153</sup>

In 1726, floods struck many regions of *China* including:<sup>153</sup>

— Shantung (now Shandong province) on the east coast of *China* at Tsinan.

— During the period between 30 June and 28 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ta-pu; and Hupeh (now Hubei province) in central *China* at Ying-ch'êng, Huang-mei, Huang-kang, Chiang-ling, Chien-li, Ch'i-ch'un and T'ien-mên.

— During the period between 29 July and 26 August, floods struck Kwangtung province at Mei, Hsin-i, Jao-p'ing and P'u-ning; Kansu (now Gansu province) in northwest *China* at Ch'ing-yang; Hupeh province at Hanyang, Han-ch'uan, Huang-p'o, Wuchang, Huang-an and Ch'ung-yang; Hopei (now Hebei province) in northern *China* at Wu-ch'iang, An-kuo and P'ing-hsiang; Honan (now Henan province) in central *China* at Pi-yüan; Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu; and Shantung province at Chi-ning, Tzū-yang and Liao-ch'êng.

— During the period between 27 August and 25 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at T'ung-hsiang; Kiangsi province at Nan-ch'ang, Fêng-ch'êng, Chin-hsien, Ch'ing-chiang [uncertain name, "Ch'ing" with "-chiang" left off], Hsin-kan, Yung-hsiu and Kiukiang; Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-ch'un; and Yunnan province in southwest *China* at Hao-ch'ing.

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**Winter of 1726 / 1727 A.D.** In 1726, sleighs passed over the ice from Copenhagen, *Denmark* to *Sweden*.<sup>38, 60</sup>

In 1727, they drove on carriage from Copenhagen, *Denmark* to *Sweden*. In February, the Seine River in *France* was frozen.<sup>62</sup>

The cold winter of 1726 was excessively [cold] without being too long in Montpellier and Marseille, *France*. The cold killed thousands of orange trees.<sup>79</sup>

The winter in 1726 was very severe in the northern countries [of *Europe*]. People traveled on sleighs from Copenhagen, *Denmark* to the *Swedish* province of Skåne [the southernmost region of *Sweden*]. In Paris, *France*, the cold was moderate, but at the Montpellier and Marseille coasts the cold was very severe; and despite its short duration, many orange trees were destroyed.<sup>62</sup>

During the period between 23 December 1726 and 21 January 1727, floods struck Shantung (now Shandong province) on the east coast of *China* at Ts'ao, Shan, Ho-tsê, Tzū-yang and Liao-ch'êng.<sup>153</sup>

**1727 A.D.** The Delaware River near Philadelphia, Pennsylvania in the *United States* was frozen and closed for three months of the winter.<sup>1</sup>

In *France*, the duration of the heat in 1727 was much longer than the previous year. After a moderate winter, the thermometer began to rise on February 7. On 10 May the temperature at sunrise was 64.4° F (18° C), and by two o'clock in the evening 80.6° F (27° C). The heat was sustained and increased during the months of July and August. On the 7<sup>th</sup> of August, at three o'clock in the afternoon, the temperature reached the peak of 95° F (35° C). The temperature remained high the rest of August and the month of September. Thus, the heat of 1727 includes no fewer than five full months.<sup>79</sup>

The summer of 1727 in Paris, *France* was characterized by:

Hot days	43 days
Very hot days	15 days
Extremely hot days	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The months of May, June and July were very hot and the heat continued into September. The peak temperatures occurred on 18 July. In Dijon, *France*, in Burgundy, the grape harvest began early on 9 September but it was a weak crop of mediocre quality.<sup>62</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

February 10<sup>th</sup> – snowed all day. February 11<sup>th</sup> – a very cold day. February 13<sup>th</sup> – the river froze over this morning but broke up in the afternoon. February 16<sup>th</sup> – a most charming pleasant day. February 24<sup>th</sup> – a very pleasant day. March 30<sup>th</sup> – we had very uncomfortable weather this month. The spring is thought to have been very backward.<sup>78</sup>

[In *Britain*] during 1727 and 1728, there was a dearth from cold and rains.<sup>72</sup>

In *Ireland* during the years 1727-29, corn [grain] was very dear. Many hundreds perished. Many immigrated.<sup>57, 91</sup>

In 1727, the price of wheat [in *England*] averaged 42 shillings per quarter [quarter ton].<sup>212</sup>

In 1727, floods struck many regions of *China* including:<sup>153</sup>

— Hupeh (now Hubei province) in central *China* at Ao-ch'êng, An-lu and Chiang-ling. The dikes were damaged.

— During the period between 19 June and 18 July, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu; Kweichow (now Guizhou province) in southwestern *China* at An-nan; and Hupeh province at Ching-mên, Huang-kang, Ch'i-ch'un and Kuang-chi.

— During the period between 19 July and 16 August, floods struck Shansi (now Shanxi province) in northern *China* at P'ing-lu; Kansu (now Gansu province) in northwest *China* at Ch'ing-yang; Kwangsi province at Ts'ang-wu; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lien-chiang [uncertain name, "Shih-ch'êng"]. At P'ing-lu, the houses were damaged by the floodwaters. [P'ing-lu is located at longitude 112.06° East and latitude 39.46° North.]

— During the period between 17 August and 14 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow, Hsiao-fêng, Yü-hang, Hsin-têng, An-chi, Tê-ch'ing, Wu-k'ang and Ch'êng; Hupeh province at Ch'i-ch'un, Lo-t'ien, Shih-shou, Kung-an and Kuang-chi;

Hopei (now Hebei province) in northern *China* at Hsü-shui and Jung-ch'êng; and Anhwei (now Anhui province) in eastern *China* at Huo-shan. At Huo-shan, many people drowned.

— During the period between 13 November and 12 December, floods struck Anhwei province at T'ung-ling, Lu-chiang and Shu-ch'êng; Kiangsu province at Kao-yu; and Shantung province at Ch'ang-i. At Ch'ang-i, many people drowned.

In 1727 during the 8<sup>th</sup> moon, heavy and continued rain damaged the rice crop in the vicinity of Shanghai, *China*.<sup>166</sup>

In 1727 during the period between 19 June and 18 July, a drought engulfed Kansu (now Gansu province) in northwest *China* at Ch'ing-yang.<sup>153</sup>

**Winter of 1727 / 1728 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1728 on January 1<sup>st</sup> – there was a great light seen in the northeast in the beginning of winter, which they say certainly predicts a very cold winter, which proved to be true. January 11<sup>th</sup> – for several days past, there was a spell of comfortable weather. January 13<sup>th</sup> – a very terrible snowstorm all day. The snow that fell today is almost two-feet (0.6 meters) deep upon a level. January 18<sup>th</sup> – the coldest day we had this year. February – there had been no thawing weather [weather that would thaw the snow and ice], but as closed [overcast] for six weeks past as ever was known. Great scarcity of hay on account of the drought last year. March 8<sup>th</sup> – until this day there was no appearance of winters breaking up. March 15<sup>th</sup> – a wonderful smile of providence, in the snow going away. The creatures were almost starved. A great many creatures had died this winter by reason of the deep snow and scarcity of hay, everywhere.<sup>78</sup>

**1728 A.D.** The summer of 1728 in Paris, *France* was very hot and very dry and characterized by:

Hot days	43 days
Very hot days	5 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperatures occurred on 17 July in Paris but in the south, the peak occurred on 19 August. In Dijon, *France*, in Burgundy, the grape harvest began early on 13 September. It was an average harvest but the wines were excellent.<sup>62</sup>

[In *Britain*] during 1727 and 1728, there was a dearth from cold and rains.<sup>72</sup>

In 1728, the price of wheat [in *England*] averaged 54 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

On 13 August 1728, an Atlantic hurricane struck North Carolina in the *United States*. Many ships were lost. One as far north as a few miles off Ocracoke Island [on the Outer Banks of North Carolina] where one ship sunk and lost all its crew.<sup>141</sup>

On August 15, twenty-three ships were forced on shore by a terrible hurricane at South Carolina, in the *United States*.<sup>55</sup>

Carolina in the *United States* was greatly damaged by storms in August 1728.<sup>40, 41, 43, 56</sup>

On 19 August 1728, a hurricane did considerable damage at Antigua in the *West Indies*.<sup>143</sup>

The Delaware River near Philadelphia, Pennsylvania in the *United States* was frozen and closed for three months of the winter.<sup>1</sup>



In 1728, floods struck Hupeh (now Hubei province) in central *China* at Ch'ung-yang, Hanyang and Ch'ien-chiang. During the period between 8 June and 6 July, a drought engulfed Shensi (now Shaanxi province) in central *China* at Lo-ch'uan. During the period between 6 August 1728 and 28 March 1729, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Hêng-fêng [uncertain name, "Hsing-an"]. Trees and bamboos withered.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 6<sup>th</sup> – thus far we had very pleasant, comfortable weather for the season. April 13<sup>th</sup> – as much rain fell today as ever did in one day. April 17<sup>th</sup> – there just began to be some young feed now. April 30<sup>th</sup> – the most of this month has been very cold. May 1<sup>st</sup> – last night there was a considerable frost. June 30<sup>th</sup> – things begin to suffer much, by reason of the drought. July 9<sup>th</sup> – our people, this day, began to cut their salt hay. A drought in Boston. November 30<sup>th</sup> – three days past has been really cold. Presumpscot River froze up. December 30<sup>th</sup> – winter set in with cold as ever remembered in December.<sup>78</sup>

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**Winter of 1728 / 1729 A.D.** In 1728 in *England*, there was a month of severe frost.<sup>47, 72, 93</sup>

The winter of 1728-29 was severe [in *England*].<sup>212</sup>

A cold winter began in *Germany* on 19 September 1728. All the rivers froze until March 1729.

In either 1729 or 1730 a snowstorm visited *Scotland*, in which about twenty thousand sheep and many shepherds were lost – “by a single day’s snow.”<sup>30</sup>

During the evening of 1 January 1729, a fog appeared in London, *England*, so thick that several chairmen mistook their way in St. James’s park, and fell with their fares into the canal. Also many persons fell into Fleet-ditch and considerable damage was done on the Thames.<sup>2</sup>

The winter of 1728-29 was severe all over *Europe*. Pingrö wrote: “I was living in a small town in Lower Poitou, in western *France* (now called Mauléon). The intense cold began on the night of 24/25 December and held without interruption until 22 January. This whole time was for us a holiday season, because the ink in the pen froze even near the fire. And there was no stove in our house. Our breath froze on our clothes. A water tank 5-6 feet deep (1.62 to 1.95 meters), was soon frozen to the bottom. We heard the extreme cold surprised some people on the road and they froze to death.” In *Provence*, the olive trees froze to death. In Holland [now *the Netherlands*] and in *Germany* a large number of trees were destroyed. With the same rigor, the cold raged in *England*. The following are the coldest readings recorded during the winter:<sup>62</sup>

Wittenberg, <i>Germany</i>	( -4.0° F, -20.0° C)
Berlin, <i>Germany</i>	( -1.1° F, -18.4° C)
Leipzig, <i>Germany</i>	( 1.6° F, -16.9° C)
Utrecht, <i>the Netherlands</i>	( 3.9° F, -15.6° C)
Paris, <i>France</i>	( 4.5° F, -15.3° C) on 19 January 1729
London, <i>England</i>	(11.8° F, -11.2° C)

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**1729 A.D.** [In March 1729], a young gentlemen traveling on a mountainous road at night, 10 miles south of Bologna, *Italy*, as he approached Rioverde River perceived a light which shone very strongly on some stones that lay on the banks. [This light was called ignis fatuus or will-o’-the-wisp.] The light seemed to be about 2 feet above the stones, and not far from the water of the river: in figure and size it had the appearance of a parallelepiped, somewhat above a Bolognese foot in length, and about half a foot high, its longest side lying parallel to the horizon. Its light was very strong, and one could very plainly distinguish the neighboring hedge, and the water in the river. The gentleman’s curiosity tempted him to examine it a little nearer. He advanced gently towards the place, but was surprised to find, that insensibly it changed from a bright red to a yellowish, and then to a pale color, in proportion as he drew nearer, and that when

he came to the place itself, it quite vanished. On this he stepped back, and not only saw it again, but found that the farther he went from it, the stronger and brighter it grew.<sup>235</sup>

In 1729 in *England* and *Ireland*, there were great rains and floods.<sup>47, 92</sup>

On 20 May 1729, there was a hurricane [in *England*].<sup>212</sup>

In June 1729, there was a drought in Ashby-de-la-Zouch in Leicestershire, *England*.<sup>212</sup>

In 1729, the price of wheat [in *England*] averaged 47 shillings per quarter [quarter ton].<sup>212</sup>

On 1 & 2 August 1729, a dreadful hurricane struck Carolina [Carolina at that time consisted of North Carolina, South Carolina and Georgia] in the *United States*. The winds north and north by east began on the 1<sup>st</sup>. By 7 a.m., the winds had increased to the point that 23 ships that were in the harbor were forced ashore. The winds became more easterly and from that time until 3 hours after, the wind was most violent. Of all the ships in the harbor, only the *Fox* and *Garland* man-of-war rode out this hurricane. The rice near the seacoast was all spoiled by the overflowing of the fields with salt water. It was thought that the town would have been destroyed, had it occurred during spring tides. About 1,500 barrels of rice, besides skins, were lost. On 2 August, about 11 p.m. the wind gradually ceased; yet many sea-faring men were drowned. On the twelfth past [July 12], a tornado struck which did much damage to the rice and corn in the country, but little or none to the shipping.<sup>227</sup>

On 10 September 1729, the ship *Campbell* was driven on Nevis Point in the *West Indies* and wrecked in a tornado.<sup>143</sup>

On 26 December 1729, there was a violent thunderstorm at Camarthenshire [Carmarthenshire], *Wales*.<sup>212</sup>

During the period between 6 August 1728 and 28 March 1729, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Hêng-fêng [uncertain name, "Hsing-an"]. Trees and bamboos withered. Then in 1729 during the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Yüan-shih. Then during the period between 28 May and 25 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Ta-yü and Nan-k'ang.<sup>153</sup>

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**Winter of 1729 / 1730 A.D.** From mid-December 1729, the rain stopped in *England*. The winds came from the south and the weather was as mild and clear as in April. There was no snow or frost to the middle of January. Then a north wind brought a weak snowfall for two days. The weather was again clear and remained so with some intervals of little rain until the end of February. Then a little snow with cold rain until mid-March.<sup>62</sup>

On 1 January 1730, there was a great fog in London, *England*. Many lives were lost.<sup>212</sup>

A journal of the factories along the Albany River [a river in Northern Ontario, *Canada*] belonging to the [Hudson Bay] Company describes the winter of 1729-30. The frost began in October 1729. The creek near the factory was frozen over on the 13<sup>th</sup> of October. By the 21<sup>st</sup>, there was a great deal of ice floating in the river and by the 31<sup>st</sup>, it was frozen fast as far as Charles Creek. By the 5<sup>th</sup> of November, the whole river was frozen over, but not so strong as to bear [the weight of man]. The weather was temperate with some snow to the 27<sup>th</sup> of November. All the month of December was the same, three or four days' cold, and then a moderate frost with some snow. The month of January, much the same; cold and moderate. The month of February was variable, but mostly moderate, at intervals warm, and then sharp weather. In March to the 8<sup>th</sup>, was a warm temperate frost; from that time to the 17<sup>th</sup> fine clear weather, with some snow; thence to the 29<sup>th</sup> clear weather tolerably warm; on the 30<sup>th</sup> a storm of snow, and then it began to

thaw in the middle of the day. It continued thawing until the 5<sup>th</sup> of April, then there was two days of frost. It thawed again until the 13<sup>th</sup> and then to the 17<sup>th</sup> there was raw cold weather. April 18<sup>th</sup> was warm with rain, then interchangeably warm, and raw weather until the 28<sup>th</sup>, when the frost was broke up in the country by the freshes [spring floods] coming down. On the 29<sup>th</sup> of April, the ice gave way to the head of the island, and the next day drove down to Baily's Island, when all the marshes were overflowed, the Bay being not yet thawed. The ice continued driving in the river until the 5<sup>th</sup> of May; then the river fell 5 feet [1.5 meters], by the breaking up of the ice at Sea. The 7<sup>th</sup> of May, there was thunder and rain; the ice still driving in the river. On 13 May there was raw cold weather. On the 22<sup>nd</sup>, the tides began to flow regularly.<sup>292</sup>

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**1730 A.D.** [In Chili (*Chile*), the city of Conception was inundated.<sup>40, 43, 47</sup> This inundation was not weather related. On 8 July 1730, the Valparaiso earthquake triggered a tsunami. Earthquakes and tsunamis razed the town in 1570, 1657, 1687, 1730 and 1751.]

[In 1730] an earthquake and inundation destroyed *Chili*. The earthquake lasted 27 days, wherein persons innumerable perished, with all the city of St. Jago. The inundation overflowed the city of Conception, and even reached as far as Calloo, where it mounted the walls, and filled the square with water. This flood was occasioned by the earthquake.<sup>273</sup>

The peak temperature in Aix, *France* during the summer reached 94.3° F (34.6° C).<sup>62</sup>

In 1730, the price of wheat [in *England*] averaged 36 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

On 30 July 1730, there was a thunderstorm at York, *England*.<sup>212</sup>

In August 1730, there was a drought at Ashby-de-la-Zouch in Leicestershire, *England*.<sup>212</sup>

In August 1730, there was a waterspout at Shelford at Nottinghamshire, *England*. There was observed a large column of water that reached from a cloud down to the River Trent, which came down with great violence, and forced the water in the river 300 yards beyond its usual bounds.<sup>212</sup>

On 1 September 1730, a hurricane struck *Jamaica*. One ship of war was lost. The ship was carrying the ex-President of Panama.<sup>141</sup>

In 1730, a hurricane struck the *Caribbean Sea*. One ship, the *Nuestra Senora del Carmen* sunk south of Jamaica.<sup>141</sup>

In 1730 during the period between 15 June and 14 July, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Wu-chiang. During the period between 15 July and 13 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Hui-min, Li-ching, Pin, Wu-ti, Chan-hua, T'êng, Ning-yang, Tzū-yang, Tsinan, Yeh, Kao-wan, Po-hsing and Kuang-jao. At Tsinan, crops were damaged by the floodwaters. At Yeh, crops were damaged and many people drowned. Also during the period between 15 July and 13 August, floods struck Hopei (now Hebei province) in northern *China* at Hêng-shui, Sha-ho, Chi-tsê, Ta-ming, Hsing-t'ai, Kuang-p'ing, Yung-nien and Ch'ing-yün; and Shensi (now Shaanxi province) in central *China* at Ch'ing-chien. At Ch'ing-chien, people and cattle drowned. During the period between 12 September and 11 October, a drought engulfed Hopei province at Tung-kuang and Ts'ang. During the period between 12 October and 9 November, a drought engulfed Hopei province at Hsing-t'ai and P'ing-hsiang; Shansi (now Shanxi province) in northern *China* at Ch'ang-chih [possible misprint, "Ch'ang-chao"]; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Chieh-yang.<sup>153</sup>

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**Winter of 1730 / 1731 A.D.** The winter in 1731 was severe. It was very rough in *Italy*. London, *England* observed the low temperature for the winter of (1.6° F, -16.9° C) and in Berlin, *Germany* the observed low temperature was (-5.6° F, -20.9° C). In Paris, *France*, the winter was less severe, and the lowest temperature occurred on 25 January (19.4° F, -7° C).<sup>62</sup>

In 1731, the snow in *England* was remarkably deep.<sup>41, 43, 56</sup>

The winter of 1730-31 [in London, *England*] was extremely cold in January.<sup>235</sup>

On 4 & 5 January 1731 at Ashby-de-la-Zouch in Leicestershire, *England*, there was great frost and great snow. On 25 January at Derbyshire, the snow was so deep in some places that the roads were hardly passable. On 30 January and 3 February, there was a great frost at Windsor. It was as cold as 30 December 1708, when the temperature fell to 0° F [-18° C].<sup>212</sup>

On 29 January 1731, the temperature at Upminster [a suburban town in east London, *England*] fell to 2° F [-16.7° C].<sup>300</sup>

On 20 January 1731, several parts of the northern roads were so covered with snow, that the *Scotch* Peers and Commissioners in their way to Parliament were obligated to alight and walk many miles on foot; and in some places the snow was so deep, that 50 men were employed to remove it to make it passable. The snow was deeper in Lancashire, *England* than it had been for 20 years past.<sup>273</sup>

On 25 January 1731, the snow was so deep in some parts of Derbyshire, *England* that the roads were hardly passable.<sup>273</sup>

A journal of the factories along the Albany River [a river in Northern Ontario, *Canada*] belonging to the [Hudson Bay] Company describes the winter of 1730-31. On the 29<sup>th</sup> of September 1730, there was some frost in the night. On 2-9 October, there was snow and some frost in the night followed by fine weather until the 12<sup>h</sup>. They stopped fishing because there was no frost to freeze the fish. The weather to the 24<sup>th</sup> of October was fine warm weather with small frost. On the 28<sup>th</sup>, there was ice on the river and the geese flew away. On November 13<sup>th</sup>, the river was full of heavy ice; the 18<sup>th</sup> it was frozen over, but still moderate weather. The winter was not so severe as the winter of 1729-30. The geese returned on the 14<sup>th</sup> of April 1731. The freshes [spring floods] came down May 5<sup>th</sup>, and by the 12<sup>th</sup> the ice was gone to Sea.<sup>292</sup>

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**1731 A.D.** On 11 February 1731, a tornado passed over old Thorney Wood [in Nottinghamshire, *England*]. It traveled a considerable distance and tore up trees by the roots and splitting some from the top to the bottom of their trunks (twisted as one might twist a wisp of straw).<sup>212</sup>

On 19 February 1731, *Barbados* reported that the crop from the island is likely to be very small because of the drought.<sup>273</sup>

In March 1731, water was so scarce at Antigua in the *West Indies* that a pail of cistern water was sold for three shillings.<sup>143</sup>

On 22 March 1731, letters from Teneriff [Tenerife – The largest of the seven *Canary Islands*] advise, that a great storm had done incredible damage to that island, by blowing down houses and church steeples, destroying vineyards, and carrying goats and sheep into the sea.<sup>273</sup>

On 26 March 1731 a letter was received from Cadiz, *Spain* that reported that the sea being blown away in the late storm, they had discovered [uncovered] the ruins of a temple, which was believed to be that of

Hercules. Three statues were found within: one gilt in gold, another in silver and the third in brass. All three were exceedingly beautiful.<sup>273</sup>

On 28 March 1731, *Antigua* in the Leeward Islands reported “There is a great want of rain, little sugar, and many ships waiting for it; and if rain don’t fall, there will be no crop next year. The young canes are much burnt. The crops are very short at *Nevis* and Mountserrat [*Montserrat*]. The ponds are almost dry; the water so scarce, that a pail of cistern water is sold for 3s. [3 shillings].”<sup>273</sup>

On 30 March 1731, *Barbados* and the *Leeward Islands* reported a great want of rain, particularly at Antigua, from whence (the springs in that island being salt) they sent to Mountserat [*Montserrat*] for fresh water.<sup>273</sup>

It was reported on June 22, that a great drought was occurred in the *West Indies*, particularly at Antigua, where a pail of water, containing three gallons, had been sold for four shillings and eight-pence sterling.<sup>55</sup>

On 24 June 1731, letters from the West Indies reported a great drought particularly at *Antigua*; at which location a pail of water containing about 3 gallons was sold at 7s. in that countries money or 4s. 8d. Sterling.<sup>273</sup>

In Cheltenham, in Gloucestershire *England*, a storm caused 2,000*l.* damage in June, 1731.<sup>40, 41, 56</sup>

The summer of 1731 was hot and the driest since 1719. It had been in Paris, *France*:

Hot days	35 days
Very hot days	3 days
Extremely hot days	2 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak fell on the 10 & 11 August and was measured at 98.4° F, (36.9° C) in Paris. In the south of *France*, the peak occurred on 10 July. In Dijon, *France*, in Burgundy, the grape harvest began early on 9 September. The harvest produced an ordinary amount of wine but of excellent quality. The level of the Seine River in Paris was lower by 15 centimeters than the low of the year 1719.<sup>62</sup>

In 1731, a hurricane struck the Windward Passage [the strait in the *Caribbean Sea*, between the islands of Cuba and Hispaniola]. Most of the men on the ships *Bridget* and *Kitty* perished.<sup>141</sup> [The ship was out of Liverpool and was commanded by Captain Minshall. The survivors made their way to St. Christopher’s island, commonly called St. Kitts.]

On Thursday, 24 June 1731, the ship *Dolphin*, bound to Montserrat in the *Leeward Islands*, was upset in a squall. One of the men was drowned; the rest of the crew got upon the side of the vessel. They had neither water nor bread. But a Negro diving, found an adze and a handsaw; with these they cut away the rigging, and righted the ship. But the ship was full of water, and their cask water spoiled. Upon the 14<sup>th</sup> day after she had overset [overturned], the crew caught a shark, drank its blood, and eat its flesh. They had nothing to drink but what rain they could catch. Three of the crew and the Negro died for want of water. On 15 July the survivors were rescued by a French ship.<sup>143</sup>

On 13 July 1731, there was a thunderstorm at Huddersfield in Yorkshire, *England*.<sup>212</sup>

In 1731, the price of wheat [in *England*] averaged 33 shillings per quarter [quarter ton].<sup>212</sup>

On 21 September 1731, it was reported that the Spanish Galleons consisting of 11 ships convoyed by 4 men of war, in their voyage home met with a hurricane [in the *Atlantic Ocean*], which left but 8 of them together, and those without masts. The *Rosario* and *Almirante* fell foul of each other and sunk.<sup>273</sup>

On 30 October 1731, a terrible tornado struck Corne-Abbas [Cerne Abbas] in Dorset, *England*. The path of destruction was 200 yards wide. Trees were uprooted and houses unroofed. It only lasted 2 minutes.<sup>212</sup>

Rainfall in Paris, *France* in 1731 only exceeded by 1.5 inches (38 millimeters) the amount that fell in 1723. During this time the sky was extraordinarily serene. The Seine River was so low that it was no longer navigable. On 23 October, the water level of the river was 5.9 inches (149 millimeters) below the low water mark of 1719. This was one of the lowest levels that the river fell to until now.<sup>79</sup>

On the 17<sup>th</sup> [of December 1731], a violent storm struck *the Netherlands*. It produced “the highest tide at Rotterdam known in the memory of man; and had it not abated before the flood returned, the damms [dams] would have been overflowed, and the greatest part of the country drowned. An English and a Dutch ship were lost coming into the harbour. In Amsterdam the top of a house was blown down, in which three men were crushed to death.”<sup>273</sup>

In 1731, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, floods struck Shantung (now Shandong province) on the east coast of *China* at Kuang-jao, Shou-kuang and Liao-ch’êng; Szechwan (now Sichuan province) in southwest *China* at Ch’ang-ning [uncertain name]; and Hopei (now Hebei province) in northern *China* at Ch’ing-yün.

— During the period between 6 May and 4 June, floods struck Hupeh (now Hubei province) in central *China* at I-ch’ang. Fields were damaged.

— During the period between 4 July and 2 August, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Tang-shan and Shantung province at Ch’ang-shan.

— During the period between 31 October and 28 November, floods struck Shantung province at Tsinan and Tsou-p’ing.

The year 1731 was a year of great abundance in the vicinity of Shanghai, *China*.<sup>166</sup>

**Winter of 1731 / 1732 A.D.** The winter of 1732 was noted as remarkable for its severity, but in Paris, *France* the thermometer did not dropped below 18.5° F (-7.5° C).<sup>62</sup>

On 1 May 1732, a snowstorm struck Edinburgh, *Scotland*, producing a great fall of snow. The next day, the ice [on the river] was so strong as to bear the weight of a man and horse. Lambs were killed by the excessive cold. This storm also struck *England*. At Ashby-de-la-Zouch in Leicestershire, *England* on 2 May, there was heavy snow. Then on 7 May, there was a great flood.<sup>212, 274</sup>

**1732 A.D.** On 30 May 1732 in *Ireland*, there was a prodigious shower of hail.<sup>93</sup>

In 1732 [in *England*], there was a plague of locusts.<sup>212</sup>

In 1732, the price of wheat [in *England*] averaged 26 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1732, a destructive hurricane struck Mobile, Alabama in the *United States*.<sup>117</sup>

In August 1732, it was reported that the harvest in *Spain*, *Portugal* and *Italy* for this year proved very bad.<sup>274</sup>



On 15 September 1732, London, *England* reported that a great number of ships were wrecked this week in diverse parts by stormy weather.<sup>274</sup>

During October 1732, Frankfort, *Germany* reported, “That the damages sustain’d [sustained] by inundations in Franconia [eastern part of the historic Duchy of Franconia in *Germany*], surpass all imagination. At Wertheim 25 houses were washed quite away; one side of the hospital, built of stone in the strongest manner, the Church at Swabach [Schwabach] in Auspach [Ansbach], part of the strong thick town walls, and the whole tower where the gunpowder was kept, were borne down by the torrent. In some places the water rose quite to the roofs of houses, and drowned man and beast; household goods and furniture of all sorts, corn, wine, beer, and other provisions, houses, barns, walls, mills, stone bridges, &c. were mixed together and beat to pieces. Many fields and meadows were half cover’d [covered] with the dead bodies of men and beasts, fragments of houses, &c. Abundance of dead were found clinging to the boughs of trees, some on bushes, and others hanging to the wheels of water-mills. Ships and other vessels, ship-mills, floats of timber, &c. lying upon the rivers, were carried quite away. No monks appearing to bring out the [sacred] host.”<sup>274</sup>

In October 1732, Lisbon, *Portugal* reported, “That what they call a thunderbolt [lightning bolt] had penetrated the tower of the city of Compost-Major, (in the province of Alantejo) and set fire to a magazine of gunpowder, consisting of 5700 arroves [arroba], each weighing 32 *l.* English [English pounds, 14.5 kilograms], 400 shells filled, &c. by which the whole city, except part of two streets, were laid in ruins; above 1000 persons were miserably shattered and torn, and many deemed incurable. The number of those buried under the rubbish was unknown, several hundreds had been already dug out. Upon the news the King of Portugal immediately sent all the surgeons, and apothecaries, that could be found in Lisbon to their assistance.”<sup>274</sup>

On 4 October 1732, Lisbon, *Portugal* reported, “there was a violent storm of wind for 3 hours, which brought in a most dreadful sea, so that scarce any ship in the Tagus [River] escaped without damage; 5 or 6 sails [sailing ships] were entirely lost, and near 60 persons. On land, the damage was as great among the vineyards and plantations.”<sup>274</sup>

In November 1732, Lisbon, *Portugal* reported, “That just before the late storm on the 15<sup>th</sup> past, the fisherman of Buarcos putting to Sea, were all lost in it to the number of 50, with their tackle valued at 3000 crusadoes [An old Portuguese coin of gold or silver having a cross pictured on the reverse.], whereby that little town was almost depopulated.”<sup>274</sup>

In 1732, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 25 April and 23 May, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Fu-ch’uan.

— During the period between 24 May and 21 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Ta-yü, Nan-ch’ang, Lin-ch’uan, Kao-an and Chi-an; and Szechwan (now Sichuan province) in southwest *China* at Ya-an, Jung-ching and O-mei. At O-mei, 79 house-sections were damaged by the floodwaters and 95 people drowned.

— During the period between 22 July and 19 August, floods struck Hupeh (now Hubei province) in central *China* at Huang-kang.

— During the period between 20 August and 18 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at T’ai-ts’ang, K’un-shan, Chia-ting, Ch’ung-ming, Pao-shan, Soochow and Ch’ing-p’u. At Soochow, there was a great storm. Fields and houses were damaged by the floodwaters and innumerable people and cattle drowned. At T’ai-ts’ang, there was a typhoon. Innumerable people drowned. At Pao-shan, many people drowned. At Ch’ung-ming, innumerable people drowned. At Ch’ing-p’u, there was a typhoon.

— During the period between 19 September and 18 October, floods struck Kiangsu province at

K'un-shan. Innumerable people drowned.

In 1732 during the period between 27 January and 19 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Lin-i. [Lin-i is located at longitude 118.24° East and latitude 35.07° North.] During the period between 5 February and 6 May, a drought engulfed Shantung province at P'ing-yüan, Ch'ü-fou and Chü. During the period between 22 July and 19 August, a drought engulfed Shantung province at Lin-ch'ing and Fu-shan.<sup>153</sup>

In 1732 during the 7<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a typhoon that lasted several days. It tore up trees and leveled houses; sea overflowed; cities flooded.<sup>166</sup>

**Winter of 1732 / 1733 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1733 on January 8<sup>th</sup> – cold. January 13<sup>th</sup> – this whole week produced a spell of warm weather. January 29<sup>th</sup> – it did not seem to be very cold, yet it froze over to Purpoodock [now Cape Elizabeth] last night. February 8<sup>th</sup> – prodigious blustering and cold. February 16<sup>th</sup> – it thawed all last night. February 22<sup>nd</sup> – ice still lies as far as North Yarmouth. A man may walk over to Hog Island [on the ice]. February 28<sup>th</sup> – it was melancholy to see so much snow as has fallen so late in the year. March 10<sup>th</sup> – there has been little of the snow melted yet. March 21<sup>st</sup> – comfortable weather. March 22<sup>nd</sup> – snow mostly consumed. March 27<sup>th</sup> – pleasant. March 29<sup>th</sup> – the snow in the woods is near four-feet (1.2 meters) deep. April 4<sup>th</sup> – cloudy and cold. April 13<sup>th</sup> – pleasant day. April 16<sup>th</sup> – Stroudwater River still froze over. April 20<sup>th</sup> – a cold and backward spring. April 23<sup>rd</sup> – it was said to have snowed at Saccarappa [now Westbrook] last night, knee deep.<sup>78</sup>

In December 1732, Prague in Bohemia [now *Czech Republic*] reported, “That the people were at work day and night to extinguish the flame, which lately broke out at openings in the adjacent mountains, and were greatly alarmed because they could not.”<sup>274</sup>

In January 1733, Vienna, *Austria* reported, “That the burning mountains in the neighbourhood of Prague [*Czech Republic*], had continued to flame out in a terrible manner.”<sup>275</sup>

In March 1733, Moscow, *Russia* reported, “That the cold had been so intense, that an hundred persons were froze to death, birds fell dead in the streets, and horses harness'd to the sledges, were frozen standing stiff as wood.”<sup>275</sup>

**1733 A.D.** On 1 March 1733, Rippon [Ripon in North Yorkshire, *England*] reported, “the greatest flood ever known there; about 4 miles [6 kilometers] from thence the waters came down so suddenly to a mill, that the miller was obligated to fly with 3 of his children to the uppermost room, where he broke out, and carried his children singly ashore in a large tub, which was overset [overturned] with his last cargoe [cargo], but assistance being ready, they got safe to land. Presently after, part of the house was carried away.”<sup>275</sup>

In April 1733, *Ireland* reported that on the Kerry coast of the Shannon, between the old Castles of Dune and Lick (which are half a mile asunder) and opposite to Carrick a Holt, the ancient seat of the earls of Clare, the cliffs rise to a great height above the sea, to 1, 2, or 300 feet [30-91 meters] perpendicular, from which height, by the undermining of the waves, they sometimes fall with mighty violence into the ocean. Nearly two years ago, a piece of one of these high cliffs fell off; whereupon there broke out a smoke attended with a strong sulphurous smell and it has continued burning ever since. From time to time, sections of the cliffs (100 feet by 60 feet) have been eaten away and fallen. Generally the flames of the fire are not visible during the daylight but only during nighttime.<sup>275</sup>

In May 1733, Marseille, France reported, that the *Capitana* of Algiers of 80 guns, and two other large ships of the Turkish Squadron going to the relief of Oran [in *Algeria*] were cast away in a storm, many thousand soldiers drowned, and the rest escaped to Scio, refused to embark again.<sup>275</sup>

In June 1733, Annapolis Royal [*Canada*] reported, “that about the 14<sup>th</sup> instant [of this month] at 8 o’clock in the morning it seemed very serene, tho’ the sun did not shine out, neither was it overspread with black clouds, or the air foggy. About 9 [o’clock] ensued a darkness, which was visible increased as the sun approached the meridian. Between 11 and 12 [o’clock] it became so dark, that the people were obligated to light candles. This strange phenomenon was the more extraordinary as there was no possibility of an eclipse at that time.”<sup>275</sup>

On 23-25 June 1733 at Ashby-de-la-Zouch in Leicestershire, *England*, the weather was very hot. On 26 June, there was a great thunderstorm. The next day the storm was very great and did much damage. On 29 July, there was another great thunderstorm. On 28-30 October, a gale struck.<sup>212</sup>

In *St. Kitts*, twenty ships were lost to a storm on June 30.<sup>40, 41, 43, 56</sup>

On 10-11 July 1733, a hurricane struck the *Lesser Antilles*. The crews from many ships were lost. Other losses occurred on land. One ship at *St. Kitts* sunk and lost its entire crew.<sup>141</sup>

On 15-16 July 1733, a hurricane struck southern *Bahamas*, Florida in the *United States* and the Florida Straits causing 56 deaths.<sup>141</sup>

In July 1733, it was very hot in London, *England*. “The weather was so excessively hot for the most part of this month that it was scarcely tolerable; horses dying on the roads. Some gentlemen thought the season too hot to take the journey to visit their corporations.”<sup>212</sup>

[In *England*] in July 1733 “The weather was so excessive hot most part of this month, that it was scarcely tolerable to man or beast. Several horses dy’d [died] on the roads, and numbers of people being tempted to go into rivers and ponds to cool themselves, above 20 were drowu’d [drowned] within the Bills of Mortality [a monthly listing of the dead]. Much mischief was also done by lightning. Some gentlemen thought the season too hot to take a journey to visit their corporations.”<sup>275</sup>

In 1733, the price of wheat [in *England*] averaged 28 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

On 31 December 1733, *England* reported, “That about the middle of this month was very stormy; great damages were done at sea and land. The new steeple of *St. Michael’s* at Southampton was shattered by thunder and lightning.”<sup>275</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:  
June 29<sup>th</sup> – it was a wonderful year for grass. August – pigeons were very plentiful. We kill more than we could eat. August 20<sup>th</sup> – trout, with a net, got 16 dozen this morning. September – generally a pleasant month. October 24<sup>th</sup> – it froze in the shade all day. November 4<sup>th</sup> – turnips are exceedingly plentiful. November 24<sup>th</sup> – warm weather. December 7 – wonderfully pleasant most of this month.<sup>78</sup>

In *India* in 1733, there was a famine confined to the north western provinces.<sup>57</sup>

In 1733, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

In 1733 A.D., there was a famine in the North-Western Provinces of *India*.<sup>179</sup>

In 1733 during the period between 5 February and 6 May, a drought engulfed Shensi (now Shaanxi province) in central *China* at T'ung-kuan and Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-shan. During the period between 8 September and 7 October, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tsinan.<sup>153</sup>

In 1733, floods struck several regions of *China* including:<sup>153</sup>

— Hopei (now Hebei province) in northern *China* at Wu-ch'iang, Hsing-t'ai, Jao-yang, Fêng-jun, Chi, Su-ning [possible misprint, "Su-hsüan"], Sha-ho, Lu-lung, Ch'ang-li, Hsien and San-ho. [Chi is located at longitude 117.24° East and latitude 40.03° North.]

— Kansu (now Gansu province) in northwest *China* at Tunhuang. Over 570 house-sections damaged by the floodwaters.

— During the period between 8 September and 7 October, floods struck Shantung (now Shandong province) on the east coast of *China* at T'an-ch'êng and Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-ch'un.

**1734 A.D.** In Holland [now *the Netherlands*], the frost was very severe; but none in *Sweden* or *Norway*.<sup>47, 93</sup>

On 28 February 1734, *Ireland* reported, "The warmth of the winter occasion'd [occasioned] the birds to breed in *Ireland* before the season; young wild-ducks were observ'd [observed] there the beginning of this month, which us'd [use to] not to lay their eggs till March."<sup>276</sup>

In Belper (Derbyshire), *England*, a flood carried away the bridge over the River Derwent and did other damage.<sup>47, 92</sup>

In northern *France* the rains of 1734 caused the Marne, the Meuse and Moselle rivers to overflow their banks at the beginning of July. There were heavy rainfalls again at the end of December.<sup>79</sup>

On two particular days [27 June and 20 & 25 July] in 1734, the temperature in Petersburg [St. Petersburg, *Russia*] rose on the de Lisle thermometer to 96° D [96.8° F, 36° C].<sup>296</sup>

On 13 July 1734, there was a great rain at Ashby-de-la-Zouch in Leicestershire, *England*. On 9-10 August, there was a thunderstorm. On 11 & 26 August, there were gales.<sup>212</sup>

In 1734, the price of wheat [in *England*] averaged 39 shillings per quarter [quarter ton].<sup>212</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January 11<sup>th</sup> – blustering and cold. January 19<sup>th</sup> – rain. January 28<sup>th</sup> – pretty comfortable. February – pleasant weather generally this month, though some days were cold. March – all along warmer and pleasanter than April last year. April 4<sup>th</sup> – as hot a day as found in summer. April 19<sup>th</sup> – Jack finished planting potatoes. April 25<sup>th</sup> – there was vastly more potatoes planted the year than ever. May 9<sup>th</sup> – though the spring was at first very forward, things didn't progress as promised. May 22<sup>nd</sup> – very warm and pleasant. June 21<sup>st</sup> – there never was (I believe) such a year for grass. July 4<sup>th</sup> – the raspberries began to ripe. July 8<sup>th</sup> – We hear that at Boston, people died of excessive heat. July 23<sup>rd</sup> – it is (I believe) as fruitful a year as ever was. September 6<sup>th</sup> – extraordinary cold. September 13<sup>th</sup> – pleasant. September 30<sup>th</sup> – we began to dig our potatoes, so early, because we have so many to dig. November 1<sup>st</sup> – feed is good yet. December – to the end of this month the weather was very moderate.<sup>78</sup>

In 1734, the island of Barbados in the *Lesser Antilles* suffered severely from want of rain. Several inhabitants perished from famine.<sup>143</sup>

In 1734, a hurricane did great damage on the island of *Jamaica* and to the shipping.<sup>143</sup>

A hurricane struck *Jamaica* on September 1, 1734.<sup>40, 41, 42, 43, 56</sup>

On 1 September 1734, a violent hurricane struck *Jamaica* which did unspeakable damage on that island, and not a little to the shipping.<sup>276</sup>

On 1 October 1734, there was a violent gale with heavy rains at Chester, *England*. This produced a great flood on the River Dee.<sup>212</sup>

On 1 October 1734, *England* reported, “By high winds and great rains the works for making the River Dee, near Chester, navigable were much damaged, the banks broken down, and such vast quantities of sand drove in as to render the design impracticable.”<sup>276</sup>

On 26 November 1734 in *England*, “It blew a hard storm in the Downs, and 2 ships, viz. the *Joseph and Jane*, and the *Two Friends*, were drove ashore but the men saved.”<sup>276</sup>

On 26 November 1734, there was a violent gale at the Downs [sea area between Goodwin Sands and the East Kent coast] in *England*.<sup>212</sup>

On 30 November 1734, *England* reported, three French and two Dutch ships were lately lost on the *Isle of Wight*, also the *Angola Merchant* was entirely lost but her men saved in a sudden squall in Hyle-Lake Harbor.<sup>276</sup>

In 1734 during the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Chiao. During the period between 4 April and 2 May, floods struck Chahar province (now eastern *Inner Mongolia*) at Huai-an. During the period 1-29 July, a drought engulfed Shensi (now Shaanxi province) in central *China* at T’ung-kuan and Kan-ch’üan.<sup>153</sup>

In 1734 during the summer, there was a great drought in the vicinity of Shanghai, *China* and an epidemic.<sup>166</sup>

**Winter of 1734 / 1735 A.D.** A very violent wind from the southwest reigned in Paris, *France* towards the end of December 1734. A great storm, accompanied by lightning and thunder, mingled with the winds on December 25<sup>th</sup>.<sup>79</sup>

On 6 January 1735, the temperature in Siberia at Kirenginiki in *Russia* was -120° F (-84° C).<sup>28</sup>

On 8 January 1735, a great gale struck *England*, *France* and *the Netherlands*. So violent a one has not been known since the memorable one of November 1703. In London, *England*, several houses were blown down, windows shattered, and almost every street covered with [roof] tiles. In the country churches were stripped, and many barns and some houses were blown over; trees without number were torn up by the roots, and [ship] wrecks without number everywhere along the coast. At Portsmouth and Plymouth several ships of the Royal Navy were driven ashore. In St. James’s Park, London, 36 large trees were laid flat; 300 in the parish of Stockton, Wiltshire; 100 in the Duke of Queensberry’s paddock, at Amesbury, and 80 in St. Pier’s Walk, Monmouthshire. Damages to the amount of £2000 was done in Mr. Scawen’s park, at Carshalton, Surrey; the great rains before and during the storm caused the rivers to overflow the lowlands, drowning sheep and cattle. Both gale and inundations general throughout *England*. Of 100 ships in the Texel, Amsterdam [in *the Netherlands*], only 17 rid [rode] out this great storm; and at Newport a fourth part of the houses were blown down. At Darlington, Durham [in *England*], the gale N.E., with snow. Barometer on the 7<sup>th</sup>, in the evening, 29.0 inches (wind S.W.), 8<sup>th</sup> a.m. 28.38 [inches], 4 p.m. 28.05 [inches], 10 p.m. 28.45 [inches]. At Ashby-de-la-Zouch [in *England*] the greatest gale ever heard of in the south of *England* (extending into *France* and Holland [now *the*



*Netherlands*]). Barometer on 4<sup>th</sup> at night 29.9 [inches]; 5<sup>th</sup> at night 29.7 [inches]; 6<sup>th</sup> at night 29.2 [inches]; 7<sup>th</sup> at night 28.1 [inches]; 8<sup>th</sup> at noon 27.9 [inches] (lower by 0.1 inches than ever known.<sup>212</sup>

On 8 January 1735, a storm struck *England*. “About an hour before noon, the wind increased to a storm, at W. [west] and W.S.W. [west southwest] so violent as has not been known since the memorable one November 27, 1703; in comparison of which it was of longer continuance, but some think not quite so violent. In London it threw down several houses and stacks of chimneys, shattered windows, and almost covered every street with [roof] tiles; in the country churches were stripp’d [stripped], many barns and some houses blown down, and trees without number torn up by the roots, and laid cross the roads. But the greatest damage was done to the shipping; wrecks were to be seen every-where along the coasts; several ships of the Royal-Navy, at Portsmouth and Plymouth were drove ashore, or lost their masts, and riggings; several boats were cast away on the [River] Thames, but larger vessels escaped better there than in other harbours. Thirty-six large trees were laid flat in St. James’s Park; 360 in the parish of Stockton, Wiltshire; 100 in the D. of Queensberry’s Paddock at Amesbury; 80 in St. Pier’s Walk in Monmouthshire [Wales]; 2000 *l.* damage done to the fine grotto, park and park walls of Mr. Scawen at Carshalton, Surry [Surrey]. The rivers being high from the great rains before, and during the storm, the waters were forced over their banks and overflowed the low lands; sheep and other cattle were lost in some places, in others the people took to their upper rooms to secure themselves from the inundations that were on every side. But we have not room to enumerate more particulars of the damage done before 6 o’clock in the evening, about which time it abated; nor indeed is it necessary; for the effects of it were perceived in much the same manner, at the same time, in every corner of the Kingdom, and consequently by all our readers. But we must not omit the good, occasioned by this dreadful tempest, to the Harbour of Wisbech, which is deepened by the freshes [freshets] to above 15 foot water, so that ships come up to the town, which saving Lighteridge, will be of great service to the trade of that part. The price of tiling and workmen was raised double in many places on this occasion.”<sup>277</sup>

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**1735 A.D.** The peak summer temperature in Port Louis, *Mauritius*, occurred in January and was 90.7° F (32.6° C).<sup>62</sup> [Mauritius is an island nation off the southeast coast of the African continent in the southwest Indian Ocean.]

In February 1735, at Dagenham, and upon the coast of Essex, *England*, an inundation carried away the sea walls, and drowned several thousand sheep and black cattle.<sup>40, 41, 43</sup> [Dagenham is now London, in the Riverside section of the Thames Gateway redevelopment area.]

On 9 March 1735, there was a gale at Kilverston in Norfolk, *England*. The gale was very violent, but brief, and only extended one mile. [This is most likely a tornado.]<sup>212</sup>

On 9 March 1735, at Kilverston in Norfolk, *England*, “rose a hurricane, which blew the lead off the church [roof] and the [roof] tiles off a house and carried them some way in the air; and levelled a piece of high-furrow’d land just as if it had been harrow’d down; it blew water out of the river, and carried it a furlong and a half [990 feet, 302 meters], and a hurdle from a sheepfold over the tops of houses. It continu’d but a short time, extended not above a mile and ended in a sulphurous smell.”<sup>277</sup>

At Ashby-de-la-Zouch in Leicestershire, *England* on 2 June 1735, there was a thunderstorm. On 23 August, there was a great rainstorm and the next day a flood. On 27 October, there was a great flood. On 7 December, there was a fearful thunderstorm and flood.<sup>212</sup>

On 19 July 1735 at Kingston, *England*, there was a flood. The excessive wet has laid the corn [grain] flat, and much hay has been spoilt by flood in the valley of the [River] Thames.<sup>212</sup>



On 19 July 1735 at Kingston, *England*, wheat sold for 11 *l.* 10 *s.* a load; the price being raised by the excessive wet weather, which in many places has laid the corn [grain] flat. The [River] Thames has been so swell'd, that in many places the farmers were forc'd to carry off their hay to the hills to make it.”<sup>277</sup>

On 30 July 1735, the wet weather caused a landslide at Wedderlaw [Wedder Law] in Midlothian, *Scotland*. “A great thunderstorm, with rain and hail, after a very hot and dry season. The side of a hill moved into the valley close to Gala, and a great quantity as far as Galashiels.”<sup>212</sup>

In 1735, it was very wet in Rutland, in central *England*.<sup>212</sup>

In summer 1735 [in *England*], it was remarkably cold and wet, like winter. During June and July, there were but few fair days.<sup>212</sup>

In 1735, the price of wheat [in *England*] averaged 43 shillings per quarter [quarter ton].<sup>212</sup>

On 27 August 1735, there was a violent gale at Sandwich Bay on the east coast of Kent, *England*. It did much damage in many parts, and destroyed a third of the hops.<sup>212</sup>

On 7 September 1735, there was a gale at Worcester, *England*, with tremendous rain, especially at Droitwich [Droitwich Spa], where inhabitants were forced into their chambers; men, horses, sheep, and bridges were carried away by the flood.<sup>212</sup>

On 7 September 1735, there was a flood at Coventry, *England*, greater than any during the past 40 years.<sup>212</sup>

On 7 September 1735 at Worcester and in the neighbouring counties in *England*, “was a tempestuous wind, attended with so fierce rains as if the clouds had bursted; the water ran like rivers thro’ several neighbouring towns, particularly at Droitwich, where the inhabitants were forc’d into their chambers; and their salt and other goods spoil’d to several hundred pounds damage; men and their horses, gates, bridges, sheep, &c. were borne away by the violence of the torrents.”<sup>277</sup>

On 13 September 1735, a fierce storm of hail destroyed most of the corn [grain] unreaped, in the shire of Air, *Scotland*. It lay two foot thick in some places.<sup>277</sup>

On 15 September 1735, a hailstorm struck Ayr, *Scotland*. The hailstones destroyed most of the unreaped corn [grain] in Ayrshire. The hailstones laid 2 feet [61 centimeters] thick in some places.<sup>212</sup>

Measured temperatures in northern *France* varied widely in 1735. In Paris, temperature variations exceeded 27° F (15° C) in the winter; 50.4° F (28° C) in the spring; 39.6° F (22° C) in the summer; and 28.8° F (16° C) in the autumn. The year was also dry and harvest was late.<sup>79</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January – though cold at times, there has been much pleasant and moderate weather this month. February 28<sup>th</sup> – this has been a summer month; only two or three cold days. March – not so pleasant as the last month. April 9<sup>th</sup> – cold and windy. April 17<sup>th</sup> – quite hot. April 21<sup>st</sup> – same. July 10<sup>th</sup> – people began to mow. August 11<sup>th</sup> – there has been so much rain, it is feared there will be but little good English hay. December – there have been several pleasant days, this month. None remarkably cold.<sup>78</sup>

In 1735, a drought engulfed several regions of *China* including: <sup>153</sup>

— During the period between 21 June and 19 July, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Hsia-ching; Anhwei (now Anhui province) in eastern *China* at Kuei-ch'ih; and Szechwan (now Sichuan province) in southwest *China* at P'i-shan. Rivers dried up.

— During the period between 18 August and 15 September, a drought engulfed Hupeh (now Hubei province) in central *China* at P'u-ch'i, Chung-hsiang, Tang-yang, Wuchang, Ch'ung-yang, Ch'i-shui and I-tu.

In 1735 during the 7<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a storm of great wind; sea overflowed.<sup>166</sup>

In 1735 in the vicinity of Shanghai, *China*, a dragon destroyed dwellings, tore up trees and damaged [rice] paddies. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

**Winter of 1735 / 1736 A.D.** In January 1736, the winter was mild [in *England*]. There was scarcely any frost. There were continuous rains and many lives lost by floods.<sup>212</sup>

[During the winter of 1735/36 in *England*] “We had scarce any frost this winter; on the contrary such continued rain, that sheep, hares and venison, in some parts, dy'd [died] rotten; and many lives were lost by the floods. Perhaps it may be attributed to the dampness of the season, that the mushrooms gathered in the woods near Boulogne in *France* were so poisonous, that three persons who supp'd [suppered] thereon, dy'd [died] the same night, and a 4<sup>th</sup>, who only tasted them, was seized in a violent manner. In *Poland* they had so much frost, that the Vistula [River] was frozen over above [more than] a month; and the cold so severe, that the dogs were driven mad by it.”<sup>278</sup>

On 2 February 1736 a gale struck Ashby-de-la-Zouch in Leicestershire, *England*. The barometer fell to 28.39 inches. On 8 February, there was a great snowfall with a gale. On 21 February, there was another great snowfall. On 24 November, there was a gale.<sup>212</sup>

In 1736 in *England*, the snows were remarkably deep.<sup>41, 43, 56</sup>

**1736 A.D.** On 16 February 1736, there was a high tide [at London, *England*]. The River Thames rose 6  $\frac{3}{4}$  inches [17 centimeters] above the height of the great tide of 8 March 1726, being higher than anytime during the past 50 years.<sup>212</sup>

On 16 February, the tide of the River Thames in London, *England* rose so high that the counsel were carried out of Westminster Hall in boats.<sup>39</sup>

On 16 February 1736 in London, *England*, a question was carried in the House of Commons for building a bridge over the River Thames from Palace Yard to the Surry Side. “During the debate, that river overflow'd [overflowed] its banks by reason of a strong spring tide, the water was higher than ever known before, and rose above 2 foot in Westminster Hall; where the Courts being sitting, the judges &c. were obligated to be carry'd [carried] out. The water came into all the cellars and ground rooms, near the river on both sides, and flow'd [flowed] thro' [through] the streets of Wapping and Southwark, as it proper channel; a general inundation cover'd [covered] all the marshes and lowlands in Kent, Essex, Suffolk, Norfolk and Lincolnshire, and some thousands of cattle were destroy'd [destroyed] with several of their owners in endeavouring to save them. The tide being brought in by a strong wind at N.W. [northwest] was the highest in Lincolnshire of any for 135 years past; 17 breaches were made, about sun-rise, in the banks of the river between Spalding and Wisbech, with several between Wisbech and Lynn, and irreparable damage done; some graziers having lost all their cattle. At Clay in Norfolk, waters came over the Great Beach, almost demolish'd [demolished] the town, and left nine foot water in the marshes. At Gold-Ongar, Essex, Mr. Cooper, and four of his servants, were drowned in endeavouring to save some

sheep, the sea-wall giving way of a sudden. The little Isle of Candy and Foulness, on the Coast of Essex, were quite under water; not a hoof [animal with hooves?] was saved thereon, and the inhabitants were taken from the upper part of their houses into boats. The particular damages may be better conceived than related.”<sup>278</sup>

The River Thames in London, *England*, rose so high at Westminster, that the lawyers were brought out of the hall in boats.<sup>40</sup>

On 28 February 1736, *England* reported, “About the middle of this month we had hard frosts, and frequent snow, for about a fortnight: They had a great deal more in *Scotland*, where several persons were lost in the snow: And in *North Wales* very old men cou’d [could] not remember it so deep before.”<sup>278</sup>

In May 1736, there was an epidemic of smallpox at Nottingham, *England*. It raged with such violence that in the month of May, 104 people were buried in St. Mary’s churchyard. During 1736, the burials exceeded the births by 380.<sup>212</sup>

In May 1736, there was a great flood in Nottinghamshire, *England*. In July, the houses near the [River] Leen were two feet [61 centimeters] deep in water.<sup>212</sup>

In 1736, there were floods in *England*. “From the beginning of March [to 5 July] such continued rains, the like not known in ye memory of man. All the low meadows in ye kingdom floated [flooded], and the hay and corn [grain] carried away or spoilt. The damage done almost incredible. In Oxfordshire the meadows were floated for many miles. In three days 5 inches [13 centimeters] of rain fell”<sup>212</sup>

On 5 July 1736, *England* reported, from the beginning of the month, we had such continued rain, the like not known in the memory of man; insomuch that all the low meadows in the Kingdom were about this time floated [flooded], and the hay, corn, and grass thereon carried away, or spoiled. Some bridges and mills gave way, and the damage done almost incredible. In the parish of Tingwick, in Oxfordshire, a large tract of earth computed at about 6,000 loads, with a hedge and several large trees thereon, was carried by the violence of the torrent across the channel of the river, by which means the current was entirely stopped, and the meadow floated for many miles.<sup>278</sup>

In 1736, the price of wheat [in *England*] averaged 40 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

February – a close [overcast] cold winter. February 28<sup>th</sup> – it looked promising for a forward spring. March 15<sup>th</sup> – severely cold. April 10<sup>th</sup> – a hot day. April 11<sup>th</sup> – the spring looks promising. April 17<sup>th</sup> – we dug the lower garden, and sowed carrots, parsnips, etc. May 29<sup>th</sup> – it was through the whole month, except one week, cold and raw. July 9<sup>th</sup> – sowed turnip seed. The fowls and chickens have destroyed the grasshoppers. July 25<sup>th</sup> – it was a wonderful year for grass. August – cold weather the last of this month. September – it has been very dry all this month. November 3<sup>rd</sup> – we pulled up all our turnips. Fine weather. December 30<sup>th</sup> – hardly any winter yet.<sup>78</sup>

The summer of 1736 in Paris, *France* was characterized by:

Hot days	62 days
Very hot days	4 days
Extremely hot days	2 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The hot days were broken down to: 7 in May, 11 in June, 21 in July, 18 in August and 10 in September.<sup>62</sup>

In Algiers, *Algeria* from May to October, the following weather was observed:<sup>62</sup>

Hot days	124 days
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Very hot days                      41 days

The peak temperatures observed this year:

Paris, <i>France</i>	( 98.6° F, 37.0° C) on 30 July
Utrecht, <i>the Netherlands</i>	( 93.9° F, 34.4° C) on 24 July
Algiers, <i>Algeria</i>	( 92.8° F, 33.8° C) on 15 July and 5 August

In Dijon, *France*, in Burgundy, the grape harvest began on 17 September. The harvest was low but the wine quality was pretty good.<sup>62</sup>

On 14 September 1736, Constantinople [now Istanbul, *Turkey*] reported. “About two [o’clock] in the afternoon, the horizon over the city was cover’d [covered] with a thick cloud and as dark as at midnight, in the midst of the cloud a bright star appeared, of the colour of blood, and took the form of a comet with a long train. The star remain’d [remained] 35 minutes in the same situation, and about 4 [o’clock] the darkness dispers’d [dispersed], and left a stinking fog which remained till midnight.”<sup>278</sup>

Around September 1736, Petersburg [Saint Petersburg, *Russia*] reported, “A great fire has happen’d [happened] there, by which 2000 warehouses and dwelling-houses, with the post-office and shambles, and several noblemen’s palaces were reduc’d [reduced] to ashes; orders were given for rebuilding the houses at a greater distance, *viz.* instead of 3 into 2 streets, and those 30 foot wide. The roads of Livonia [now *Latvia* and *Estonia*] and *Finland*, having taken fire thro’ [through] the excessive heat of the weather, the smoke of them cover’d [covered] the country, and reached even to Muscow [Moscow].”<sup>278</sup>

On 7 October 1736, *England* reported “a great storm did considerable mischief [damage] to our shipping, but was in *France* much more violent.”<sup>278</sup>

On 9 October 1736, a gale struck *England*. The great storm did considerable damage to the shipping, but in *France* it was much more severe.<sup>212</sup>

On 12 November 1736 at Edinburgh, *Scotland*, there was a great northwest gale. From 12 to 18 November, there was an intense frost. It was so severe that in 24 hours after it began, persons were walking on the [frozen] lake.<sup>212</sup>

On 20 December 1736, there was a gale [in *England*].<sup>212</sup>

On 24 December 1736 at London, *England*, there was a very high tide. The River Thames flowed into Westminster Hall.<sup>212</sup>

On 24 December 1736 in London, *England*, “this morning at 5 [o’clock] by a very high tide the [River] Thames flowed into Westminster-Hall, broke down the bank above the horse-ferry, and did great damage in the gardens, meadows, and cellars thereabouts. In the afternoon it was high water again at two o’clock, being at London Bridge 2 hours sooner than usual. A breach was made a little below the old one near Dagenham, in Essex, and great tracts of land laid under water.” At this time, his Majesty was at sea in a great storm. Concern for his safety was relieved when it was reported on the 26<sup>th</sup> that he had safely landed onshore.<sup>278</sup>

In 1736, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch’ao-yang. Also in the same year, floods struck Hupeh (now Hubei province) in central *China* at Chung-hsiang, Han-ch’uan, Chiang-ling, Mien-yang and T’ien-mên. During the period between 7 August and 4 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo and Ch’ing-yüan.<sup>153</sup>

**Winter of 1736 / 1737 A.D.** The winter of 1736-37 was very severe near the foot of Horrilakero [a mountain consisting of a reddish stone, interspersed with white crystals of an oblong form] in Lapland [*Finland*]. “The cold was fo [so] extreme in December 1736, that whenever we would taftē [taste] a little brandy, the only thing that could be kept liquid, our tongues and lips froze to the cup, and came away bloody. The froft [frost] even congealed the fingers of fome [some] of us, and threatened us with yet more difmal [dismal] accidents. While the extremities of our bodies were thus freezing, the reft [rest], thro’ [through] exceffive [excessive] toil, was bathed in fweat [sweat]. Brandy did not quench our thirt [thirst]; we muft [must] have recourfe [recourse] to deep wells dug thro’ [through] the ice, which were fhut [shut] almoft [almost] as foon [soon] as open, and from which the water could fcarce [scarce] be conveyed unfrozen to our lips; and muft [must] thus run the hazard of the dangerous contraft [contrast] which icy water might produce in our heated bodies. Judge what it muft [must] be to walk in fnow [snow] two foot deep, with heavy poles in our hands, which we were continually laying upon the fnow [snow], and lifting up again.” In the town of Tornea in the month of January, the cold was increased to the extremity, that Mr. Reaumur’s mercurial thermometer, which at Paris, in the great frost of 1709, it was thought strange to see fall to 14 degrees below the freezing point [0.5° F, -17.5° C], were now got down to 37 [-51° F, -46° C]. The spirit of wine in the others was frozen. If we opened the door of a warm room, the external air instantly converted all the vapor in it to snow, whirling it round in white vortexes. If we went abroad, we felt as if the air was tearing our breasts in pieces. And the cracking of wood, whereof the houses are built, as the violence of the cold split it, continually alarmed us with an approaching increase of cold. During our whole stay in the frigid zone, the cold was so excessive, that the 7<sup>th</sup> of April 1737 at five in the morning, the thermometer was fallen to twenty divisions below the point of freezing [-13° F, -25° C].<sup>227</sup>

In Philadelphia, Pennsylvania in the *United States* the winter of 1736 was intensely cold and many people perished.<sup>1</sup>

In Philadelphia, Pennsylvania in the *United States* the winter of 1737 was intensely cold and many people perished.<sup>1</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1737 on January 2<sup>nd</sup> - 'Tis thought the ground was frozen four-feet (1.2 meters) deep. January 3<sup>rd</sup> – there is no wood, little corn; sad complaints everywhere. January 4<sup>th</sup> – Corn has been secured but the grain mills are inoperative [because the water is frozen]; people know not what to do. January 11<sup>th</sup> – it snowed all day. January 16<sup>th</sup> – a level snow of about eight-inches (20 centimeters) but turned to rain. January 17<sup>th</sup> – glare of ice. January 18<sup>th</sup> to 22<sup>nd</sup> – snow. January 27<sup>th</sup> – more snow.<sup>78</sup>

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**1737 A.D.** On 9 January 1737, there was a great gale at Bristol in southwest *England*. In the evening, and for some hours in the night, such a violent storm of wind, rain and hail that the like has not been felt since the great November storm of 1703, the water rising within 4 or 5 inches [10-13 centimeters] of this mark [high water mark]. The lowlands in Gloucestershire and Somersetshire, and in Barton Regis overflowed [flooded], and abundance of sheep etc. were drowned. The freshes of water (rain and hail) joined to the tide, flooded and did incredible damage in Bristol. A public house, and the sea wall for 200 yards [183 meters] were carried away. At Redwick and Chitnen, 800 sheep were drowned. At Upton-on-Severn [Upton-upon-Severn], many trees were blown down. There was a great deal of thunder and lightning. In Bridgewater, the floods went into the houses. At Highbridge, many hundred acres of land overflowed and a great number of sheep drowned. At Thornbury, there were destructive floods. At Chepstow, the water rose 70 feet [21 meters]; one man lost 130 cattle. The damage in Bristol was estimated at £100,000 [£13.6 million in today’s currency using the retail price index inflation rate].<sup>212</sup>

On 13 March 1737, there was a violent gale off *Ireland*. A sailing ship traveling from Cork to Nevis was two days out of port when it encountered this storm.<sup>212</sup>

In March 1737, Proske, near Rosenberg in *Poland* reported, “That a famine raged in those parts, and that a woman had her head cut off for killing and eating her own infant. That a peasant and his family were taken up for having consumed the flesh of 2 small children, and another 12 years old.”<sup>279</sup>

In April 1737, an expedition into the northernmost part of *Lapland* in search of an ancient monument [with prehistoric writing] commented, “During the winter, while the snow continues in separate particles like dust, the deer [reindeer] will spurn it away to get at the moss [which they eat], which they scent at the depth of 5 or 6 feet [1.5-1.8 meters], but the surface of the snow having now been thawed and again frozen, was become a solid cake of ice, which, when the deer stopped, the Laplanders were obligated to break for them, and indeed this is the only way in which they reward an animal that affords them almost all the necessaries and conveniences of life. The milk of this creature [rain deer or reindeer], which is a little acrid, but as rich as the cream of cows milk, they keep in cakes, for when it is frozen it will continue good a long time. They also make it into cheeses, which would be excellent if the skill was equal to the material. The skins afford them great variety of garments. Those of the young, of which the hair is very soft, yellowish, and a little curled, are used for linings; the colour afterwards becomes brown, and the hair stronger; the skin then serves for a warm and light covering, with the hair on the outside, called lappmudes [gowns made of reindeer skin]. When the deer is yet older, the skins are used for gloves and belts. The guts are spun out into thread, with which the several parts of these garments are sowed together. The flesh, which is excellent, they eat, either fresh or dried, and the horns they sacrifice to their deities.”<sup>300</sup> [An interesting symbiotic relationship]

In May 1737, Copenhagen reported, “That the sickness in *Poland*, occasioned by the misery of that country, and the extreme dryness of the season increasing daily, and having reached to Dantzick [now Gdańsk] and other places upon that coast, the Danish Court apprehending it may prove infectious, have forbid communication with the places infected.” This drought may have also played a part in several fires, which occurred at that time. “The town of New Brandelburgh [Neubrandenburg, *Germany*], in the Dutchy of Stargard, has been burnt to ashes. And that a fire had happened at Jenekoping [Jönköping], a city in *Sweden*, which reduced the castle, church, and many fine buildings to ruins: the magazine took fire, and was burnt in half a hour: the ammunition sufficient for 40,000 men blew up, and gave a most terrible shock.”<sup>279</sup>

On 21 May 1737, a hurricane struck the Road at the Cape of Good Hope [*South Africa*] and as a result 8 out of 9 homeward bound East-India ships were lost.<sup>279</sup>

During the summer of 1737, several dreadful fires occurred. [These in part may be related to the dryness of the season.] *Panama* in the Spanish West Indies was entirely destroyed. Twelve thousand houses and palaces at Moscow, *Russia* were destroyed by fire. Two thousand five hundred houses at Jaroslaw in Muscovy [Jaroslaw, *Poland*] were destroyed by fire. The fires at Moscow and Jaroslaw were believed to be set by the Turks who also apparently tried to also set fire to Saint Petersburg without success.<sup>279</sup>

As recorded on 7 June 1737, there was a thunderstorm at Birr, *Ireland* during the previous week. “Last week the greatest lightning that has happened for many years.”<sup>212</sup>

On 21 June 1737, there was a great drought in the west of *England*.<sup>212</sup>

On 28 June 1737, there was a plague of gnats (small stinging flies) at Gravesend, *England*. They were so troublesome, that smoky fires had to be lighted to drive them away. Then on 9 July, there was such a cloud of these small flies that the inhabitants of Barnet in Middlesex, could not see across some of the streets. They stained the wearing apparel of passers-by. At Gravesend, the little black flies lay so thick on the surface of the River Thames that for a great way it looked black. The leaves of the trees and plants



were also black. On 1 August 1737, there was a plague of ladybirds [Coccinellidae or ladybugs] at Erith in Kent. They formed incredible swarms and were never before seen in such abundance. The ground and plants were completely covered with them.<sup>212</sup>

In 1737, the price of wheat [in *England*] averaged 38 shillings per quarter [quarter ton].<sup>212</sup>

The summer of 1737 in *Italy* was excessively hot. The summer of 1736 in Paris, *France* was characterized by:

Hot days	45 days
Very hot days	10 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperature occurred on July 21; namely 91.6° F (33.1° C). The year was dry. In Paris, the annual rainfall was only 427 mm (16.8 inches). In Dijon, *France*, in Burgundy, the grape harvest took place from 16 to 23 September. The grape production was very low because the vines were twice hit by a hailstorm; on 6 June and 30 August.<sup>62</sup>

On 2 July 1737, there was a thunderstorm at Bristol, *England*. It was very violent in the evening. The rain fell for 45 minutes heavier than ever remembered before.<sup>212</sup>

On 2 August 1737, there was a violent gale with great rainfall at London, *England*. Innumerable trees torn up by the roots, chimneys blown down, and ships sunk in the River Thames. At Tunbridge Wells [Royal Tunbridge Wells] on 3 August, there was a great flood. On 4 August, there was a thunderstorm at Walton-on Thames.<sup>212</sup>

On 3 August 1737, a terrible hurricane with winds at north blew down an abundance of trees [in *England*] and several ships from anchor.<sup>279</sup>

On 9 September 1737 between 4 and 5 o'clock in the evening, a most dreadful hurricane that was ever remembered in these parts struck the Isle of Cows on the coast of St. Domingo [now *Haiti* and the *Dominican Republic*] in the West Indies. "The town of St. Louis was entirely levelled with the ground, except the church and two houses, those of the Fort St. Louis were blown down; the ships at anchor under that fort were thrown upon the coast, or foundered on their anchors, and several persons were drown'd; all the sugar canes and cotton-trees are destroyed. The master of a ship from St. Eustasia [*Sint Eustatius*] reports, that when he left that coast, he saw above 20 boats perish, that the town is almost all blown down, and the country ruined. The thunder and lightning fell in several places, and burnt divers [diverse] ships and magazines."<sup>280</sup>

On 9 September 1737, a hurricane struck the *Dominican Republic*. The hurricane carried away Negroes into the sea. Several persons were drowned near Fort St. Louis.<sup>141</sup>

During the evening of 9 September 1737, the town of St. Louis in Saint Domingo, was entirely destroyed by a hurricane. All the sugar canes and cotton trees were destroyed, and all the ships at anchor there were thrown upon the coast.<sup>143</sup> [Saint-Domingue (in French) or Santo Domingo (in Spanish) was a French colony on the Caribbean island of Hispaniola that in 1804 became the independent nation called *Haiti*.]

Heavy rains from 28 September to 3 October 1737 caused floods that did great damage at St. Ives, Huntingdon, and Ely, *England*.<sup>212</sup>

In September 1737, there was a cattle plague in Nottinghamshire and Lincolnshire, *England*. Upwards of 40,000 cattle died in these two counties.<sup>212</sup>

On 30 September 1737, a furious hurricane struck the Bay of Bengal in *India* and *Bangladesh*. The hurricane “attended with heavy rain, which raised 15 inches [38 centimeters] of water in 5 hours, and a violent earthquake, which threw down abundance of houses; and as the storm reached 60 leagues [180 miles, 290 kilometers] up the River Ganges, it is computed that 20,000 ships, barks, sloops, boats, canoes, &c. have been cast away. A prodigious quantity of cattle of all sorts, a great many tygers [tigers], and several rhinoceroses were drowned; even a great many caymans [a reptile similar to alligators and crocodiles] were stifled by the furious agitation of the water, and an innumerable quantity of birds was beat down into the river by the storm. Two English ships of 500 tons were thrown into a village above 200 fathom [1200 feet, 366 meters] from the bed of the River Ganges, broke to pieces, and all the people drowned pell-mell among the inhabitants and cattle. Barks of 60 tons were blown two leagues [6 miles, 10 kilometers] up into the land over the tops of high trees. The water rose in all 40 foot [12 meters] higher than usual. The English ships drove ashore, and broke to pieces, were the *Decker*, *Devonshire*, and *Newcastle*; and the *Pelham* is missing. A French ship was drove on shore, and bulged; after the wind and waters abated they opened their hatches, and took out several bales of merchandize, &c. but the man who was in the hold to fling the bales suddenly ceased working; nor by calling to him, could they get any reply; on which they sent down another, but heard nothing of him, which very much added to their fear; so that for some time no one would venture down. At length one more hardy than the rest, went down, and became silent and unactive [inactive] as the two former, to the astonishment of all. They then agreed by lights to look down into the hold, which had a great quantity of water in it, and to their great surprise, they saw a huge alligator sta[?] in thro’ [through] a hole in the ship’s side, and ‘twas with difficulty they killed it; when they found the three men in the creature’s belly.”<sup>280</sup>

On 11 October 1741 [Misprint, should be 1737], there was the most awful and destructive storm in *India*, which was ever experienced. It was computed that three hundred thousand persons perished on the land and water. The water rose 40 feet (12 meters) higher than ever before known. It was also computed that more than a thousand vessels were lost, and among them eight English East India ships, with all their crew.<sup>1</sup>

At the mouth of the Ganges River in *Bangladesh/India*, there was a great storm causing 20,000 vessels of different kinds to be cast away, eight English East-India ships, and 300,000 people were lost, and the water rose forty feet higher than usual on October 11, 1737.<sup>40, 41, 43, 56</sup>

A great storm struck *India* on 11 October 1737. Many hundreds of vessels cast away; a fleet of Indiamen greatly damaged. Some 30,000 persons are believed to have perished.<sup>47, 57, 90</sup>

In 1737, the Hooghly River Cyclone struck *India* and *Bangladesh* causing 300,000 deaths.<sup>98</sup>

In October 1737, a hurricane struck St. Kitts in the *West Indies* and Montserrat in the *Leeward Islands*. An English merchantman was sunk at Basseterre, St. Kitts and only one of the crew survived. At Montserrat, the storm carried away Negroes into the sea.<sup>141</sup>

In 1737, a hurricane did great damage at St. Kitts and Montserrat. At Montserrat, it blew down all the windmills and houses and carried away mules, Negroes, and cattle into the sea. The sugar canes were all destroyed.<sup>143</sup>

In October 1737, it was reported in England “there was lately a terrible hurricane at *Montserrat* and *St. Kitts*, in which Capt. Sutton’s ship was lost, with the crew except one man, and 50 hogshead of sugar. At *Montserrat* the storm was so violent, that it blew down and washed away all the windmills, houses and sugar-houses, and carried [carried] away mules, negroes and cattle into the sea, the sugar-canecanes were all

destroy'd [destroyed], and had the hurricane continued 6 hours longer, the whole island must have been wash'd [washed] away." <sup>279</sup>

On 18 October 1737 at Canterbury, *England*, the River Stour had a higher flood than for the past 30 years. <sup>212</sup>

In 1737 in Sheffield in Yorkshire, *England*, the weather was very changeable. The summer was dry. August was as cold as winter. September was very changeable. In October, there was much catarrh [inflammation of mucous membranes]. In November, there was fatal diarrhea. <sup>212</sup>

On 1 December 1737, there was a violent gale at London, *England* that did much damage. <sup>212</sup>

On 16 December 1737, there was a violent gale at Margate, *England*. <sup>212</sup>

In 1737, a drought engulfed several regions of *China* including: <sup>153</sup>

— During the period between 5 February and 8 August, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Yü-t'ien.

— During the period between 31 March and 29 April, a drought engulfed Hopei province at An-tz'ü [uncertain name, "Tung-an"] and Kansu (now Gansu province) in northwest *China* at Hui-ning. Crops were damaged by the drought.

— During the period between 28 June and 26 July, a drought engulfed Hupeh (now Hubei province) in central *China* at Hanyang, Huang-p'o, Hsiao-kan, Huang-kang and Ma-ch'êng.

— During the period between 24 September and 23 October, a drought engulfed Hopei province at Huo-lu, Luan-ch'êng and P'ing-shan.

In 1737, floods struck many regions of *China* including: <sup>153</sup>

— During the period 1-30 March, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Yüeh-ch'ing, Wên-chou and Shui-an.

— During the period between 29 May and 27 June, floods struck Anhwei (now Anhui province) in eastern *China* at Shou and Hupeh (now Hubei province) in central *China* at Huang-kang.

— During the period between 27 July and 25 August, floods struck Hopei (now Hebei province) in northern *China* at Wu-ch'iang, Jao-yang, Huo-lu, Luan-ch'êng, P'ing-shan, Ching, Jung-ch'êng, Hsien, Hsin-yüeh, Kao-i and Peiping; and Shantung (now Shandong province) on the east coast of *China* at Hsin and Liao-ch'êng.

The year 1737 was a year of abundance in the vicinity of Shanghai, *China*. Some stalks had double, others four or five heads. <sup>166</sup>

In *Italy* and *Spain*, the frost was very severe; none in Holland [now *the Netherlands*] or *Germany*. <sup>47, 93</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January 31<sup>st</sup> – pleasant. February – rains and pleasant weather alternately. March 5<sup>th</sup> – it is a melancholy time in regard to the scarcity of corn; some have had none for several weeks. March 26<sup>th</sup> – it was a very backward spring indeed. March 30<sup>th</sup> – spring like day; the trees hardly beginning to bud. All the talk in Boston is about the mob that pulled down the market. [There was a great scarcity of provisions at that time in Massachusetts as well as in the whole eastern country. Much distress prevailed in Boston in the spring of the year, and this outbreak was probably occasioned by high prices and the exactions of the market people.] April 2<sup>nd</sup> – the gooseberry bushes look quite green. April 11<sup>th</sup> – snowed all day. April 18<sup>th</sup> – cloudy and cold. April 20<sup>th</sup> – it looks no more like spring than it did a month ago. No plowing or gardening yet. April 21<sup>st</sup> – all the talk is – no corn, no hay, and there is not a peck of potatoes in all the eastern country. April 25<sup>th</sup> – there is no grass at all. May 2<sup>nd</sup> – we sowed our peas, and lower garden. May 4<sup>th</sup> – a multitude of creatures were not able to get up; many have died [because of starvation]. May 9<sup>th</sup> – warm today. May 10<sup>th</sup> – the whole neighborhood without milk. May 17<sup>th</sup> – the grass hasn't grown because of a

lack of rain. May 20<sup>th</sup> – a joyful, seasonable rain. May 24<sup>th</sup> – very pleasant. June 4<sup>th</sup> – corn is 10s. a bushel in Boston; hardly any to be got. July 18<sup>th</sup> – there never was, in the memory of man, more seasonable weather. July 20<sup>th</sup> – grass is very thin. July 22<sup>nd</sup> – no feed on the Neck [peninsula]. July 27<sup>th</sup> – grasshoppers plentiful. August 8<sup>th</sup> – the grass began to shoot. September – various weather this month, but on the whole a fine season for the corn to dry. October 10<sup>th</sup> – cold. October 19<sup>th</sup> – fine weather. October 23<sup>rd</sup> – it was never known to be so dry. No sawing nor grinding. [The rivers were so dry that the water mills could not grind the grain nor saw lumber] November 5<sup>th</sup> – there has been some rains. November 24<sup>th</sup> – no grinding; we had a bag of corn go from mill to mill, for about two months, and not ground yet. December 18<sup>th</sup> – it was remarkable that there had been no northwesterly winds this fall or winter.<sup>78</sup>

In 1736, Charles Marie de La Condamine traveled to *Peru* [and *Ecuador*] to measure the degree of the Meridian in order to determine the shape of the Earth [the study of geodesy that showed the earth's shape to be that of an oblated spheroid, rather than perfectly round sphere]. He observed that on the top of their high mountains a unique atmospheric phenomenon is every day to be seen. The first time that M. Bouguer, and his company [Bouguer and Condamine teamed together between 1737 and 1741] remarked it, they were together on a mountain, called Pambamareca [Pambamarca – elevation 13,500 feet, 4,100 meters], somewhat lower than Pichinca [Guagua Pichincha – elevation 15,696 feet, 4,785 kilometers]. Upon the dissipation of a cloud, in which they had been involved, they perceived the sun rising, which shone very bright. The cloud passed to the side of them, which was furthest from the sun, and each one saw his own shadow projected upon it, and his own only, because the surface of the cloud was irregular. The cloud was so near them that they could distinguish all the parts of the shadow, the arms, the legs, and the head. But their astonishment was greatly increased, when they perceived the head to be adorned with a glory, or aureolus [golden, splendid, magnificent], formed of 3 or 4 little concentric crowns, of very vivid colors each, with the same variety as the primary rainbow, red being the outermost. The intervals between these circles were equal, the last was the faintest. And at a great distance they perceived a large white circle, which surrounded the whole figure. This was a kind of apotheosis [glorification] of each spectator, and every one enjoyed a sensible pleasure in seeing himself adorned with all these crowns, without perceiving those of his neighbors. The diameter of this iris increased every moment, and the circle appeared interrupted and broken on those parts of the clouds, the particles of which were frozen.<sup>295</sup> [This phenomena is referred to as a *Brocken Spectre* with halo-like rings of a *Glory*]

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**1738 A.D.** On 2 January 1738, there was a gale at Bristol, *England*. Such a violent storm of hail, wind, and rain, that the like has not been known, nor the water so high since November 1703. A great number of people and sheep drowned.<sup>212</sup>

On 9 January 1738 in *England*, it was reported, “This evening happened such a violent storm of hail, wind, and rain at Bristol, that the like has not been known, nor the water so high since Nov. 1703. Several ships were drove ashore on the marshes, the low lands on Gloucestershire and Somersetshire sides were overflowed by the rapidity of the tide joined with the freshes [freshets], and great numbers of sheep lost, and several garden walls broken down; also incredible damage done in the city by overflowing streets, cellars, and houses. The 3 Horse-Shoes, a publick-house [tavern], was carried away by the torrent, with all the goods, and barrels of liquor, but the people saved their lives. Several persons were drowned, but particularly at Thornbury, on P. Beasy lost his wife, 5 children, and 2 servants, but saved his own life by sitting upon the ridge of his house till morning, when a boat took him off.”<sup>280</sup>

On 4 January 1738, there was a severe thunderstorm with a sudden violent wind at Bath, *England*. It destroyed the Walcott church.<sup>212</sup>

On 14 January 1738, there was a violent gale at *Scotland*. At Edinburgh, from midnight until 4 a.m., much damage was done. Many [ship] wrecks in *Scotland*, and several churches were blown down. At Aberbrothwick, a church was destroyed. At Inverary, the gale was very violent. At Cambelton, 20 houses were blown down. At Perthshire and Dundee, there was great damage. Along the North Road,

nothing was seen but the ruins of houses. In the Isle of Mull, several towns did not have a house standing. At Newcastle, from 1 a.m. until 5 a.m., there was great damage. The roofs of houses were blown away. There was no storm of such fury for many years.<sup>212</sup>

On 25 January 1738, there was a gale at Deal in Kent, *England*. On 2 February, there was a gale at London.<sup>212</sup>

On 27 February 1738 in Dublin, *Ireland*, there was a great hailstorm accompanied by thunder and lightning.<sup>93</sup>

In June 1738, two men fell dead from only the influence of heat [heatstroke] on the streets of Charles Town, [in the *United States*]. On that day the thermometer rose to 29.3° Reaumur in the shade (36.7° C, 98° F). Many slaves died on the same day in the countryside where they worked. [Benjamin] Franklin said it is not rare in Pennsylvania to see on hot summer days the harvesters drop dead in masses while they are cutting [the fields].<sup>58,80</sup>

In June 1738 in South Carolina in what would become the *United States*, the temperature rose to 98° F [37° C] in the shaded air. In the sun, the temperature was closer to 126° F [52° C]. Two men in the streets dropped suddenly dead; as did several slaves who were at work in the rice fields, whose face, necks, breasts and hands immediately became livid.<sup>295</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January – the month came in warm, like the beginning of April. January 23<sup>rd</sup> – two things are remarkable, relative to the wind, for several months past; one is, that the wind always comes about with the sun. The other, that after foul weather, the wind comes as far as the southwest and except once or twice, no further. February – the former part of the month cold. The last half, fair, pleasant and moderate weather. March – plenty of hay, corn, etc.; a vast difference on this account between last spring and this spring. March 27<sup>th</sup> – the frost is generally out of the ground. It looks likely for a forward spring. April 11<sup>th</sup> – Jack dug the lower garden. April 14<sup>th</sup> – unusually hot weather. The spring is thought to be two or three days forwarder than the last. May – pleasant. We finished planting potatoes today. May 15<sup>th</sup> – hot weather. May 23<sup>rd</sup> – fine, pleasant day. May 29<sup>th</sup> – abundance of rain. July 7<sup>th</sup> – grasshopper. The drought came on very severely, and prevailed in such a manner, as the like was never known. September 3<sup>rd</sup> – more raccoons, jays, and red squirrels than ever was known. The weather this month generally pleasant. November 5<sup>th</sup> – there was, I think, more grass now than in the summer. November 23<sup>rd</sup> – cold weather. November 27<sup>th</sup> – snow last night, but fair and moderate today. December – frequent snows this month, but turned to rain, and the latter part of the month remarkably slippery.<sup>78</sup>

The summer of 1738 in Paris, *France* was characterized by:

Hot days	49 days
Very hot days	1 day
Extremely hot day	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperature in Paris of 98.4° F (36.9° C) took place on 5 August. The year was dry, which can be seen by the annual rainfall in Paris of only 399 millimeters (15.7 inches). In Dijon, *France*, in Burgundy, the grape harvest began on 29 September. It was very poor harvest, but the season produced pretty good wines.<sup>62</sup>

On 25 July 1738 in *England*, there was a great hailstorm in Bedfordshire, Middlesex and Suffolk.<sup>93</sup>

On 25 July 1738, there was a dreadful thunderstorm at Dunstable [Dunstable Downs], *England*. Many windows were shattered by hailstones as big as walnuts. At Uxbridge, the hailstones were bigger, and several persons were wounded. The tiles of houses and the branches of trees were broken. This storm



was also felt at Watford, Bushby, and St. Albans, at about noon. A similar storm 3 or 4 hours later occurred at Bungay in Suffolk, where turkeys and poultry were killed in great abundance. It was violent at Islip in Oxfordshire. It also struck Marlborough and Newbury. At Reading, there was much damage to houses and windows.<sup>212</sup>

On 25 July 1738, “about noon a dreadful storm of thunder, lightening [lightning], and hail, happened at Dunstable [in Bedfordshire, *England*], which put the whole town in the utmost consternation. A house opposite to the sign of the Sugar Loaf was fir’d [fired] and shatter’d to pieces by the lightening; the people were apprehensive of the fire spreading throughout the town and brought forth the [fire] engine; but no farther damage was done: except the shattering a great many windows by the hail-stones, which were as big as walnuts. At Uxbridge the hail-stones being bigger, wounded several people, and broke not only the windows, but the [roof] tiles of the houses, and tore off the branches of trees. This storm was felt also at Watford, Busby, St. Albans, and places adjacent in Hertfordshire. Between three [three] and four a-clock [o’clock] in the afternoon, they had a like storm of hail, about Bungay, in Suffolk, preceded by an uncommon clap of thunder. The windows of the churches were shatter’d, the corn [grain] laid flat, turkeys and other poultry kill’d in great numbers.”<sup>280</sup>

In 1738, the price of wheat [in *England*] averaged 35 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

On 5 August 1738, there was a thunderstorm at Harlow in Essex, *England*.<sup>212</sup>

In 1738, there was a great drought from August through 7 September at Sheffield in Yorkshire, *England*.<sup>212</sup>

In September 1738, Cranborne in Dorsetshire, *England* reported, “The 29<sup>th</sup> of last month at five in the afternoon, was seen near this place a surprising meteor, or phænomenon in the sky to the north east, the sun shining bright. It first appear’d as fire bursting from behind a cloud, out of which fire issued a light glowing ball, with a train of flame behind it, which quickly disappeared. The same was seen at Wells in Somersetshire; also at Tupton in Derbyshire about the same time; it did not come from behind a cloud, for the sky was quite free from clouds, and the sun shin’d very clear; it appear’d like a cone of fire, which terminated in a sharp point, with a bright nucleus or a ball at its thicker end, which seem’d to burst and go away in a great flame. It was a most south east. At Reading, and 15 miles [24 kilometers] round, (the same time) an astonishing noise was heard in the air, when it was quite serene. The crack which was very sudden and violent was succeeded by a rumbling noise for the space of a minute. This phænomenon by its description from different parts, perfectly agrees with what happen’d in the month of March 1719, and was very dreadful and surprising to the western parts of *England*; and is that sort of meteor which naturalist call *Draco Volans*, or, a flying dragon.”<sup>280</sup>

In 1738 during the period between 20 March and 14 August, a severe drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Yen-ch’êng. During the period between 6 May and 8 August, a drought engulfed Kiangsu province at Wu-chiang and Huai-yin. During the period between 13 October and 11 November, a drought engulfed Kiangsu province at Wu-chin and Yen-ch’êng.<sup>153</sup>

In 1738 during the period between 15 August and 13 September, floods struck many regions of *China* including:<sup>153</sup>

- The Sang-kan River in Hopei (now Hebei province) in northern *China* and Shansi (now Shanxi province) in northern *China*. The crops in 190 villages were damaged by the floodwaters.
- Hupeh (now Hubei province) in central *China* at Huang-kang and Ma-ch’êng.
- Hopei province at Pai-hsiang, Su-ning, Ts’ang, Wu-ch’iang, An-tz’ü, Hsien, Hsing-t’ai, Shen-tsê and Wu-chi.
- Honan (now Henan province) in central *China* at Hsin-an [uncertain name].



— Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Jao-p'ing.

— Szechwan (now Sichuan province) in southwest *China* at Sui-ning and Ho-chiang.

In 1738 during the 10<sup>th</sup> moon on the 5<sup>th</sup> day in the vicinity of Shanghai, *China*, there was a storm with violent wind from northwest. Flocks of sea birds filled the sky; the storm devastated the grains for over a month and then dispersed.<sup>166</sup>

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**1739 A.D.** On 4 January 1739, there was a violent gale with thunder, lightning, hail and rain at Bristol and Bath, *England*. A great number of trees were torn up by the roots and many others twisted off at their trunks. At Bath, the flood was so great that boats came up the streets. In most parts of the kingdom, the waters overflowed the roads so as to make them impassable. This storm was also felt in Paris, *France*.<sup>212</sup>

On 4 January 1739, “in the morning was a most violent storm of thunder, lightning, wind and rain, whereby great numbers of trees were tore up by the roots, many twisted off at their trunks, and numbers of boats staved [broken] in the river. At Bristol [*England*] the same time, the thunder-claps were astonishing, and the vehement showers of rain and hail attended with boisterous gales of wind, swell'd the river to that height, as to make its way against the tide of flood with a full torrent. At Bath, was so great a flood, the boats came up the street and the cellars were filled with water. The lead on a church [roof] by a gust of wind was [was] rolled up from the eaves to the top, and the building so shaken, as to make it unsafe to assemble therein; the floods also set a new-built house on fire, by falling in among some sacks of stone lime. In most parts of the Kingdom the water overflow'd the roads, so as to make them unpassable. The same storm was felt at Paris [*France*], where the lightning beat down the steeple of a church, in be burnt a cottage.”<sup>281</sup>

In South Carolina in what would become the *United States* on January 1739, the temperature fell to 19° F [-7.2° C].<sup>300</sup>

On 14 January 1739, “happen'd at Edinburgh [*Scotland*] a dreadful hurricane of wind, which continued with great fury from one to four [o'clock] in the morning, whereby the high-built houses of that city receiv'd considerable damage. The leads which cover'd the stately buildings in the Parliament close were carry'd off the roofs, some upwards of 40 feet [12 meters] in dimension; the Canon-Gate Church suffer'd extremely, and its portico almost demolished; the buildings in the Castle were very much damaged, their fine lead coverings carry'd off, and thrown upon the rocks, and the magazine ruin'd. At Glasgow several ships drove ashore, and are very much damag'd, and two were cast away; the North Coast betwixt Roseneth [Rosneath] and Glasgow, is full of gabarts and small boats drove up among the corn land. In the Merse few houses are less undestroy'd, several churches are blown down, numbers smother'd in the ruins, and an universal havock [havoc] made amongst their sheep and cattle; at Dumfries, the fine church was unroofed, and the high steeple much damag'd; at Dysart a woman in labor, attended by the midwife and neighbours were all killed by the falling in of the house. At Londonderry [*Ireland*] the storm was observ'd to begin and end with the eclipse of the moon, raging with the same violence and doing a vast deal of damage to houses; at Dublin, it threw down 3 chimnies [chimneys] belonging to the Ld [Lord] Chief Justice Reynolds, blew down a corner of the Deanery House belonging to Christ-Church, the front of a house in Francis-street, and almost innumerable chimnies [chimneys].”<sup>281</sup>

On 14 January 1739, there was a dreadful gale at Edinburgh, *Scotland*, that continued from 1 to 4 a.m. The storm did much damage to the roofs of houses. At Glasgow, several ships were driven ashore. The north coast of *Scotland* between Glasgow and Roseueth [Rosneath] was full of gabarts and small boats, drove up amongst the cornland. In Merse, few houses are left undestroyed, several churches are blown down, numbers of people were smothered in the ruins, and caused universal havoc among the sheep and cattle. The storm was also violent at Dumfries, *Scotland* and Dysart, Londonderry, and Dublin,

*Ireland.*<sup>212</sup>

In January 1739, “a ship being off the Capes of Virginia [in what would become the *United States*], with Palatines from Germany [Palatinate region of Germany] in great distress for want of provisions, and not knowing the Bay, drop’d anchor, and fired several guns for a pilot to come off; but the weather being bad, and much ice floating, none came: whereupon a German gentleman was on board took his son and daughter, and several other passengers, (to the number of about thirty) in the longboat, and went on shore to see if they could get some provisions for their relief; but not finding a house, they made a fire in the woods, and sat by it all night; the weather being extreme cold, there were but four of them alive next morning: several of them were gentlemen of good estates, and had gold watches in their pockets, and pieces of gold. The wind blowing very hard that night, the ship drag’d her anchor, and struck so much that she sunk till the water came to her upper deck: a great number of the passengers in their cabins [cabins], were so sick and weak that they were not able to get upon deck to save themselves, but were drown’d, and were found floating in the ship. The master and mate died at sea, and the boatswain had the command of the ship, which came out from Rotterdam with 300 passengers, of which there is but 4 left alive, besides 4 or 5 sailors. She was bound to James River in Virginia, the German Lord who came there last year, having obtain’d a grant for a large tract of land, and was to bring over about 3000 people to settle it, and this ship’s company was the first of them.”<sup>281</sup>

On 11 May 1739, there was a thunderstorm at Colchester in Essex, *England.*<sup>212</sup>

On 20 May 1739, there was a thunderstorm at Cobham in Surrey, *England.* “Greatest storm of thunder, hail and rain ever known. Hail larger than the biggest marbles. Incredible damage done. Windsor, hail and large pieces of ice 3½ inches [9 centimeters] long and 1 inch [2.5 centimeters] thick. At Abergavenny [in Monmouthshire, *Wales*], hail like pieces of ice, were 3 to 5 inches [8-13 centimeters].”<sup>212, 281</sup>

On 17 June 1739, Scaffhausen [Schaffhausen] in *Switzerland* reported, “Many people who went from this country to inhabit the British Colonies of Carolina and Georgia [in what would become the *United States*] are returning from thence, the climate not agreeing with them.”<sup>281</sup>

In 1739, the price of wheat [in *England*] averaged 38 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In August 1739, the Turkish fleet in the *Black Sea* was almost destroyed by a storm.<sup>281</sup>

On 10 September 1739, about 7 o’clock in the evening, began a most violent storm of thunder and lightning, accompanied with an excessive rain, which lasted until midnight. A farmer at Raveningham, Norfolk [in *England*], had his barn fired [catch fire] by the lightning, and all his corn [grain] consumed. At Mr. Collier’s, Lambeth, the lightning pierced through the roof, and thence through the floor, splitting in several pieces a large old-fashioned oaken bedpost; and then through a 2<sup>nd</sup> floor, on a very thick piece of deal, to which the jack was fastened, which it shivered into a thousand pieces, but did no other damage. Mr. Collier and his wife being in bed, saw the lightning break through the ceiling, and it did not appear much larger than the blaze of a common candle; the holes through the roof, and both the floors, are not 2 inches [5 centimeters] diameter, and look as if bored by a large auger. At Bremen in *Germany*, the lightning set fire to a magazine of 40,000 pounds [20 U.S. short tons] of gunpowder, whereby a fort, with the adjacent houses, were blown up, 40 persons killed, near 1000 houses damaged, and the city set on fire in 25 places; but a heavy rain falling, the flames were happily extinguished.<sup>281</sup>

On 10 September 1739, there was a most violent thunderstorm at London and at Raveningham in Norfolk, *England.* It began at 7 p.m., with excessive rain until midnight. This terrible storm struck Aldborough in Sussex, where some ships were wrecked. The storm was also violent at Bremen,

*Germany*, where a gunpowder magazine was blown up.<sup>212</sup>

On 11 September 1739, a gale struck London, *England* causing much damage. At Bristol and the lowlands of Yorkshire, there was great damage from excessive rains, which swept away great quantities of corn [grain] and raised the price of grain. The gale, which came from the southwest, was violent between Bristol and Portsmouth.<sup>212</sup>

On 11 September 1739 in *England*, “all the day was a very high wind whereby several boats were overset on the [River] Thames, and several persons drowned; [roof] tiles blown from the houses, and a bricklayer was kill’d [killed], by the fall of a brick on his head; at nine [o’clock] at night the wind rose higher, ‘till between 11 and 12 it blew a prodigious storm, which continued ‘till morning, in which the *Endeavour*, from Bristol to Portsmouth, and the *Nancy*, from Shields to London, were lost, with all their men and cargoes. Great damage was done about Bristol, and the low grounds of Yorkshire, by the excessive rains, which swept away great quantities of outstanding corn [grain], and raised the price of grain, especially barley.”<sup>281</sup>

On 28 September 1739, there was a flood in *England* and *Wales*. Great damage was done to crops by excessive rain in Yorkshire, Devonshire [Devon], and *Wales*.<sup>212</sup>

On 30 October 1739, there was a gale at Newcastle-on-Tyne [Newcastle-upon-Tyne], *England*. On 21 November, another gale struck Beachyhead [Beachy Head], Tinmouth [Teignmouth], and Lime [Lyme Regis].<sup>212</sup>

In *France* in 1739, there was a severe famine.<sup>57, 91</sup>

In 1680, 1720, 1739 and 1740 [in *Europe*], storms of hail of one foot thickness fell.<sup>190</sup>

On 3 December 1739, Oporto [Porto, *Portugal*] “after long and heavy rains, our river began to rise, and continu’d to do so for the next 3 days, till it became so high, rapid and terrible, as to exceed description. It overflow’d great part of the city wall next [to] the water. All the houses, workhouses, lodges, &c. near the river were overflow’d, and many of them carry’d away, four Portuguese ships loaden [loaded] for Brazil and one Swede, were lost; a Portuguese ship, almost built, was carry’d off the stocks and lost; two English ships are lost, and another thrown upon the keys; and one drove over the bar to Sea. The damage is supposed to amount to 200,000 *l*.”<sup>281</sup> [In present currency, this would equate to 27.1 million pounds using the retail price index inflation rate.]

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: April 11<sup>th</sup> – no appearance of any feed [i.e. grass] yet. April 20<sup>th</sup> – we have remarkable seasonable weather. April 30<sup>th</sup> – there has been no rain for about a month past, except a small shower. August 31<sup>st</sup> – we have had more hot weather these four days past, than all the summer together. September 17<sup>th</sup> – last night there was a very white frost that killed the tops of our potatoes. October 8<sup>th</sup> – the cold weather prevails as far as Boston, so that there is no business going forward.<sup>78</sup>

In northern *India* in 1739, there was a famine in Delhi and its neighborhood.<sup>57</sup>

In 1739, there was a famine in *India*.<sup>156</sup>

In 1739 A.D., there was a famine in Delhi and its neighborhood in *India* and a famine in Sindh [now a province in *Pakistan*].<sup>179</sup> Following the raid of Nadir Shah army on Delhi in 1739 and on the Sikh inroads in the western districts which occurred soon after, there was scarcity.<sup>181</sup>

In 1739, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Hupeh (now Hubei province) in central *China* at Ch'i-shui and Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu.

— During the period between 6 May and 8 August, a drought engulfed Kiangsu province at Nan-t'ung [uncertain name, "T'ung"] and Ch'ing-p'u; T'i-shan [uncertain name and province]; and Anhwei (now Anhui province) in eastern *China* at T'ung-ling, Ho-fei, Lu-chiang, Wu-wei and Tung-liu.

— During the period between 8 August and 8 November, a drought engulfed Hupeh province at Hanyang, Huang-p'o, Hsiao-kan, Chung-hsiang, Ching-shan, T'ien-mên and Ao-ch'êng.

In 1739 during the period between 8 May and 5 June, floods struck Anhwei (now Anhui province) in eastern *China* at Po, Ying-shang, Fou-yang and Wu-ho. During the period between 8 August and 8 November, floods struck Shantung (now Shandong province) on the east coast of *China* at Yang-ku and Shou-chang. In Shantung province, crops were damaged by the floodwaters.<sup>153</sup>

In 1739 during the 9<sup>th</sup> moon on the 3<sup>rd</sup> day in the vicinity of Shanghai, *China*, dragons fought at Mau Lake, and went off southeast to the sea, destroying the [rice] paddies as they went. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

**Winter of 1739 / 1740 A.D.** In 1739, the winter was recorded as being intensely cold throughout *Europe*.<sup>1</sup>

*Denmark* experienced a cold winter between 29 September 1739 and May 1740. Wolves crossed the ice.<sup>28</sup>

During the winter of 1739-40, the *Baltic Sea* froze.<sup>37</sup>

During the winter of 1739-40, the *Baltic Sea* was completely covered with ice.<sup>68</sup>

In 1740, *Denmark* and *Prussia* experienced very intense frost.<sup>47, 93</sup>

In 1740, the cold during the winter was intense in *Germany*.<sup>237</sup>

In 1740, the River Thames in *England* was frozen for eleven weeks. Forest birds almost all perished, and trees were split by the frost. The harbor of Barcelona in southern *Spain* froze over, and navigation was suspended in the *Greek Archipelago* on account of the danger from floating ice.<sup>63</sup>

The winter of 1739-40 was unusual because of the long duration of cold weather. From October to March there were 75 frost days in Paris, *France* including 22 days in a row. The thermometer reached its lowest level on 10 January 1740 with a reading of 7.3° F (-13.7° C). The cold was very strict in January. And in February the cold was constantly making itself felt. Every day the thermometer fell below freezing point, and then it rose again slightly. The mildest afternoon brought us only 37.6° F (+3.1° C). A very strong northerly wind brought from the 23<sup>rd</sup> to the 24<sup>th</sup> of February, a severe drop in temperature. Then on 25 February, the intense cold dropped the temperature back down to 9.3° F (-12.6° C), almost matching the extreme cold of 10 January. Finally, up to the ninth of March, the temperature fell below zero every day.<sup>62</sup>

During the winter of 1739-40, the chill was both very intense and very stubborn. It affected mainly the northern regions. Its persistence had earned it a remarkable name called the "Alarming Long Winter". In Paris, *France* each day the thermometer fell below zero (0° C) during the months of January, February and the first nine days of March. The temperature rose very little during the rest of March and April. It only returned to normal range on May 23. The temperature again fell far below the penny ordinary

degree after the month of June. There was even a white frost in the countryside during the morning of August 3. October had two frosts and ice. The weather went cold early in the month of November. Extraordinary rains finally crowned this deplorable year by producing disastrous floods.<sup>79</sup>

The chill of 1740 was composed of alternating periods of freezing and thawing. The frosts in Paris, *France* lasted two and a half months. A strong north wind blew hard on 23 and 24 February, bringing sudden bitterness. The record cold arrived on February 25 producing a temperature of 3.9° F (-15.6° C). The Seine River froze across its entire width. Montpellier did not feel the harshness of this winter. The air in Montpellier was sweeter than a normal springtime in Paris. But Provence did not share this privilege, all olive trees were destroyed by a cold, which was measured at 0.5° F (-17.5° C). In central *France*, the winter of 1740 stood midway between the excessive cold in the north and the general softness in the south of *France*. In Bordeaux, the cold during the month of January dropped only once to 27.5° F (-2.5° C). February was much harder but still did not drop below 17.6° F (-8° C). But the severity of the winter was its persistency; the thermometer remained almost constantly below zero. The cold temperatures dropped deeper in Lyon, near the east of *France*. There a low temperature of 18.5° F (-7.5° C) was observed in January, and 12.0° F (-11.1° C) on 19 February.<sup>79</sup>

In *England* the cold was more intense than in *France*. The River Thames was frozen over completely. In the *Northern Europe*, the *Zuider-Zee* was completely frozen. In Uppsala in eastern *Sweden*, the temperature was recorded on 11 January as -5.3° F (-20.7° C). In February at the same location, the ice measured 0.67 meters thick and the observed temperature was -10.8° F (-23.8° C). The effects of the cold on the plants were, despite this long winter, less severe than in the winter of 1709. The grain harvest was very mediocre. But the olive trees that were not on trellises and were not covered had been destroyed. The long duration of the cold affected the general health; and increased mortality rates were a result of this extraordinarily destructive weather. Réaumur said, "I know towns in Poitou, *France*, which lost half its residents". The swallows that arrived at the beginning of April died from lack of food because of the long duration of winter and the delay in the arrival of small insects, which they feed upon. The swallows fell down dead at all times of the day in the streets, yards and gardens. In *England*, during the first half of January, many cattle perished. As in 1709, this thaw was accompanied by devastating floods; the bridge at Rouen, *France* was torn away by the ice.<sup>62</sup>

On 24 December 1739, a great frost began in London, *England* that lasted nine weeks. (Some accounts indicated it lasted 104 days, and others said it began on 25 December and ended on 17 February 1840.) The ice was so thick that carriages were driven on the River Thames. On 29 December, the cold was very great. Outside it was 5° F [-15° C], and in the room only 11° F [-12° C]. The frost was more severe than any since the memorable winter of 1715-16. In Hertfordshire, a number of oaks were riven [split] by the frost, and the solid timber split as far as a case knife could be thrust. Flocks of ducks, widgeons, and coots, in Kent and Essex were frozen to death. The rivers Severn, Tyne, Avon by Bristol, Forth, Tay, and Liffy were all frozen up. The streets of London were clogged with snow and ice, so that the coal carts had eight horses. The cold was also extreme in *Holland [the Netherlands]*, *France*, *Germany*, *Poland*, *Lithuania*, and *Podolia* [present day *Ukraine* and northeastern *Moldova*]. Mr. Derham says, "This was the most severe frost on record, and on January 3<sup>rd</sup> the temperature was -11° F [-24° C]." During the night of 5 and 6 January at Stoke Newington [a district of London], ink froze in a room in a few minutes. There was a printing press on the ice upon the River Thames as far down the river as Queenhithe.<sup>212</sup>

On 29-30 December 1739, a violent east gale with snow struck London, *England*. The tides bore heavy floating ice upon them, many ships were driven ashore and dashed to pieces.<sup>212</sup>

On 29 & 30 December 1739 [in *England*], "a great number of lighters, barges and boats were driven from their fastenings in the river by a violent storm from the east, accompanied with snow, and the tides bearing heavy, floated ice upon them. Many ships at sea were drove on shore and sandbanks, and dashed



to pieces, the sailors being unable to work them by reason of the extreme cold, some losing their lives, and many the use of their limbs.”<sup>282</sup>

In December 1739, the frost was also felt at Lyndon in Rutland in central *England*. The ice froze three inches [8 centimeters] thick in 24 hours, the most severe ever known.<sup>212</sup>

According to Lord Charles Cavendish from 1 January to 5 February 1740, the temperature was seldom as high as 32° F [0° C] in *England*. It fell as low as 2° F [-17° C].<sup>212</sup>

During the winter of 1740, the frost lasted nine weeks in *England*. There were great fairs and coaches on the [frozen River] Thames. It was known as a hard winter. In London, the ice was 10½ inches [27 centimeters] thick. In *Scotland* at St. Andrews, the minimum temperature was 9° F [-13° C], at Ayrshire 6° F [-14° C], and at Glasgow 9° F [-13° C].<sup>212</sup>

In 1740, the River Thames at London, *England* was frozen over.<sup>38, 60</sup>

In *England*, the frost of 1740 will stand famous in history.<sup>72</sup>

In *England*, there were fairs on the frozen River Thames during the winter of 1739-40.<sup>90</sup>

In *England* in 1740, the frost lasted 9 weeks, when coaches plied upon the River Thames, and festivities and diversions of all kinds were enjoyed upon the ice. The winter was known as “The Hard Winter”.<sup>90</sup>

In 1740, the *Zuiderzee* froze completely. The River Thames in *England* was also frozen over completely.<sup>62</sup>

In *England*, an intense frost as perhaps was ever known in those parts, began about Christmas and continued eight weeks.<sup>39</sup>

In *England*, a frost began on 24 December 1739 and continued nine weeks, or 103 days.<sup>2, 40, 41, 43</sup>

In *England*, there was nine weeks of frost; coaches plied on the Thames. This year “will stand famous in history”. “I well remember after that dreadful winter, 1739-40, that cold northeast winds continued to blow on through April and May.”<sup>47, 93</sup>

In London, *England* “the frost of 1739-40 commenced on Christmas-day, and lasted till the 17th of the following February, when it began to break up; but the river was not clear of ice till the end of the month. The usual sports of a fair were made upon the ice; booths and drinking-tents erected; and also printing-presses, which in all these fairs upon the Thames seem to have been considered the greatest wonder of all.” “Above bridge the Thames was completely frozen over, and tents, and numerous booths were erected on it for selling liquors, &c. to the multitudes that daily flocked thither for curiosity or diversion. The scene here displayed was very irregular, and had more the appearance of a fair on land than a frail exhibition, the only basis of which was water. Various shops were opened for the sale of toys, cutlery, and other light articles.”<sup>29</sup>

On 31 January 1740, *England* reported, “this month the frost, which began the 26<sup>th</sup> of last [26 December 1739], grew more severe than has been known since the memorable winter of 1715-16; so that many who had lived years at Hudson’s Bay [in *Canada*], declar’d they never felt it colder in those parts. The [River] Thames floated with rocks and shoals of ice; and when they fixed [froze together], represented a snowy field, rising every where in hillocks and huge rocks of ice and snow; of which scene several painters took sketches. Booths, stalls, and printing-presses were erected, and a Frost-Fair held on it: multitudes walk’d



over it, and some were loss by their rashness. Several perished with cold in the streets and fields in and about the city. All navigation being obstructed, coals rose to 3 *l.* 10 *s.* per chaldron [cauldron, about 3136 pounds or 1422 kilograms]; and the damage among the shipping between the Medway and London Bridge was computed at 100,000 *l.* [In present currency, this would equate to 12.3 million pounds using the retail price index inflation rate.] Flocks of ducks, widgeons and cepts were found on the ice on the Kent and Essex shores, perish'd with cold, or starv'd to death. Vast quantities of fish, especially eels, were found frozen to death on the banks of the Severn, near Thornbury in Gloucestershire, and flocks of crows resorted thither to feed on them. In Suffolk wild-geese and other birds devour'd the winter-corn close to the earth for the space of many acres. In Hertfordshire numbers of oaks were riven [split violently] by the frost, and split into the solid timber as far as a case-knife could be thrust; and at Buntingford, in that county, a new spring forced its way out of the ground, and filled the road with ice so as to make it unpassable. The rivers Severn, Tyne, the Avon by Bristol, the rivers of Forth, Tay, &c. in *Scotland*, and the Liffy by Dublin [*Ireland*], were all frozen up like the Thames. And by all advices from Holland [now *the Netherlands*], *France*, *Germany*, &c. the cold was extreme. In *Poland* and *Lithuania*, the inhabitants, besides what they suffer'd by the frost, were very much incommoded by the bears and wolves, which ranged about devouring men and cattle. In Podolia [now *Ukraine* and northeast *Moldova*], whence the Russians, in their march, had carry'd off all the forage and most of the provisions, tho' they left money for it, the inhabitants were perishing both with hunger and cold." "The streets of London [*England*] were so clog'd [clogged] with snow and ice, that hackney-coaches went with 3 or 4 horses, and coal carts up the streets from the wharfs with 8 horses; and Fleet-Street was so long neglected, and so dangerous, that some scores of men were at work on Sunday the 27<sup>th</sup> to clear the way. The want of meal being great in *Scotland*, and some mills frozen up, they were obliged to work on Sundays. An unusual thing there!" The streets were so slippery during the frost, that many people fell and broke, others sprain'd their limbs."<sup>282</sup>

In *England*, "This winter was one of the most severe ever remembered, and from the long continuance of frost from Christmas Day, 1739, to February 17th, 1740, when it began to thaw, but very gradually, it has been known ever since as the Great Frost. It was impossible for the colliers from the north to get up the river, and the distress among the poorer classes was terrible, not only from want of fuel, food and water, but also of work. The watermen and fishermen with a peter-boat in mourning, and the carpenters, bricklayers, and labourers, walked in procession through the streets soliciting the alms of the charitable, and to the honour of the city and all, great sums were collected and disbursed. Another terrible calamity happened a few days after the frost had commenced: this was a terrible gale which did incalculable damage in the river, dragging vessels from their moorings and dashing them against one another, while the large sheets of ice floating in the stream overwhelmed the wherries and lighters and barges, and sunk many, especially those laden with coal and corn. Above the bridge the Thames was frozen completely over and a Frost Fair was held on it. Various shops were opened for the sale of toys, cutlery, and other light articles. Printing presses were set up and the usual drinking booths and puppet shows abounded. All sorts of sports and diversions were carried on, and the place became a perfect carnival, as if the populace were utterly oblivious of the distress and misery which existed on shore."<sup>29</sup>

In *England*, Thomas Gent, the famous printer of York, in his life, tells how he setup a printing press on the river in that city during this frost, as follows: In January "the frost having been extremely intense, the rivers became so frozen that I printed names upon the ice. It was a dangerous sport on the south side of the bridge, where I first set up, as it were, a new kind of press – only a roller wrapped about with blankets. Whilst reading the verses I had made to follow the names – wherein King George was most loyally inserted, some soldiers round about that made great acclamation, with other good people; but the ice suddenly cracking, they almost as quickly ran away, whilst I, who did not hear well, neither guessed the meaning, fell to work, and wondered at them as much for retiring so precipitately as they at me for staying; but taking courage, they shortly returned back, brought company, and I took some pence amongst

them. After this I moved my shop to and fro, to the great satisfaction of young gentlemen, ladies, and others, who were very liberal on the occasion.”<sup>47</sup>

In *England*, “This month (January) the frost, which began the 26<sup>th</sup> of last, grew more severe than has been known since the remarkable winter of 1715-16; so that many who had lived years at Hudson’s Bay declared they never felt it colder in those parts. The Thames floated with rocks and shoals of ice. . . . Bookstalls and printing presses were erected, and a frost fair held on it; multitudes walked over it, and some were lost by their rashness. Several perished with cold in the streets and fields in and about the city. All navigation being obstructed, coals rose to 3*l.* 10*s.* per chaldron. Many forest trees were split up by the frost, as had been the case in 1684.”<sup>47, 93</sup>

In February 1740, Newcastle, *England* reported the weather was observed to be notably cold through all of last year, particularly the autumn or latter part of it, occasioned by frequent north and northeasterly winds, which brought along with them large quantities of chill vapours and clouds; so that we had continual changes and varieties of fair and rain even at the time of year which is generally the best in our climate. By these means neither the earth nor atmosphere have been so much heated or warmed by the rays of the sun, as generally happens in moderate summers.<sup>282</sup>

On 23 February 1740, Carlisle, *England* reported, “Our frost broke on Sunday the 17<sup>th</sup> instant, and notwithstanding the rapidity of some of our rivers, which withstood its assaults long before they froze, I measur’d some of the icy fragments tost [tossed] ashore by the flood 22½ inches [57 centimeters] thick next day after the thaw, the like certainly never known in these climates. The ice on the River Eden by Carlisle, which is many miles lengthways in several places, is not risen to the flood, and we expect very bad consequences whenever it shall, unless dissolv’d by a gentle thaw, which the present circumstances seem to promise, it having bore [the frozen river supported the weight of] all manner of carriages for six weeks past, and must be very thick. Our snow is quite gone, save in the mountains.”<sup>282</sup>

In February 1740, Uffington [now in Oxfordshire, *England*] reported, “most of the large oak trees growing in the common meadow are split by the violence of the frost.”<sup>282</sup>

It was noted that in the winter of 1740 even the most temperate climates [of *Europe*] felt the effects of winter. Boiling water froze in a minute and a half. The ice was 30 inches [76 centimeters] thick in the ditches about Upsal [Uppsala, *Sweden*], and several lakes were frozen to the bottom.<sup>294</sup>

In *Ireland*, during 1739-40, potatoes destroyed by the frost. Wheat sold for 42*s.* per kilderkin [about 18 gallons or 82 liters].<sup>57, 91</sup>

At Leeds in Yorkshire, *England*, during the winter of 1739-40, there were 103 days of frost.<sup>272</sup>

In Philadelphia, Pennsylvania in the *United States* the winter of 1740 was very cold and stormy. The Delaware River was closed until the 14<sup>th</sup> of March.<sup>1</sup>

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**1740 A.D.** In *England*, there were great floods from the breaking up of the frost and snow of the preceding severe winter.<sup>47</sup>

In April 1740 in *Ireland*, there was excessive cold with hail.<sup>93</sup>

The summer of 1740 in New England in what was to become the *United States* was cool and wet. An early frost injured the corn crop and the long season of rain, which followed, hindered it’s ripening. One-third was cut when it was green and most of the rest molded because of the rain. Therefore, there was little seed corn in New England for the next spring’s planting. The rain of the summer and fall flooded

the lowlands everywhere.<sup>199</sup>

On the 9<sup>th</sup> past [9 June 1740], began a great riot at Newcastle upon Tyne, *England*, on account of the dearness [scarcity] of corn [grain].<sup>282</sup>

On 29 June 1740 at Wisbich [Wisbech] in the Isle of Ely, *England*, a mob arose, and entering the town broke the corn merchants windows, seized about 25 laths of wheat, and forced wagons to carry it off, sold some for 1 *d.* a bushel, and some for 4 *d.*<sup>282</sup>

After the long winter of 1739-40, came one of the coldest summers of this century. The highest temperature of summer in Paris, *France* was 83.1° F (28.4° C) on 23 July. In Denainvilliers in north-central *France* the winter cold ceased on 25 May. The weather was noticeably milder, although there were only a few warm days during June but the nights were always fresh. The grain and the fruit were very late. In July, the nights were cold, and by early August the grain had not yet formed the ears. Harvesting started towards the end of August and was completed on the 20<sup>th</sup> of September due to the cold and rain. In Boulonnais in northern *France*, the harvest began in the beginning of November. It was after the first snow fell, and the grains were still in the fields. Some cereals could not ripe and as a result rotted in the fields. The early melons, called Carmelite melons [Noir des Carmes], were harvested in September. In Burgundy, *France*, the grape harvest only began on 10 October. The yield of grapes was very low in quantity and the wine produced was of a poor quality. The year was rainy in Burgundy. Even in June there were frost and snow. The plant runners broke the ice.<sup>62</sup>

In 1680, 1720, 1739 and 1740 [in *Europe*], storms of hail of one foot thickness fell.<sup>190</sup>

At Antigua in the *West Indies*, there was a violent storm in August 1740.<sup>40, 41</sup>

In 1740, Antigua in the *West Indies* and the *Caribbean* island of Martinico [Martinique] suffered considerably from a hurricane.<sup>143</sup>

In 1740, the price of wheat [in *England*] averaged 50 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

On 4 September 1740, a gale struck London, *England*. On 7 September, another gale struck London and Newcastle. This second gale caused great damage to the shipping.<sup>212</sup>

On 7 September 1740, “blew a storm at southwest, which did a great deal of damage to the ships and boats on the [River] Thames [near London, *England*]. A tidewater was blown overboard and drowned, and some trees were blown down in St. James’s Park. The same raged with great violence at Newcastle, sinking keels, and driving ships from their moorings.”<sup>282</sup>

Around September 1740, a hurricane struck *Antigua* and Martinico [now *Martinique*] and caused prodigious damage. Many ships were drove in there [cast ashore]. The French and Spanish Fleets suffered much, and two of the former were lost.<sup>282</sup>

On 11-12 September 1740, a hurricane struck *Puerto Rico*. Two warships were lost.<sup>141</sup>

In September 1740, the Spanish fleet arrived at *Puerto Rico* greatly damaged by a storm, in which they lost two ships of war.<sup>143</sup>

On 12 September 1740, a destructive hurricane, lasting 12 hours, struck from the mouth of the Mississippi River to Pensacola, Florida in the *United States*.<sup>117</sup>

There was a violent storm off the coast of *England* on November 1.<sup>40, 41, 43, 56</sup>

On 1 November 1740, a gale struck London, *England* where it caused much damage. The gale also struck the eastern and northeastern parts of the kingdom. One of the spires of Westminster Abbey, and a great part of Hyde Park wall were blown down. Between Lynn and Yarmouth, 60 ships went ashore. At Whitby, the damage amounted to £40,000 [£5 million in today's currency using the retail price inflation index]. The storm was not violent in western *England*.<sup>212</sup>

On 1 November 1740, "a most violent hurricane did much damage in and about London [*England*], and the eastern and north-eastern parts of the Kingdom. At Kensington, the Reverend Mr. Dormer, who kept a boarding-school, and his wife were killed by the fall of a stack of chimnies [chimneys]; one of the spires of Westminster Abbey, and a great part of Hide-Park wall were blown down; several persons were cast away on the River of Thames, abundance of boats broke to pieces, the Pr. [*Prince*] of Orange, the Ship [70 guns] of Capt. Peddie, who a few days before had bravely defended her against a Spanish privateer off the Lizard, was drove ashore near Margate and dash'd to pieces, and five of the crew lost. The passage-boat from the Nore to Chatham, was lost with 15 persons. Between Lyn [Lynn] and Yarmouth above 60 ships were drove ashore, and many of their men drowned; the coast of Suffolk were covered with wrecks and dead bodies, and the damage on land is very considerable. At Whitby in Yorkshire, besides the loss of many lives, the damage is computed at 40,000 *l*. The western parts felt but little of this storm." The ship *Buckingham* returned to Spithead having lost her mast in the storm of 1 November. The *Superbe* had lost all her mast but the bowsprit.<sup>282</sup>

In 1740, there was a flood at Foulness in Essex, *England*.<sup>212</sup>

In France there was a flood. On 25 December 1740, the Seine River in Paris, *France*, at the bridge "Pont de la Tournelle" reached a height of 7.9 meters (25.9 feet) above the zero mark [the low water mark of the year 1719]. The water level reached the window of a second story house on the wharf of the porte Saint Bernard.<sup>71</sup>

In *France*, the rains and cold almost filled the entire year 1740. The precipitation gauges at the Paris Observatory measured in 23 inches (584 millimeters) of rainfall this year. There were 6 inches (153 millimeters) in the first six months, and 17 inches (431 millimeters) in the last six. December furnishes 5.4 inches (137 millimeters) of rainfall, almost as much as the first six months. Bordeaux had greater rainfall than Paris, because she surpassed 6.4 inches (162 millimeters) the annual average figure. Because of the cold, the evaporation was almost zero. The accumulation of these rains while the ground was already very wet and saturated resulted in considerable floodwater. The Seine River in Paris was particularly monstrous. It reached at the end of the year, 24.3 feet (7.39 meters) above the zero water mark on the bridge "Pont de la Tournelle". This was the highest known river height after the flood of 1658, which was 27 feet (8.23 meters). The rainfalls this year was really extraordinary. They produced disastrous floods on all sides. Few provinces escaped. In Paris, the month of December produced the heaviest rainfalls. The overflow of the Seine River surpassed that of February 1711, however, without reaching the level of 1658.<sup>79</sup>

In Dublin, *Ireland*, there were heavy rains and great floods; shipping at Dublin injured.<sup>47, 92</sup>

In *England* during 1740-41, there was a famine from frost, cold, exporting and hoarding up of corn.<sup>57, 72, 91</sup>

In 1740 during the period between 24 June and 23 July, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ch'üan.<sup>153</sup>

In 1740 during the 4<sup>th</sup> moon, heavy rain and hail damaged the wheat crop in the vicinity of Shanghai,

*China*.<sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January – this month was generally fair and pleasant. February 18<sup>th</sup> – a summer like winter. We had only two snows, and sledding but about three weeks; two or three snaps of cold weather, else constantly warm and open, and always fair. February 27<sup>th</sup> – warm southerly weather. March 3<sup>rd</sup> – a summer day. March 10<sup>th</sup> – same. March 18<sup>th</sup> – warm. March 29<sup>th</sup> – charming weather. April 14<sup>th</sup> – the spring does not look very promising. April 23<sup>rd</sup> – exceeding hot. April 30<sup>th</sup> – a pleasant day. May 11<sup>th</sup> – a very backward, cold spring. June 25<sup>th</sup> – we have had the finest, most seasonable weather that can be; everything is promising. July 22<sup>nd</sup> – it begins to be a dry time. July 28<sup>th</sup> – the last month was ideal as any for growing, as ever was in the memory of man. August 10<sup>th</sup> – there has been an uncommon season of hot weather this summer.<sup>78</sup>

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**Winter of 1740 / 1741 A.D.** The winter of 1741 near Philadelphia, Pennsylvania in the *United States* was intensely cold. The Delaware River was closed from the 19<sup>th</sup> of December to the 13<sup>th</sup> of March. Many creatures died from hunger and cold. As late in the season as the 19<sup>th</sup> of April, snow fell to the depth of three feet (0.9 meters).<sup>1</sup>

During the winter of 1740-41, the Hudson River between New York and Powles' Hook [now called Paulus Hook, Jersey City, New Jersey] in the *United States* was frozen and was crossed on the ice. [Manhattan, New York is located 1 mile across the Hudson River from Powles' Hook. "Crossed on the ice" generally means the ice was sufficiently thick to allow foot and wagon traffic.] [This is only one of four winters when the Hudson River was completely frozen over during the century from 1740-1840. The other winters were 1764-65, 1779-80, and 1820-21.]<sup>202</sup>

The winter of 1740-41 began early with October "as cold as ordinarily November is" in Bolton, Connecticut in the *United States*. By January 1741, drifting snow soon brought an end to regular travel by highway in New England and the Middle Colonies, and the penetrating cold closed all the rivers and waterways with solid ice. One man made a 200-mile trip by sleigh over the frozen sound from Cape Cod to New York City. The extreme cold was not confined to the Northeast; that year the York River in Virginia froze solid enough to cross. "Notwithstanding the settling of the snow, the snow on the sixth day of March was three foot deep," wrote Bissell. "The weather continued cold and the snow wasted but slowly, so that there was considerable quantity of snow the middle of April." The Connecticut River was still frozen solid enough to be crossed on the first of April.<sup>26</sup>

In the *United States* not only was the winter 1740/1741 characterized by very low temperatures, but also by huge amounts of snow. People in the region saw this winter as the most severe since the European settlement began. There were 23 snowstorms in all, most of them being strong. On 3 February about a foot of snow fell, and about one week later there were two more storms, filling the roads in Newbury, Massachusetts, up to the top of fences. Snow depths of about 10 feet (3 meters) were reported from some places.<sup>32</sup>

The winter of 1740-41 in New England in what was to become the *United States* was very cold and snowy. The region was hit with 27 snowstorms, most of them of good size. On 3 February 1741, nearly a foot [30 centimeters] of snow fell in Newbury, Massachusetts. The next week there were two more storms. In some places the snow was 8-10 feet [2.4-3.0 meters] deep and filled the roads to the tops of fences. The fences were still covered with snow on 4 April. Three days later another storm hit dumping another foot of snow. In the woods the snow was four feet [1.2 meters] deep on the level. The drifts on the island of Dorchester, Massachusetts were still not melted on 3 May.<sup>199</sup>

— In Salem, Massachusetts, the rivers were frozen over as early as October and on 4 November 1740 the weather became very cold. It snowed from 13-15 November in Essex County, Massachusetts. Snow depth measured one foot [30 centimeters] at that time. The cold weather broke on 22 November and for



nearly three weeks it rained. This caused freshets in the Merrimack River and several rivers and streams. Rawson's meadow in the lowlands at Turkey hill in Newbury was 12 feet [3.7 meters] underwater. As a result of the freshet, floating ice created an ice dam at Falmouth, Massachusetts, which caused great damage.

— Plum Island River was frozen over on 12 December 1740 and remained frozen until the end of March. The Merrimack River also froze from the extreme cold. Ice soon became thick enough to support teams. Before the end of December, the river became a great thoroughfare. Loaded sleds drawn by two, three or four yoke of oxen came from the towns up the river, and landed below the upper long wharf near where the ferry was then located in Newbury. Twenty to forty teams traveled daily from Amesbury and Haverhill, and people traveled down the harbor as far as half-tide rock. On 28 February, a hole was cut in the Merrimack River near Deer Island, where the current ran the swiftest. The ice measured 30 inches [0.8 meters] thick.

— As far south as New York, the harbors were so frozen that vessels could not come into them. The sea was also frozen and people traveled out long distances. In Boston harbor, a beaten road through the snow was kept open on the ice as far out as Castle William [now Fort Independence]. Tents were set up on the ice to provide refreshments to the travelers. Horses, sleighs and people on foot continually traveled up and down the frozen rivers.

In the *United States* the snow remained on the ground into April and May 1741, delaying the time when the ground was ready for planting. The farmers were almost discouraged, thinking of the failure of the corn crop the year before.<sup>32</sup>

In the *United States* shortages arose, "by reason of which scarcity a great number of cattle and horses died, and near half the sheep, and about two thirds of the goats," Bissell wrote. "Exceeding scarcity followed, partly by reason of abundance of Indian corn being ruined by the long rains in December, and partly by people giving their corn to their creatures to save their lives. We suppose the ensuing summer was the greatest scarcity as ever the English (settlers) felt since the first settlement of this government. Indian corn rose in the price from ten to twenty shillings, and what was commonly sold for twenty shillings, till at last all buying and selling utterly ceased. Money was no temptation, and men of good estates who had money was found to put themselves into the quality of beggars, and beg sometimes two quarts at a place, to relieve the distresses of their poor families."<sup>26</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1740 on October 28<sup>th</sup> – it began to snow. October 29<sup>th</sup> – significant snow melt, yet it is still three-inches (8 centimeters) deep. November 5<sup>th</sup> – I believe no man ever knew so wintery spell so early in the year. December 3<sup>rd</sup> – there was a great freshet [flood caused by a thaw], which did a great deal of damage. December 4 – the frost is still wholly out of the ground. December 21<sup>st</sup> – Rev. Smith rode to Saco and lodged with his father, who was forced out of his own lodging by vast quantities of ice, which jammed and raised the water eighteen-inches (46 centimeters) higher than his bedstead. December 29<sup>th</sup> – the Fore River has been shut up [blocked by ice] a day or two. December 30<sup>th</sup> – several persons walked over to Purpoodock [now Cape Elizabeth on the frozen ice]. In 1741 on January 1<sup>st</sup> – a little cooler, but a pleasant day. January 7<sup>th</sup> – I rode with Mater [Nicholas] Hodge to North Yarmouth; we rode round the cove and turned down to Mr. Norris' across Presumpscot River, and rode from thence all the way on the ice, which was exceedingly hard and secure. January 11<sup>th</sup> – I rode over the [frozen] river. January 19<sup>th</sup> – the whole week produced a spell of charming weather. January 27<sup>th</sup> – a charming pleasant day. January 29<sup>th</sup> – much cooler. April 10<sup>th</sup> – melancholy time, the snow lying, and little hay. April 25<sup>th</sup> – the snow melted wonderfully. April 30<sup>th</sup> – roads now settled [became hard] surprisingly; the reason for this was the frost failed to penetrate the ground the winter past. May 1<sup>st</sup> – fair, hot, sunshine but easterly wind. I saw one patch of snow on the Neck [peninsula].<sup>78</sup>

In December 1740 in *England*, there were great snows, rains, storms and severe frosts, and in some places dreadful thunder and lightning. Cattle, corn, and hay were swept away by the rising of the rivers Severn, Trent, and Wye. The weather was similar in *France*. But it was worse in Holland [now *the Netherlands*] and *Germany*, where whole territories were underwater.<sup>212</sup>



During December 1740, *England* had great snows, rains, storms, severe frost, and in some places dreadful thunder and lightning. Cattle, corn [grain], and hay were swept away by the rising of the Severn, Trent, Wye, and other rivers. The like happened in *France*, but Holland [now *the Netherlands*] and *Germany* suffered more severely. The dikes were broken in several places. Whole territories laid underwater, particularly 30 villages in Altena [in *Germany*], where the inhabitants got to the tops of houses and trees to save their lives. The roof of St. Bartholomew's Church at Frankfort [*Germany*], where the Emperors are elected, was beat in the storm.<sup>282</sup>

In December 1740, the temperature at Stoke, Newington [a district in the London Borough of Hackney, *England*] fell to 2° F [-16.7° C].<sup>300</sup>

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**1741 A.D.** On 28 July 1741, a violent thunderstorm struck the southeast parts of the West Riding of York and parts of Nottinghamshire and Lincolnshire in *England*. "Most of the hailstones as large as musketballs, some big as pigeons' eggs, some three inches [8 centimeters] long and one inch [2.5 centimeters] in diameter, of various shapes like broken icicles, which tore up the standing corn [grain], broke large branches of trees, tore up trees by the roots, knocked down and broke the heads of several people, and killed birds and hares. Thus it raged ten miles [16 kilometers] in length and one mile [1.6 kilometers] broad; and did much damage 40 miles [64 kilometer] long and 2 miles [3.2 kilometer] broad. The farmers' loss is £4000. Hail lay in heaps half a yard [46 centimeters] deep, like ice, two days after."<sup>212</sup>

On 28 July 1741 in *England*, "happened a violent storm of thunder and hail in the south east parts of West Riding of Yorkshire, part of Nottinghamshire, and Lincolnshire. The hailstones were generally as large as musketballs, many as big as pigeons eggs, and some two or three inches long, and an inch in diameter, of various shapes, like broken icicles, which tore and cut up the standing corn [grain], and beat, as with a flail, the corn that was reaped; broke off large branches of trees, and tore up some by the roots; knocked down and broke the heads of several people, and killed birds and hares. Thus it raged 10 miles [16 kilometers] in length, and 1 [mile, 1.6 kilometers] in breadth. The hail lay in heaps half a yard [46 centimeters] deep 2 days after like ice. The loss of the poor farmers is computed at 4000 *l.* and a collection is proposed for their relief."<sup>284</sup>

On 29 July 1741, it was reported, "a terrible tempest has ruined all the country about Geneva [*Switzerland*], so that it will take up three years to restore the vines to their former condition, and nine [for] the chestnut-trees. The Cantons of Berne and Fribourg have likewise suffered, and the country was covered with hail two foot in depth."<sup>284</sup>

In 1741, the price of wheat [in *England*] averaged 46 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

On 8 August 1741 about 11:45, a very violent hurricane of wind from the west struck St. Ives in Huntingdonshire, *England*. The storm only lasted about 30 minutes but in that time it blew down the spire, which broke through the church, and the damage was computed at 1500 *l.* Scarce a windmill is left standing within seven or eight miles [11-13 kilometers] of the place. The spires of Hemingford and Bluntisham churches were likewise blown down, and the damage done the rector's house, and gardens of the latter place amounts to above 500 *l.* The same storm reached Lynn about one and spread a general desolation round that place; mills, trees, barns, stacks of hay, were blown down, some [houses] stripped of the thatch. Two spires fell, one of them through the body of the church. Several ships lost their masts and riggings and the damage in the town is reckoned above 20,000 *l.* Maidenhead, Slough, Rochester, Chatham, Stroud, and several parts of Surrey and Kent likewise felt the fury of this hurricane, which there came for the south. At night, the shipping of Sunderland in Yorkshire suffered greatly by the storm where the wind was at east.<sup>284</sup>

On 8 September 1741, a southwest gale struck Buntisham in Huntingdonshire, *England*. The gale began at noon and lasted 13 minutes, in which period sixteen barns, twelve houses, and all the mills within seven or eight miles [11-13 kilometers] were blown down. Hay and cornstalks were quite blown away. The spires of St. Ives steeple, Bluntisham and of Hemmingford were blown down. The course of the storm was from Huntingdon to St. Ives, Erith, between Wisbeach and Downham, to Lynn and Sultshaw, where very few trees escaped. The gale was not so violent at Cambridge, where there was thunder and lightning. Another account said the storm reached Lynn about one o'clock, and there spread a general desolation; mills, houses, stacks of hay, and two church spires blown down. The damage at Lynn being £20,000. [In today's currency, this would be equivalent to £2.4 million using the retail price inflation rate.] The following towns also felt the fury of this gale: Maidenhead, Slough, Rochester, Chatham, Strood, and parts of Surrey and Kent. During the night the gale struck the shipping off Sunderland and Yorkshire, which suffered greatly. [Because of the short duration of the gale and the localized damage, this storm sounds more like the damage from a tornado.]<sup>212</sup>

In Canterbury, *England*, there was a storm on September 8<sup>th</sup>.<sup>40, 41, 56</sup>

In *Scotland* in 1741, there was a famine from terrible shake-winds when corn [grain] was ready for reaping.<sup>57, 72, 91</sup>

In December 1741, it was noted that the last two severe winters [the winter of 1739-40 and the winter of 1740-41] and dry summers [in *England*] have raised the price of tallow [the fat from cattle and sheep that is used chiefly to make candles and soap].<sup>212</sup>

About noon on 18 December 1741, a large ball of fire was seen to pass over Canterbury, *England*, which was followed by a storm that broke almost all the windows in town, and the next morning three suns appeared in the sky attended with a rainbow inverted, which lasted from nine to twelve, to the great astonishment of the inhabitants.<sup>284</sup> [Possible meteor air burst.]

In 1741 during the period between 5 February and 8 August, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Mei and Yai.<sup>153</sup>

In 1741, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 15 May and 12 June, floods struck Hupeh (now Hubei province) in central *China* at Chung-hsiang, T'ien-mên and Mien-yang.

— During the period between 13 June and 12 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Ning-tu and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lung-ch'uan and Ch'ao-yang.

— During the period between 11 August and 9 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou and Hu-chou; Kiangsi province at Kao-an; Kiangsu (now Jiangsu province) on the east coast of *China* at Pao-shan; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu.

— During the period between 10 September and 9 October, floods struck Hupeh province at Chung-hsiang.

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 2<sup>nd</sup> – raw, rainy. May 3<sup>rd</sup> – rain showers. We hear there is a famine in Ireland and a universal scarcity. May 4<sup>th</sup> – cloudy, but warm and looks like clearing up. Up to this time there was no plowing or any prospect of it unless God suddenly gives us steady fair weather; the ground being so wet and full of water. The grass seems to be appearing finely. May 9<sup>th</sup> there is now a bank of snow on the front of the Neck, though none anywhere else for some time. In Rhode Island and other places, they have lost half their sheep and many cattle. May 18<sup>th</sup> – I don't think ever more rain (since the Great Flood) fell in one day; the ground is everywhere one universal pond, and many

bridges are carried away. May 23<sup>rd</sup> – a hot summer day. May 24<sup>th</sup> – it was extraordinarily hot; I sweated much during the afternoon preaching. May 25<sup>th</sup> – very hot last night and again today. Corn is rotten in the ground everywhere, and a pretty deal that was planted was not fit for seed. The cherry trees do but now bloom; the apple trees do just begin; as fine a grass spring as can be. August 10<sup>th</sup> – we had more hot weather the summer past than ever known here. It is now a dry time, no water in the roads, and rain much wanted. August 30<sup>th</sup> – exceedingly hot Sabbath, people dying almost from the heat. From the 25<sup>th</sup> of the month, there has been such a spell of hot weather as that there has been not only nothing like it the summer past, but I think the whole sixteen years I have been in Falmouth. Hot weather constantly.<sup>78</sup>

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**Winter of 1741 / 1742 A.D.** In 1741 in *England*, there was all frost or rain from 15<sup>th</sup> September to 1<sup>st</sup> February. “All frost or rain.”<sup>47, 72, 93</sup>

On 31 December 1741, letters from Madrid reported that a French squadron from Toulon [*France*] was by a violent storm driven into Cartagena [*Spain*] in a shattered condition, and the Spanish squadron from Cadiz [*Spain*], which had entered the straights had been driven back into the ocean.<sup>284</sup>

On 31 December 1741, Rev. William Gostling reported an Airquake [blast wave from an atmospheric explosion of an asteroid/comet] in Canterbury, *England*. “About one in the afternoon I found my house violently shaken for some seconds of time, as if several loaded carriages had been driving against my walls; and heard a noise, which at first my family took for thunder, but of an uncommon sound. For my own part (as I thought thunder which could shake us at that rate, would have been much louder). I concluded it an earthquake: and, going immediately to the top of my house, found the sky cloudy, but nothing like a thunder cloud in view; only there was a shower of rain from the eastward presently after, and the coldest that I have felt. I thought it the shock of an earthquake, as I told you before; but since find it was attended (and I suppose caused) by a ball of fire, which passed with great rapidity over our country, from westward to eastward, for how long a journey I cannot tell. It began with two great blows, like the reports of cannon (which the jumbling of my sashes prevented my distinguishing); and then rolled away till it was heard no more. The appearance, I hear, was as that of a very large shooting-star; and it left a train of light, which soon disappeared, it being noon-day. I met a pilot today coming from Deal, whom I asked about it, and he told me he saw no fire-ball, but heard the noise, and that it made the ship shake he was in, going from Gravesend to the Nore [in Thames Estuary].”<sup>296</sup> [Additional accounts of this phenomenon, from Sussex, Newport in the Isle of Wight, and London, may be seen in the Philosophical Transaction for that year.]

On 20 January 1742, the temperature at Tooting in Surrey, *England* was very hot, unusually so.<sup>212</sup>

In 1742, "The cold of this year, says Maraldi, is the largest that has been seen in Paris, *France* since the year 1709. It started to snow on 2 January and up to the 10th increased continually." At 6:30 in the morning, the observer in the northeastern side of the tower at the observatory recorded the temperature using a thermometer as follows: on the second of January (32° F, 0° C); on the third (25.2° F, -3.8° C); fourth at (19.6° F, -6.9° C); on the fifth (12.9° F, -10.6° C); on the sixth (10.9° F, -11.7° C); on the seventh (6.1° F, -14.4° C); on the eighth (4.5° F, -15.3° C); on the ninth (3.9° F, -15.6° C); on the tenth (1.6° F, -16.9° C). The Seine River was frozen over from 27 December 1741 until towards the end of January 1742. The winter was long, for on the 11<sup>th</sup> and 12<sup>th</sup> of March, the thermometer was still reading 21.9° F (-5.6° C). As a result of the late frost many plants were damaged. In *England*, there were only a few weeks of severe cold.<sup>62</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: In 1742 on March 11<sup>th</sup> – the snow is four-feet (1.2 meters) deep in the woods.<sup>78</sup>

The following is an account by Captain Middleton of the effects of cold at Prince Wales's Fort in Churchill River in the Hudson Bay [located across from Churchill, Manitoba, *Canada* during the winter of 1741-42].<sup>286</sup>

— The trees, joists and rafters of the buildings, burst with a noise like the firing off a great many guns together, on the approach of a severe frost. The rocks also split and were raised up in great heaps, leaving large cavities beneath.

— The hares, rabbits, foxes and partridges, in September and the beginning of October, changed their natural color to a snowy white, except some foxes of a different sort, which were grizzled, and some half red and half white.

— Lakes, and standing waters of 10 or 12 foot deep were frozen to the ground, and the fish all perished. But in the lakes of greater depth, and in rivers near the sea, fish are caught all the winter, by cutting holes through the ice to the water, and letting down lines and hooks. To catch them with nets, several holes are cut in a straight line the length of the net, which by a stick fastened to the head line is passed from hole to hole, until it reaches the utmost extent, and what fishes come to these holes for air are thereby entangled, and when taken out are instantaneously frozen stiff. The seamen freshen their salt provision, by cutting large holes through the ice in the stream or tide of the river, at the beginning of winter, and keep it open all that season, and the minute the salt meat is immersed underwater, it becomes pliable and soft, though before it was hard and frozen. In large lakes and rivers the ice is sometimes broken by trapped vapors.

— Beef, pork, mutton and venison, killed at the beginning of winter are preserved by the frost, for 6 or 7 months, free from putrefaction. Geese, partridges &c. killed at the same time, and kept with their feathers on, and guts in, require no other preservative but the frost as long as winter continues. Fish are preserved in the same manner.

— If beer or water is left, even in copper pots, and though they were put by the bedside, in a severe night the pots are split into pieces before morning, not being able to withstand the expansive force of the enclosed ice.

— The air is filled with innumerable particles of ice, very sharp and angular and plainly perceptible to the naked eye. Captain Middleton several times tried to make observations on some celestial bodies, with reflecting and refracting telescopes, but the metals and glasses by the time he could fix them to the objects, were covered a quarter of an inch thick with ice, and thereby the object rendered indistinct. He also tried to get the sun's refraction to every degree above the horizon, with Elton's Quadrant, but to no purpose, for the spirits froze almost as soon as brought into the open air.

— Bottles of strong beer, brandy, strong brine, spirits of wine, set in the open air 3 or 4 hours, froze to solid ice.

— The earth, in the two summer months, at 10 or 12 feet [3.0-3.7 meters] depth is hard frozen, and what moisture is found 5 or 6 feet [1.5-1.8 meters] down, is white like ice.

— Rivers near the Sea, where the current of the tide is strong, do not freeze above 9 or 10 feet [2.7-3.0 meters] deep, but waters in land are frozen fast by the beginning of October, and continue so till the middle of May. All the water used for cooking, brewing, &c. is melted snow and ice, no spring being yet found free from freezing, though ever so deep.

— The walls of the houses are of stone, two feet [0.6 meters] thick. The windows very small with thick wooden shutters, which are closed shut 18 hours every day in the winter. They made four large fires every day in great stoves, and as soon as the wood was burnt to a coal, the tops of the chimneys were closed stopped with an iron cover, to keep the heat within the house. Notwithstanding which, in 4 or 5 hours after, the fire is out, the inside walls and bed-places [bedrooms] were 2 or 3 inches [5-8 centimeters] thick with ice, which is every morning cut away with a hatchet. Three or four times a day, iron of 24 pounds [11 kilograms] weight, are heated red hot and hung up in the windows, yet all this will not keep beer, wine, ink, &c. from freezing by the bedside.

— The snow that falls here is as fine as dust, but never any hail, except at the beginning and end of winter. At almost every full and change of the moon, there are very hard gales from the North.

— The fogs and mists, says Captain Middleton, that are brought here from the Polar parts, in winter, appear visible to the naked eye in icicles innumerable, as small and fine hairs or threads, and sharp as

needles [rare long prism diamond dust ice crystals]. These icicles lodge in our cloaths [clothing usually made of leather and skin], and if our faces or hands were uncovered, they produced white blisters, as hard as horn. Yet if we immediately turn our backs to the weather, and can endure our hand out of the mittens to rub the blistered part a little, we sometimes bring the skin to its former state. If not, we make all possible haste to a fire, get warm water to bathe it, and thereby dissipate the humours [in ancient physiological theory, the 4 humours were considered blood, phlegm, yellow bile and black bile]; otherwise the skin would be off in a short time, with much hot ferous [containing], watry [watery] matter. This happened to some individuals almost every time they went abroad for 5 or 6 months in the winter. — The doctors have in vain used their utmost skill, to prevent the terrible effects of the scurvy, which is occasioned by keeping within doors for the cure of the frozen parts. Nothing will hinder this distemper from proving mortal, but exercise and stirring abroad.

Captain Middleton journal recorded his stay at Prince Wales's Fort in Churchill River in the Hudson Bay [located across from Churchill, Manitoba, *Canada*] during the winter of 1741-42. On 18<sup>th</sup>-27<sup>th</sup> of October 1741, the snow was 10-12 feet deep [3.0-3.7 meters] and there was no stirring about without snowshoes. On the 15<sup>th</sup> of November, the ice on the river was 4 or 5 feet [1.2-1.5 meters] thick. On the 14<sup>th</sup> of December, it was so cold that a 70-year old Indian was starved to death under the walls of the fort in his tent. On the 7<sup>th</sup> of April, the water rose 9 or 10 feet [2.7-3.0 meters], the ice at the ship was 10 feet [3 meters] thick, and the snow above it another 13 feet [4 meters]. On the 9<sup>th</sup> and 10<sup>th</sup> of April 1742, there was moderate warm weather, some hail and large flakes of snow. This was a sign that the winter was spent. All the snow for 6 months being as fine as dust [diamond dust ice crystals]. On the 23<sup>rd</sup> of April, the tide rose 10 feet 3 inches [3.1 meters]. On 1 June, the ice gave way in the channel and drove to the Sea.<sup>292</sup>

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**1742 A.D.** In Limerick, *Ireland*, there was a great flood; much damage.<sup>47, 92</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: April 18<sup>th</sup> – comfortable Sabbath. April 25<sup>th</sup> – unusually hot. May 6<sup>th</sup> – the grass grows wonderfully. May 29<sup>th</sup> – same. Very hot weather for a week past. October 18<sup>th</sup> – some unusually hot days about this time. December 23<sup>rd</sup> – charming weather everyday. December 29<sup>th</sup> – wonderful weather for about ten days past; there has been no cold weather yet.<sup>78</sup>

On 22 June 1742, there was a thunderstorm at Thorndon [in Suffolk, *England*] between 3 and 4 a.m.<sup>212</sup>

In 1742, the price of wheat [in *England*] averaged 34 shillings per quarter [quarter ton].<sup>212</sup>

On 18 August 1742, a thunderstorm struck Tettenhall in Wolverhampton, *England*. The storm produced great heat [hail] and thunder, which did terrific damage to the corn [grain], trees, etc. The hail lay on the ground in a sheltered place for a week [afterwards].<sup>212</sup>

On 31 August 1742, it was reported that great damage was done to the pastures, particularly around Bristol, *England*, by swarms of grasshoppers. The same has happened in Pennsylvania in the *United States*.<sup>285</sup>

A great storm struck on the 2<sup>nd</sup> and 3<sup>rd</sup> [of October or November 1742] near Cardiff, *Wales*. The sea broke in and destroyed 700 sheep and many vessels were cast away.<sup>285</sup>

On 27-28 October 1742, an Atlantic hurricane struck the *Virgin Islands* and *Puerto Rico*. Two ships were lost to the storm.<sup>141</sup>



On 9 November 1742, the sea rose at St. Malo in *France*, three foot higher than it does in the greatest spring tide.<sup>285</sup>

*Gibraltar* [at the southern end of the Iberian Peninsula at the entrance to the Mediterranean Sea] reported that on the 21<sup>st</sup> of November 1742 between nine and ten at night it began to blow a violent storm at southwest in which was lost, the *Drake* sloop and two other ships, and two fine xebeques [xebec sailing ship] belonging to the King, three ships with stores for the garrison and a large settee [lateen-rigged masts] storeship, besides several Portuguese vessels.<sup>285</sup>

In 1742 during the period between 5 February and 6 May, a drought engulfed Yunnan province in southwest *China* at Hao-ch'ing and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Kuang-ning, Lung-ch'uan, Ch'ao-yang, Jao-p'ing and Chieh-yang. During the period between 5 February and 8 August, a drought engulfed Kwangtung province at Yang-chiang.<sup>153</sup>

In 1742 during the period 2-31 July, floods struck Hupeh (now Hubei province) in central *China* at Kuang-hua, I-ch'êng, Chiang-ling and Chih-chiang; and Kiangsi (now Jiangxi province) in southern *China* at Ta-yü and Ning-kang [uncertain name, "Yung-ning"]. At Ning-kang, houses and fields were damaged by the floodwaters. During the period 1-29 August, floods struck many regions of China including:<sup>153</sup>

— Kiangsu (now Jiangsu province) on the east coast of *China* at Yen-ch'êng and Suchow. At Suchow, houses were damaged by the floodwaters. At Yen-ch'êng, several tens of thousands of houses were damaged.

— Kiangsi province at I-ch'un.

— Shantung (now Shandong province) on the east coast of *China* at An-ch'iu and T'an-ch'êng [possible misprint, "Yen-ch'êng"]. At An-ch'iu, 6 or 7 li [over 2 miles] flooded and some people drowned.

— Anhwei (now Anhui province) in eastern *China* at Tung-liu, Ying-shang, Wu-ho and Po.

— Hupeh province at Wuchang, Chia-yü, Han-ch'uan, Huang-p'o, Hsiao-kan, Chung-hsiang and Hanyang.

**Winter of 1742 / 1743 A.D.** The Seine River in *France* was entirely frozen over.<sup>38</sup>

The Seine River in *France* was on 27 December 1742 at 13.5° F (-10.3° C) , frozen in its breadth and stayed for a portion of January in this state.<sup>62</sup>

During December 1742 and January 1743, several ships suffered by storms. On the 1 January 1743, a large Dutch ship bound from Curasoe [Curaçao] for Amsterdam with the Master and a crew of 31 came into Ballyvaughan Harbor in *Ireland* with a cargo of 400,000 *l.* value. They had been eight weeks at Sea, without other sustenance than rainwater and cocoa nuts. The ship was stove to pieces on the Coast of Galway, and a great part of her cargo was plundered. All the crew had large sums of money about them, and one of them who died in the boat, was rifled as soon as brought ashore; another was robbed of 170 pieces of eight, and a ring he had on his finger, which being tight, was gnawed by one of the villains to get it off. The rest of the crew shared the same inhuman treatment. If they had not been protected by the timely assistance of Mr. Wecomb, a neighboring gentlemen, who likewise went to save what he could of the wreck. The *Neptune*, Captain Lawson, from Antigua with rum, sugar, &c. bound for Dublin, was forced on shore in Cardigan Bay, *Ireland*, where the people not only plundered the cargo, but destroyed the ship, and made an attempt on the captain's life, who endeavored to defend his vessel and goods. A vessel from Cork, for Amsterdam, having foundered off Jersey Island, the crew, amounting to seven, got ashore in the boat, and while five of them went to look for lodging in the country, the people came down and murdered the two in the boat.<sup>286</sup>

Frost in *England*.<sup>40, 41, 43</sup>



In *England*, by the 18<sup>th</sup> of December 1742, the frost was very severe for many weeks. “The frost having continued near three weeks, the streets in some parts of the city, though there had been no snow, were rendered very incommodious, and several accidents happened.”<sup>47, 93</sup>

On 18 December 1742, there was a frost in London, *England* that lasted for three weeks but without any snow. There was significant ice on the River Thames.<sup>212</sup>

On 18 December 1742, [London, *England*] reported, “The frost having continued near three weeks, the streets, in some parts of the city, tho’ there had been no snow, were rendered very incommodious, and several accidents happened. Most of the merchant ships in the river, unloaded, were hawl’d [hailed] on shore, to prevent any damage they might receive from the vast floats of ice, and crossing in wherries was become almost impracticable. On the 16<sup>th</sup> at night two boats, one with four women and a waterman [a river worker who transferred passengers across and along the city rivers], and the other with a waterman only, were jamm’d in by the ice at Westminster, and the passengers got not to land till 9 next morning at Fulham; having lost the use of their limbs.”<sup>285</sup>

During the winter of 1742-43, Marshall Belle-Isle left Prague [*Czech Republic*] according to French accounts with 11,000 foot and 3,000 horse soldiers. The Austrian according to their accounts killed and took prisoners between four and five thousand [in the Bohemina Forest], including those destroyed by the cold, seized the greatest part of the French baggage, and the wagons loaded with the plunder of Prague. Nothing they say, can describe the dismal spectacles in the road, which the French took. They were strewed with the dead, or dying bodies of men and cattle, and full of blood, and the villages burnt and plundered. The frost was so excessive that many of the French were unable to march, and some of those taken prisoners lost the use of their limbs on approaching the fire.<sup>286</sup>

The winter of 1742-43 was severe in *France* and Quebec, *Canada*. In Paris, *France*, the Seine River froze on the night of the 26<sup>th</sup>/27<sup>th</sup> of December 1742. The thermometer read 13.5° F (-10.3° C) on 27 December and on 10 January 1743 the readings took place in ice conditions. It is believed that in Quebec, *Canada* the thermometer fell almost to the freezing point of mercury. [The mercury in mercury thermometers solidifies (freezes) at -37.89 °F (-38.83 °C).]<sup>62</sup>

At Fort Churchill [located on the west shore of the Hudson Bay in Manitoba, *Canada*] the winters around 1742 were severe. The fort was situated upon an elevated situation upon a rock without shelter, close by the shore, surrounded with snow and ice for eight months in the year, exposed to all the winds and storms. The town of Missilimakinac [Michilimackinac, Michigan in the *United States*] is situated a league [3 miles, 4.8 kilometers] of the Entrance of the Illinese Lake [Lake Michigan]. This lake has excellent climate. On the north side of the lake, the spring begins in April N.S. [new style – Gregorian calendar]. In the land, the ice breaks up in March, but there is floating ice until the beginning of April. The frost and the winter set in during the latter end of November. On the southern side of the lake, the winter breaks up the beginning of March, all the ice being gone before April, and the winter does not begin until the beginning of December. On the south side of the lake is the River Chicacou [Chicago in Illinois], which was frozen over the beginning of December, and upon the 3<sup>rd</sup> of January it began to thaw and was navigable on the 24<sup>th</sup>. Lake Errie or Conti [Lake Erie] has excellent climate. It is never disturbed by storms and only has 3 months of winter.<sup>292</sup>

In the *United States*, the winter of 1742 was one of the coldest winters since the settlement of the country; a gentleman drove himself with a horse and sleigh through Long Island Sound (on the ice) to Cape Cod.<sup>1</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1743 on March 1<sup>st</sup> – very cold. This has been a closed [overcast] winter, the snow was constantly so deep in the woods that the teams could not stir, though there was not so much near us, and in Boston there was hardly any.<sup>78</sup>

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**1743 A.D.** On 1 February 1743 at night there being a great storm of wind, many ships were drove from their moorings in the [River] Thames [in London, *England*]. Barges and boats were overset, and some people drowned.<sup>286</sup>

On 3 February 1743, there was a great gale at London, *England* that caused many [ship]wrecks.<sup>212</sup>

On 1 April 1743, there was a violent northeast gale at Newcastle, Hartley, Blyth, Sunderland, Scarborough, Whitby, and on the Norfolk coast in *England*. The storm produced many [ship]wrecks.<sup>212</sup>

On 1 April 1743, a violent storm or rather hurricane at northeast struck *England*. It began at 6 o'clock in the morning. Seven cobsles [fishing vessels] belonging to Newcastle, attempted to make the harbor. Two of which with great difficulty got safely into the harbor. But the other five being at a greater distance from land, and the men much fatigued when they came near shore, were incapable of managing their boats, so that they were all, to the number of 19 [individuals], lost in sight of the towns people, who could give them no assistance. Two vessels belonging to Hartly [Hartley], and one to Blyth, were lost at the same time, and all the people perished. Several ships lying at Sunderland were drove to sea in great confusion, running foul of each other, with the loss of their masts, bowsprits, &c. Two ships foundered near the bay, one of which appeared to be a new one of 300-tons, and the other about 200-ton, whose crews all perished. The riggings and the masts of the ship came ashore near Scarborough. Another ship likewise ran ashore at the same place and was beat to pieces. A great many wrecks appeared all along the Yorkshire coast. Three colliers were drove by the violence of the wind on Whitby Rocks in Yorkshire, and all lost with their crews. A Boston vessel was also lost at Blackney [Blackeney] in Norfolk.<sup>286</sup>

On 27 April 1743, there was a gale at Gravesend in Kent, *England*. “His Majesty driven back and detained at Sheerness by the gale.”<sup>212</sup>

On 15 July 1743, a hailstorm struck [the London Borough of] Enfield in *England*. The hailstones were as big as nutmegs and they broke the windows and laid [down] the corn [grain] for several miles round.<sup>212</sup>

On 15 July 1743 in Enfield (Middlesex) England, there were hailstones as big as nutmegs. The hailstones broke windows, and laid the grain for several miles round. A boy and 2 horses were killed by the lightning.<sup>93</sup>

On 15 July 1743 in *England*, there was a hailstorm at Middlesex and Leicestershire.<sup>93</sup>

On 15 July 1743, hailstones fell about Enfield [a suburb of London], *England* as big as nutmegs, broke the windows, and laid the corn [grain] for several miles round. A boy and two horses were struck dead by lightning.<sup>286</sup>

A major heat wave struck Peking (now Beijing) in northern *China* on 25 July 1743. Eleven thousand people suffered heatstroke. The temperature was 120° F (49° C).<sup>28</sup>

More than 5,400 people died suddenly in Beijing, *China* in 1743 from the effects of extreme heat. The thermometer recorded 34° Reaumur (108.5° F, 42.5° C).<sup>80</sup>

In 1743, the price of wheat [in *England*] averaged 25 shillings per quarter [quarter ton].<sup>212</sup>

On 18 August 1743, a thunderstorm struck Tewkesbury in Gloucestershire, *England*. The storm produced

unusual hail with thunder and lightning. The hailstones were as big as hen's eggs. They broke windows to the value of £1000. [In today's currency, this would be equivalent to £141,000 using retail price inflation index.] They struck off the ears of corn [grain] and killed pigeons. At Chester, the storm was equally violent, so that in some places only very little wheat could be reaped.<sup>212</sup>

A storm struck Tewkesbury, in Gloucestershire, *England* on August 18 causing 1,000*l.* damage.<sup>40, 41</sup>

On 18 August 1743, a very unusual storm of hail, with thunder and lightning did much damage in the northwest part of the Kingdom [*England*]. The hailstones were as big as hen eggs, and broke the church and other windows in Tewkesbury, to the value of 1000 *l.* It struck off the ears of the corn [grain], and killed several pigeons. The storm was felt almost with the same violence as far as Chester, so that in some places little of the wheat could be reaped, and they were obligated to turn out their hogs to eat up the rest. At Leicester fell pieces of ice near 5 inches [13 centimeters] in length and hailstones 2 inches [5 centimeters] in circumference, which killed some hundreds of small birds. The streets were so flooded, that almost all the houses had water in them several feet deep. Many wagonloads of ice were gathered in heaps. This storm was compared there to the breaking of waterspouts.<sup>286</sup>

On 19 August 1743 in the western and northwestern area of *England*, there were hailstones as big as hens' eggs. Church and other windows broken in Tewkesbury to a value of £1000. Pigeons were killed and grain crops destroyed. The same storm felt in Cheshire where there was great damage to grain crops, which were afterwards fed off by pigs. The storm extended into Gloucestershire, Leicestershire and Warwickshire. In this same storm, there fell at Leicester pieces of ice 5 inches long, and many large hailstones. These hailstones killed hundreds of small birds. The hail blocked the drains, and the town was flooded. Tons of ice were gathered into wagons. The storm was compared there to the "breaking of waterspouts."<sup>93</sup>

In September 1743, several ships of the Jamaica fleet suffered in a hurricane at sea [in the *Atlantic Ocean*].<sup>286</sup>

On 20 October 1743, a hurricane struck *Jamaica*.<sup>124</sup>

On 20 October 1743, a hurricane struck *Jamaica*. A great number of marines were drowned.<sup>141</sup>

[The source cites this year as 1740, but it appears to be out of chronological order, which leads me to believe the actual year is 1743] Droughts engulfed many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Anhwei (now Anhui province) in eastern *China* at Shou.

— During the period between 5 February and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China* at An-hsin [uncertain name, "Hsin-an"].

— During the period between 24 April and 23 May, a drought engulfed Anhwei province at T'ung-ling.

— During the period between 24 May and 21 June, a drought engulfed Hopei province at Kao-ch'êng.

— During the period between 21 July and 18 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tê and Hopei province at Wu-ch'iang, Chêng-ting, Ho-chien, Ning-ching and Hêng-shui.

— During the period between 8 November 1743 and 5 February 1744, a drought engulfed Hopei province at Wu-i.

In 1743 during the period between 6 May and 8 August, floods struck Hupeh (now Hubei province) in central *China* at Huang-kang and I-tu; Kiangsi (now Jiangxi province) in southern *China* at Hsing-kuo; and Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-ch'un.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 28<sup>th</sup> – there has been no easterly weather this month, and though cold, yet raw and chilly as usual. The roads are everywhere as dry as summer. May 1<sup>st</sup> – an uncommonly dry time. May 7<sup>th</sup> – refreshing rains. June 1<sup>st</sup> – Indian corn wants heat. June 20<sup>th</sup> – a very dry time; people fear a drought. June 22<sup>nd</sup> – it rained plentifully. June 27<sup>th</sup> – there are millions of worms, in armies, appearing and threatening to cut off every green thing; people are exceedingly alarmed. July 1<sup>st</sup> – days of fasting are kept in one place and another, on account of the worms. July 28<sup>th</sup> – an exceeding scarce time for hay: it is £7 to £8 a load. August 1<sup>st</sup> – fine growing season. October 31<sup>st</sup> – wonderful weather, moderate and dry. November 7<sup>th</sup> – there has been no rain for many weeks, so that not a mill goes in this part of the country. [The rivers are dry and the water mills could not function.]<sup>78</sup>

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**Winter of 1743 / 1744 A.D.** In 1744, the Seine River in *France* was entirely frozen over.<sup>38</sup>

The Seine River in *France* froze on the morning of 11 January 1744, in low northeast winds and clear weather, while the thermometer showed 16.3° F (-8.7° C).<sup>62</sup>

The winter in 1744 in *France* was severe, but the cold was not as great nor did it last as long as the winter of 1742. The Seine River froze on the morning of 11 January between the Pont-Neuf and Pont-Royal entirely. The coldest day occurred on 14 January measuring 14° F (-10° C).<sup>62</sup>

In January 1744, there was so great a fog at The Hague in *the Netherlands*, that at midday the people were forced to carry torches before the coaches, and the coachmen had to lead their horses to prevent accidents. The people in churches, were obligated to remain there until the weather cleared up before they could return home.<sup>287</sup>

On 29 January 1744, the temperature at Lydon in Rutland, *England* fell to 20° F [-6.7° C].<sup>300</sup>

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**1744 A.D.** On 19 February 1744, a gale struck Deal in Kent, *England*. On 25 February, a great gale struck Deal. And then on 28 February, another gale struck Deal.<sup>212</sup>

On 20 February 1744, a gale struck Guernsey [in the *English Channel* off the coast of Normandy].<sup>212</sup>

A storm on 20 February 1744 caused two French Men-of-War ships to split on the Rocks of *Guernsey*, an island in the English Channel. Two others were able to make harbor, one without its head and the other had lost its masts. A storm on 24 February caused nine or ten merchant ships to be driven ashore from the Downs in *England* and several of the crews perished. On 5 March, it was reported that General Bowle's Regiment of Horse landed at Parkgate, from Dublin, *Ireland*. They had so bad a passage in the late storm that upwards of 50 of the horses died. It was reported on 10 March that 7 or 8 French transports with troops were cast away in a storm.<sup>287</sup>

On 24 February 1744, a northeast gale struck Brighton on the southern coast of *England*. A dozen ships were driven on shore from the Downs.<sup>212</sup>

On 2 April 1744, it snowed in London, *England*. Then on 6 April, it was the greatest cold in the month at 34° F [1° C]. Then on 20 April, London experienced its first warm day of the year when the temperature rose to 65° F [18° C]. The next day, temperatures peaked at 75° F [24° C]. On 24 April, a lightning storm struck London.<sup>212</sup>

The maximum temperature during the summer on a plantation on the Comewyne River, [*Suriname*], was 89.4° F (31.9° C).<sup>62</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 29<sup>th</sup> – a forward spring; a great mercy, on account of the scarcity of hay. No person ever saw such an April in this eastern country, so dry and warm and pleasant. May 1<sup>st</sup> – a fine season as ever was known. May 31<sup>st</sup> – no person in the land ever saw such a spring, so hot, and intermixed with seasonable showers. We have ripe strawberries, and everything were two weeks more advanced than normal. July 15<sup>th</sup> – a wonderful year for grass and hay, both English and salt. August 20<sup>th</sup> – I don't remember that pigeons were ever so plentiful as now. October – I reckon this month was more like the month of September, and September was more like October.<sup>78</sup>

On 4 June 1744 in *England*, there was a great hailstorm in Gloucestershire.<sup>93</sup>

On 4 June 1744, a thunderstorm struck Gloucester, *England*. The storm began at noon and lasted all afternoon. It produced thunder, lightning, hail and rain and did much damage. In the North Highlands of *Scotland* another storm caused a great inundation, which carried away several houses and two fine bridges.<sup>212</sup>

On 4 June 1744, Gloucester in southwest *England* advised that at noon began there a most violent storm of lightning, thunder, hail and rain, which lasted the whole afternoon and did much damage. In the North Highlands in *Scotland* was a storm of thunder, lightning and rain, which caused a great inundation, and carried away some houses and two fine bridges build by General Wade.<sup>287</sup>

In 1744, the price of wheat [in *England*] averaged 25 shillings per quarter [quarter ton].<sup>212</sup>

On 13 August 1744, a very violent thunderstorm struck Edinburgh, *Scotland*. “The rain so great that ye streets and cellars were filled with water. The hailstones measured five inches [13 centimeters] round, and entirely threshed the standing corn.” The next day a violent thunderstorm struck London, *England*.<sup>212</sup>

On 13 August 1744, at Edinburgh, *Scotland* and several miles to the southwest was felt a very violent thunder and lightning storm. Several people in the castle were stunned [by the lightning], and some houses in the city were damaged. The storm of rain was so great at the same time that streets and cellars were filled with water. The steeple of Liberton Church was ruined and the east end of the church a smooth round hole made, as if done with the greatest art. A man and a horse were killed near Strathmiglo. The hailstones measured 5 inches [13 centimeters] round. The hailstones entirely shreaded [shredded] the standing corn [grain].<sup>287</sup>

On 14 August 1744 in *England*, a storm of thunder and lightning struck a lad dead, and a woman blind in St. George's Fields. Another person was struck blind in Black Pryers, and a journeyman painter at work in a house near Streatham Church in Surrey.<sup>287</sup>

In October 1744 [in *England*], the constant heavy rain caused floods in divers [diverse] places. As a consequence, sheep and cattle drowned.<sup>212</sup>

Great many pieces of a shipwreck were observed. A large ship believed to be English struck the rocks called the Caskets near the Isle of Awvigny [Acquigny] in *Normandy* during a terrible storm. The shipwreck occurred a few days before 20 October 1744.<sup>287</sup>

A letter dated from 30 October 1744 from Derby in the East Midlands region of *England* reported; “The continual rains have overflowed these parts, and the bridges in many places are covered with water, so that the farmers cannot come to market, many thousand acres of land are like a sea, vast numbers of sheep and other cattle drown'd, and great quantities of barley destroyed, which has occasioned a considerable rise in that commodity. Mr. Warner, a farmer near Mansfield, was drown'd last week in crossing the river Ouse.” Similar accounts were received from Kent, the Isle of Sheppey and other places.<sup>287</sup>



On 31 October 1744, [England] reported that the constant and heavy rain this month occasioned floods in diverse places, and some sheep and other cattle were drowned.<sup>287</sup>

In October 1744, Flanders [now Belgium] reported that the wind and rain was so violent for 3 days that great numbers of their soldiers became sick and as a result the Army went into winter quarters. The other armies in the region also retired. The English horse guard and the regiment of horse proceeded to Brussels; and the foot and dragoons to Ghent and Bruges, the Dutch, Austrian and Hanoverians went likewise to their respective quarters. A dreadful murrain broke out among the black cattle, calves, sheep and hogs in Burgundy, Forest, Beaujolais, Lyonnais, and Dauphiny. The animals died of this distemper. Their spleen and lungs were quite dried up. But the peasants discovered a very odd cure. If the beast were buried alive in a hole full of mud, with nothing but the head of the beast sticking out for 9 hours, when the animal was removed, they were well.<sup>287</sup>

On 20 October 1744, a dreadful hurricane struck *Jamaica*. The hurricane began at six in the afternoon and lasted until six in the morning. The wind during this time was due south. Mosquito Fort was demolished— eight of his Majesty's ships and vessels, and ninety-six merchant vessels, were stranded, wrecked, and foundered. Out of 105 vessels, only his Majesty's ship *Rippon* rode out the gale, and she without masts. His Majesty's ships *Prince of Orange*, *Bonetta*, and *Thunder* bomb were wrecked, but the people saved. [A bomb ship was a wooden sailing ship that fired mortars.] The *Montague* went aground and bilged. The *St. Alban's* and *Experiment* on shore. The *Greenwich* sunk, and Captain Allen and seventy-one men drowned. The *Lark* hulk sunk, and 110 persons drowned.<sup>143</sup>

A violent hurricane struck *Jamaica* in October 1744. The hurricane, which was accompanied by an earthquake, almost destroyed Port Royal. The fortifications at Mosquito Point (later known as Fort Augusta) were badly damaged and the Old Harbour was swept away. Only one out of 105 ships then in Kingston Harbor managed to ride out the storm.<sup>152</sup>

A hurricane struck *Jamaica* in October, 1744.<sup>40, 41, 42, 43</sup>

Port-Royal in *Jamaica* destroyed by a storm on October 20, 1744.<sup>43, 56</sup>

On 20 October 1744 at *Jamaica*, happened as dreadful a storm as ever was known in this part of the world. It began about six o'clock in the evening, and lasted till 6 o'clock in the morning. The winds at all times were due south. By this hurricane, the new fort at Mesquita point was demolished, many houses were blown down, roofs and piazza's blown off, and the wharfs of this town, Port Royal and Passage Fort destroyed, and a great part of the goods thereon washed away. Eight of his Majesty's ships and vessels, and 96 merchant vessels were stranded, wrecked and foundered, so that out of one hundred and five vessels, only his Majesty's ship the *Rippon* rode it out but without masts. The people in Port Royal were terribly afraid of a deluge, the town being two or three feet [0.6-0.9 meters] overflowed from the harbor, and the sea threatening destruction, which the wall most happily prevented. They have met with great damages in their houses, &c. In the country, several plantations, houses, works, &c. were destroyed. Many people, both white and black, drowned. Cattle, sheep, poultry, and provisions in great quantities of all kinds destroyed by the fury of the tempest, and the rapidity of the overflowing rivers. Of his Majesty's ships, the *Prince of Orange*, *Bonetta*, and *Thunder* bomb were wrecked, but the people saved. The *Montague* aground, bulged, and lost her mast but the people were saved. The *St. Albans* and *Experiment* ashore, the people saved and both will be got off. The *Greenwich* sunk, and Captain Allen, and lieutenant Battersworth, and 70 men drowned. The *Lark* hulk sunk, and about 20 white men and 90 Negroes drowned. The greater part of the merchant ships will get off, and most of their cargoes saved.<sup>288</sup>

On 31 October to 1 November 1744, a hurricane struck *Jamaica* causing 182 deaths.<sup>141</sup>



In 1744, a storm did prodigious damage at Port Royal, in *Jamaica*. It stranded, wrecked and foundered eight British ships, and ninety-six merchant ships in the harbor.<sup>174</sup>

In 1744, there was a famine in *India*.<sup>156</sup>

In 1744, floods struck many regions of *China* including:<sup>153</sup>

— Hopei (now Hebei province) in northern *China* at Tientsin, Ho-chien, Pa and Fu-ning.

— During the period between 11 June and 9 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ên-hai and Ta-pu. At Ch'ên-hai, the dikes and several hundred house-sections were damaged by the floodwaters. At Ta-pu, over 190 house-sections damaged.

— During the period between 10 July and 7 August, floods struck Hupeh (now Hubei province) in central *China* at Han-ch'uan; Szechwan (now Sichuan province) in southwest *China* at Sui-ning, Chien-yang, Ch'ung-ch'ing, Mien-yang, Ch'iung-lai, Chengtu, Hua-yang, Chin-t'ang, Hsin-tu, P'i, Ch'ung-ning, Wên-chiang, Hsin-fan, P'êng-shui, Shih-fang, Lo-chiang, P'êng-shan, Ch'ing-shen, Yüeh-shan and Jen-shou; and Shantung (now Shandong province) on the east coast of *China* at Tzū-yang and Shih-hung. Over 600 persons drowned in these three provinces.

— During the period between 8 August and 5 September, floods struck Hupeh province at Tang-yang and Chekiang province at Shao-hsing, Ch'ang-shan, Ch'un-an, T'ung-lu, Ch'ang-hua, Chia-shan, and Chien-tê. At Tang-yang and Shao-hsing, the crops were damaged by the floodwaters. At Ch'ang-shan, innumerable people drowned.

In 1744 during the period between 12 May and 10 June, a drought engulfed Hsi-ch'ing [uncertain name and province]; Ch'ing-p'ing [uncertain name and province]; and Hopei (now Hebei province) in northern *China* at Kao-i and Ning-ho. During the period between 8 August and 5 September, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Hui-min.<sup>153</sup>

The year 1744 was a year of abundance in the vicinity of Shanghai, *China*.<sup>166</sup>

**Winter of 1744 / 1745 A.D.** In 1745 in *Russia*, the frost was unusually severe.<sup>47, 93</sup>

In 1745 the cold of winter reached 14° F (-10° C) in January in the region of olive groves in southern *France*. Many of these trees died.<sup>79</sup>

The winter in 1745 was very long in *Italy* and strong. In Paris, *France* the thermometer on 14 January 1745 read 9° F (-12.8° C); but this cold did not last long and the winter was without snow.<sup>62</sup>

On 10 January 1745 in South Carolina in what would become the *United States*, the temperature at 2 p.m. was 70° F [21° C]. The next morning it had fallen to 26° F [-3° C]. And on the 12<sup>th</sup> in the morning it reached 15° F [-9° C].<sup>295</sup>

**1745 A.D.** In Dublin, *Ireland*, there was a great flood; serious damage to bridges.<sup>47, 92</sup>

In April 1745 in London, *England*, a great cattle plague began, having been brought from *Holland* [*the Netherlands*]. It also struck other parts of *England* and lasted for many years. In summer it was very violent in Essex. In the autumn it was very violent in London. In Buckinghamshire, it was stamped out by killing the cattle that were sick. It appeared two years before in *Germany*. The cattle plague appeared in Argyllshire [*Argyllshire, Scotland*] in May, where it caused a great mortality among the black cattle. Six thousand died.<sup>212</sup>

On 11 May 1745, a hailstorm struck Yorkshire, *England*. The great storm caused great damage to the

gardens and fields. The hailstones were 5 inches [13 centimeters] in circumference.<sup>212</sup>

In Yorkshire, *England* in May, there was a hailstorm with stones measuring 5 inches round.<sup>40, 41, 43, 56, 57</sup>

On 11 May 1745, in *England*, hailstone masses of ice 5 inches in length fell in Yorkshire and did great damage to fruit and grain crops.<sup>93</sup>

On 11 May 1745, there was a great storm of hail. The hailstones, which were 5 inches [13 centimeters] about fell in Yorkshire, *England*, and did much damage to the fields and gardens.<sup>288</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Rome, <i>Italy</i>	( 95.0° F, 35.0° C)
Moscow, <i>Russia</i>	( 94.1° F, 34.5° C) on 15 June

The rains of 1745 caused extensive flooding in southern *France*. There were 72.4 inches (1,840 millimeters) of rainfall in Nîmes; 33.2 inches (844 millimeters) in Toulon; and 32.7 inches (830 millimeters) in Bordeaux.<sup>79</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

February – a very moderate, pleasant month; but little snow or foul weather. March 30<sup>th</sup> – this month has been like February; wonderfully pleasant, and like a normal April. June – so cool a June has not been known. August 18<sup>th</sup> – a good hay season. September 30<sup>th</sup> – no frosts till a night or two ago. October 26<sup>th</sup> - warm and pleasant.<sup>78</sup>

On 25 June 1745, there was a thunderstorm at Norwich, *England*. The storm was very violent at Horseford. There was a sudden sinking of the earth, leaving a hole 12 feet [3.7 meters] deep, and 12½ feet [3.8 meters] in diameter, circular in form, having perpendicular sides, and without cracks.<sup>212</sup>

In 1745, the price of wheat [in *England*] averaged 27 shillings 6 pence per quarter [quarter ton]. Other accounts give the price at 19 shillings.<sup>212</sup>

On 24 October 1745, a letter from Plymouth, England reported that his Majesty's ship, the *York*, chased ten French merchant ships, and two frigates, their convoy on the coast near Audierne Bay [in northwest *France*], and being in a hard gale at southeast was lost with them, and the crews of the whole perished.<sup>288</sup>

During 18-20 November 1745, tempestuous weather struck *Great Britain*. Several vessels were lost at sea particularly his Majesty's ship the *Fox in the Frith* and all men lost. Also two sloops of war were lost. The same storm was also felt by our enemies, and their embarkations retarded.<sup>288</sup> [At this time England was pursuing war with rebel armies in Scotland.]

During 18-20 November 1745, a gale struck throughout *England*. It caused many shipwrecks.<sup>212</sup>

In 1745 in London, *England*, the spring and summer were very wet. Autumn was cold and dry. The winter was damp and cold.<sup>212</sup>

In *India* during the years 1745-52, there was a famine in Nara districts of Sind [now *Pakistan*], and Thar and Parkar.<sup>57</sup>

In 1745 A.D., there was a famine in Sindh [now a province in *Pakistan*].<sup>179</sup>

In 1745, floods struck many regions of *China* including:<sup>153</sup>

— During the period 2-30 May, floods struck Hsi-kuei [uncertain name]; Kweichow (now Guizhou province) in southwestern *China* at P'an; and Hupeh (now Hubei province) in central *China* at Mien-yang and Ch'ien-chiang.

— During the period between 31 May and 29 June, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at T'ai; Anhwei (now Anhui province) in eastern *China* at Po; Po-hsien [uncertain name, uncertain province]; and Kansu (now Gansu province) in northwest *China* at T'ien-shui. At Po-hsien and T'ien-shui, innumerable people and cattle drowned.

— During the period between 29 July and 26 August, floods struck Kansu province at Ch'ing-shui [uncertain name, "Pai-sha"] and Lung-hsi [possible misprint, "Lung-shih"]; and Hupeh province at Tsao-yang and Chiang-ling. At Ch'ing-shui, the dikes and many houses were damaged by the floodwaters.

— During the period between 23 November and 22 December, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan; Hupeh province at Tsao-yang, Ch'ien-chiang and Mien-yang; Kiangsi (now Jiangxi province) in southern *China* at I-ch'un; and Shantung (now Shandong province) on the east coast of *China* at Kao-wan.

In 1745 during the period between 31 May and 29 June, a drought engulfed Hopei (now Hebei province) in northern *China* at San-ho. During the period between 8 August and 8 November, a drought engulfed Hopei province at Yüan-shih, Hsing-t'ai, Tsao-ch'iang, Chêng-ting, Wu-chi and Kao-ch'êng; Chahar province (now eastern *Inner Mongolia*) at Huai-lai; and Shansi (now Shanxi province) in northern *China* at Hsi-yang and Tai. Crops were damaged by the drought.<sup>153</sup>

In 1745 during the 2<sup>nd</sup> moon on the 9<sup>th</sup> day, there was a hailstorm in the vicinity of Shanghai, *China*. Hailstones fell, which were the size of millstones; killing birds, beasts and men. At the time of the hailstorm, it grew suddenly as dark as night; lamps were lighted; again after it was over, the sun suddenly shone brightly. This darkness lasted about four hours.<sup>166</sup>

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**Winter of 1745 / 1746 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1745 on November 16<sup>th</sup> – uncomfortable weather; deep snow in Boston, Massachusetts that lied on the ground all week; a considerable snow in Portland, Maine. December 27<sup>th</sup> – thus far moderate, and hardly like a normal December. December 31<sup>st</sup> – a blustering, severe night. This is the first day that looks like winter. No sledding yet. In 1746 on January 31<sup>st</sup> – a fine, moderate winter thus far. Only two short cold snaps. February 24<sup>th</sup> – the snow is three or four feet (0.9 or 1.2 meters) deep in the woods. February 28<sup>th</sup> – the snow is still as deep as at any time this winter. March 20<sup>th</sup> – a severe month, quite unlike the last. The snow still covers all the Neck [peninsula].<sup>78</sup>

On 20 February 1746, a storm struck Louisbourg [on Cape Breton Island, Nova Scotia, *Canada*]. “A violent gust of wind and snow storm arose, which shipwreck'd almost all the vessels in the harbour, and among other damages done in the city, the general's house did not escape, but a great part of its roof was blown down. On the evening before, it was clear, still weather, and no symptoms of a stormy night; yet before morning the whole harbour was blocked up with ice and snow, so that it was all as firm land. The greater sort of seals [seals] and sea-cows were trapan'd [trapped] thereby, and left their watry [watery] element, for fear of being drowned. The whalemén, who were posted on the island battery, drove near a dozen of these sea-cows ashore alive on that fortress. Many of them were almost thrice the bigness of a large horse; their skins are almost an inch thick, and some of these sea animals will make more than a barrel of oil. Their teeth, or rather horns, were about two feet [61 centimeters] in length, and are some of the finest ivory in the world. The French say there was never such a sight seen here before; and, what was very affecting and awful, the force of the wind and sea drove the ice so hard against the walls of the island battery, that it burst open the gates (tho' barr'd with iron) and tore up the dead corps [corpses] in their coffins which were buried on that battery; and these were seen jamm'd in the ice, in one place and another, and people now walk over the harbour in safety as on terra firma [dry land].”<sup>294</sup>

This winter in *Russia* was of great severity. In Astrakhan in the *southern European Russia*, the thermometer fell to  $-23^{\circ}\text{F}$  ( $-30.6^{\circ}\text{C}$ ). In Paris, *France* the coldest day was 15 February with a reading of  $15.6^{\circ}\text{F}$  ( $-9.1^{\circ}\text{C}$ ). The Seine River produced ice floes twice, once on 14, 15 and 16 February, and again on 13 and 14 March.<sup>62</sup>

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**1746 A.D.** The summer of 1746 produced very hot days in the *Languedoc*. In the middle of *France* there were large storms in June. The grape harvest in Burgundy only began on 26 September. The harvest of wine was not very abundant, but of excellent quality. The grain production was only two-thirds of an average year. There was an abundance of vegetables; but little fruit. The year was dry throughout its duration. Only 390 millimeters (15.4 inches) of rain fell during the year.<sup>62</sup>

On 19 May 1746, the ship *Elizabeth and Mary*, commanded by Captain Adamson met with a violent storm of wind and ice [in the *Atlantic Ocean*], which lasted 48 hours in which 30 Dutch vessels and 3 English vessels (the *Volunteer*, Captain Alcock; the *Hurst* galley, Captain Guy; and an unidentified ship commanded by Captain Nicholson) were lost. The *Elizabeth and Mary* was almost torn to pieces. The *Elizabeth and Mary* took 130 men from the *Volunteer* and *Hurst* onboard but the rest was feared lost. The above English vessels had on board 2 and 3 whales each; which the Dutch found means to save, though they refused to take any men onboard except 83, who had saved themselves in some Greenland yawls, and forced their way into one of them, and were afterwards taken onboard the *Elizabeth and Mary*. The Dutch ships caught 406 whales, including 23 that were lost in the ships cast away.<sup>289</sup>

On 24 June 1746, there was a violent storm of wind, with thunder and rain, which did much damage. The *Berkeley* galley, commanded by Captain Steward, bound for Cape Breton, with several families going to settle there, was overset between Fiarlee and Beech, on the coast of Kent, *England*, and all but three perished. Letters from Tunbridge relates that the tempest blew down several elms, and the lightning rived [tore apart violently] into splinters 4 oaks, and that for 15 minutes there was a continuous thunder without intermission and a continual storm of hail, rain and flame [lightning]. Several sheep were killed, and one man and two horses were struck dead near Boughton-Green fair [*England*]. The man had his fingers and his toenails, and the skin of his legs stripped off, whence issued a sulphurous scent.<sup>289</sup>

On 24 June 1746 in *England*, there was a hailstorm in Kent.<sup>93</sup>

On 24 June 1746, a violent gale with thunderstorm struck Kent, *England*. The gale caused much damage.<sup>212</sup>

On 18 July 1746, it was the hottest day [of the year] in London, *England*. The temperature reached  $85^{\circ}\text{F}$  [ $29^{\circ}\text{C}$ ] in the shade. The next day the temperature was  $77.5^{\circ}\text{F}$  [ $25^{\circ}\text{C}$ ].<sup>212, 296</sup>

In 1746, the price of wheat [in *England*] averaged 20 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1746, the cattle plague struck Cottenham in Cambridgeshire, *England*. In 1746 and 1747, 1,200 cattle perished. The disease spread in *England*. It August, it broke out again in London.<sup>212</sup>

In 1746, a hurricane struck the Gulf coast of the *United States*.<sup>117</sup>

In 1746, a hurricane struck the *Caribbean Sea*. Thirteen out of twenty-one ships on their way from Brazil to Lisbon, Portugal "disappeared without a trace" in a hurricane.<sup>141</sup>

On 2 October 1746, a typhoon struck along the coast of *India*. The French squadron, commanded by Le Bourdonnai, being at anchor in Madras Roads [now near Chennai], a hurricane came on, which in a few hours destroyed nearly the whole of the fleet, together with twenty other ships belonging to different

nations. One of the French ships foundered in an instant, and only six of the crew were saved.<sup>191</sup>

In October 1746, a violent earthquake struck Lima, *Peru*. It lasted for about 3 minutes. Fifteen hundred souls were lost, 4 churches, 14 monasteries, and 15 hospitals, besides some thousands of houses were buried in the ruins. The jewels and vessels of gold and silver lost amount, it is said to 300 million piasters [coin - piece of eight]. The town of Callao, a seaport within two leagues [6 miles, 10 kilometers] of that city was swallowed up by the sea [a tsunami], and the hurricane was so violent, that several vessels, which rode at anchor, were afterwards found on dry land several leagues up the country. The sea has filled up the place where the town stood, which was the best port in *Peru*, and all the inhabitants between 6,000 and 7,000 perished, except about 200 sailors and fishermen, who were thrown upon land with their vessels. The loss of the king of Spain is irreparable, both in regard to the settlement, and the vast treasure laid up there during the war, which was not to be brought to Europe till after a peace. (Lima has been twice before almost destroyed by earthquakes, first in 1586, and last in October 1687. The latter of these shocks was so dreadful, the *Wafer*, who felt it 150 leagues [450 miles, 724 kilometers] at sea, affirms, that it frightened the whole ship's company, who thought they had struck upon a rock, and was convinced of the contrary only by sounding. The water was mixed with sand, though no bottom could be found; and the ships on the coast were driven some leagues over the land, as in this last earthquake. The city was built by Pizarro, the conqueror of Peru, in 1534. It stood 12° 30' S.L. [south latitude] was surrounded with a wall, fortified with bastions, and very populous. The plain around it is fruitful in corn, wine, oil, sugar, flax, and fruits. It was about four miles in length, and near two in breadth; had a square, with piazzas in the center, where all the principal streets were terminated, and the palaces of the viceroy and the archbishop, with all the public offices, were situated.)<sup>293</sup>

In 1746 during the period between 19 June and 14 September, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Yü-tu.<sup>153</sup>

[Although this is cited as 1745, it is out of chronological order and these entries appear to belong within the year 1746.] In 1745, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 18 July and 16 August, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lien and Hunan province in south-central *China* at Lin-wu.

— During the period between 17 August and 14 September, floods struck Anhwei (now Anhui province) in eastern *China* at Fêng-yang, Ying-shang and Po.

— During the period between 13 November and 11 December, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling and Ch'ien-chiang. At Chiang-ling, the dikes were damaged.

— During the period between 12 December and 10 January, floods struck Shantung (now Shandong province) on the east coast of *China* at Chi-mo.

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 27<sup>th</sup> – a sweet pleasant day. April 11<sup>th</sup> – Jack dug the upper garden. April 12<sup>th</sup> – the spring is uncommonly forward. April 18<sup>th</sup> – I sowed peas, carrots, etc. April 29<sup>th</sup> – the most part of the week has been as dry as midsummer. May 4<sup>th</sup> – the creatures were let on the Neck. June 9<sup>th</sup> – a fine growing season. June 26<sup>th</sup> – the weather turned very dry. July 9<sup>th</sup> – a melancholy drought advances. July 31<sup>st</sup> – there was a little rain this morning, but the ground is exceeding dry. August 15<sup>th</sup> – it is thought the present is the greatest drought that ever was in New England. August 24<sup>th</sup> – plentiful showers. August 29<sup>th</sup> – it rained like a flood. September 29<sup>th</sup> – an unusual, moderate growing season. October 5<sup>th</sup> – it was like springtime; the grass grew surprisingly. Pleasant weather the latter part of the month. November 25<sup>th</sup> – Indian corn 25s. a bushel. November 30<sup>th</sup> – hay at Boston £20. December 1<sup>st</sup> – very pleasant day.<sup>78</sup>

The maximum temperature during the summer at Mahon, *Island of Minorca*, was 86.9° F (30.5° C).<sup>62</sup>  
[The Island of Minorca is one of the Balearic Islands off the southeastern coast of Spain in the Mediterranean Sea]



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**Winter of 1746 / 1747 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: In 1746 on December 15<sup>th</sup> – severely cold. In 1747 on January 12<sup>th</sup> – our whole bay froze over entirely.<sup>78</sup>

Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>

Governor Glen of South Carolina in the *United States*, in a pamphlet published in London in 1761, says "that on the 7<sup>th</sup> of February 1747, the temperature at Charleston was as low as 10° [F] at 8 o'clock in the morning, and had been lower during the night; that all bearing orange trees were killed to the ground, and even an olive tree eighteen inches in diameter."<sup>115</sup>

A frost in South Carolina in the *United States* on 7 February 1747 killed almost all the orange trees in the country.<sup>174</sup>

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**1747 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: January 19<sup>th</sup> – moderate weather. February 28<sup>th</sup> – since the 7<sup>th</sup>, the weather was pleasant and moderate. March 31<sup>st</sup> – there were no high winds this month or lion-like days; the month was more like April. We had our upper garden dug. April 3<sup>rd</sup> – it is thought the spring is full month forwarder than usual. April 9<sup>th</sup> – the grass grows wonderfully. April 16<sup>th</sup> – English beans and peas came up in our garden. April 30<sup>th</sup> – the latter part of this month had been pretty raw, cold and wet, and the grass no forwarder than in the beginning of April. May 24<sup>th</sup> – the earth had a fine green face. June 30<sup>th</sup> – everything is wonderfully flourishing. July 10<sup>th</sup> – mowed some of my hay. July 20<sup>th</sup> – mowers exceeding scarce. September 29<sup>th</sup> – there has been no fall like this, so moderate and dry; my potato tops look more green and flourishing than at any time this year. October 28<sup>th</sup> – the fall was dry; no water at the mills, or grinding.<sup>78</sup>

On 3 June 1747, a very violent thunderstorm struck Midhurst in Sussex, *England*. A bridge was washed away.<sup>212</sup>

In 1747, there was a flood in London, *England*. The River Thames was very high.<sup>212</sup>

On 3 June 1747, a violent storm of thunder and rain struck Arun at Midhurst in Suffex, *England*. A bridge was carried away and the church and churchyard was overflowed with water some feet deep. Several sheep were drowned and a man attending them killed by lightning, as was a grocer in Arundel.<sup>293</sup>

On 8 July 1747, a violent storm of thunder and lightning and a fall of hail struck Bristol, *England*. Many of the hailstones were several inches round. One in particular measured about 5 inches [13 centimeters] round. When it was put in a basin and dissolved, it yielded nearly a quarter pint of water. Several shocks of an earthquake, attended with a considerable noise, and succeeded by claps of thunder, were felt in different parts of Devonshire.<sup>293</sup> [The thunder was so strong that it made the ground shake.]

On 8 July 1747, thunderstorm with violent rain and hail struck Bristol, *England*. The hailstones were 2-3 inches [5-8 centimeters] in circumference.<sup>212</sup>

On 8 July 1747 in *England*, there was a great hailstorm in Gloucestershire and Somersetshire.<sup>93</sup>

On 11 July 1747, a violent thunderstorm struck Bridgewater in Sussex, *England*. The storm split trees and damaged corn [grain].<sup>212</sup>

On 12 July 1747, a violent storm of thunder and lightning, with rain struck Bridgewater in Sussex, *England*. It split trees, damaged corn [grain] and killed Mr. Best, a farmer.<sup>293</sup>



In 1747, the price of wheat [in *England*] averaged 28 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In 1747, there was a drought in *Scotland*. The autumn was hot and dry. The rivers were lower than ever known.<sup>212</sup>

In 1747, the cattle plague struck Nottinghamshire and Leicestershire, *England*. In those two counties 40,000 cattle died. In Cheshire 30,000 died in six months. In this visitation of the plague throughout *Europe*, 3 million cows died. In May, the cattle plague was very violent throughout *England*. Eighty thousand cattle were slaughtered and 150,000 died of this plague in *England*.<sup>212</sup>

In 1747, several regions of *China* experienced flooding.<sup>153</sup>

During the period of 8 June – 7 July, the following areas were affected:

— Shansi (now Shanxi province) in northern *China* at Yang-ch'êng, Ying, Hun-yüan and Tatung experienced flooding.

During the period of 6 August – 4 September, the following areas were affected:

— Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning and Chên-hai experienced flooding. At Chên-hai, the city walls were damaged.

— Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Ch'ang-shou, K'un-shan and T'ai experienced flooding. At Soochow, there was a typhoon. At Ch'ang-shou, over 74,600 acres of land and 22,490 house-sections were damaged. Over 50 persons were drowned. At K'un-shan, innumerable people were drowned. At T'ai, there was a typhoon and many people drowned.

— Hupeh (now Hubei province) in central *China* at Tsao-yang experienced flooding.

— Shantung (now Shandong province) on the east coast of *China* at Chi-yang, Tê-p'ing, P'ing-yüan, Chan-hua, Tzū-yang, Chi-ning, Chia-hsing, T'an-ch'êng, Chü, Mêng-yin, Jih-chao, and Lin-i experienced flooding. [Lin-i is located at 118.24 E. longitude, 35.07 N. latitude.]

— Hopei (now Hebei province) in northern *China* at Ch'ih-ch'êng experience flooding. [There is some uncertainty on the city location because the original text described it as Tung-ch'ih-ch'êng.]

In 1747 during the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Chi-mo and P'ing-tu. During the period between 6 May and 8 August, a drought engulfed Shantung province at Wên-têng. During the period between 8 August and 8 November, a drought engulfed Shantung province at Kao-mi and Shansi (now Shanxi province) in northern *China* at An-i and Yüan-ch'ü.<sup>153</sup>

In 1747 during the 6<sup>th</sup> moon, snow fell [during summer] in the vicinity of Shanghai, *China*.<sup>166</sup>

On 15 September 1747, the Barbados and Leeward Island fleet, consisting of 86 sails [sailing ships] met a violent storm in the *Atlantic Ocean* at North latitude 38°, about 150 leagues [450 miles, 724 kilometers] from Bermuda. Her Majesty's ship *Lyme* of 20 guns was overset and all her crew except four perished. The *William and Anne*, Capt. Wraton; the *Catherine*, Capt. Debuke; the *Unicorn*, Capt. Armstrong; the *John and Martha*, Capt. Bosewell; the *Scroop*, Capt. Rasbury, for London; and the *Polly*, Capt. Gregg, for Liverpool, all from St. Kitts, foundered but the crews were saved. The *Hornet*, Capt. Gardiner, from Barbados for Liverpool, and a ship from Falmouth foundered, and only one man, which belonged to the latter, was saved.<sup>293</sup>

Two violent hurricanes on 21 September and 24 October 1747 did great damage among the *Leeward Islands*. Fourteen sails [sailing ships] were lost at St. Kitts and thirty-six at the other islands.<sup>143</sup>

On 26 September 1747, a hurricane struck the central *Atlantic Ocean*. The Fleet from Barbados on the 15<sup>th</sup> met a violent storm in Latitude 39° North, in which the *Lyme* 20-Gun Man-of-War overset

[overturned] and all the crew except four perished. The *Homer* from Barbados for Liverpool, and a ship for Falmouth, foundered at the same time, and only one man was saved.<sup>141</sup>

On 31 December 1747, it was reported that two violent hurricanes on 21 September and 24 October last, have done vast damage among the leeward islands of *Montserrat*, *Nevis*, *St. Kitts*, and *Antigua*. Fourteen ships were lost at *St. Kitts* in the last storm. Those ships were bound for London and most of them fully loaded with sugar. The loss of all sorts of ships are reckoned above 50.<sup>293</sup>

On 1 December 1747, a violent storm struck *England*. In London, the storm blew down trees in St. James's Park and upset boats in the River Thames by which several persons drowned. The storm did a great deal of damage to the shipping on the coasts of *England* and Holland [now *the Netherlands*]. Nine English ships were lost, and many forced on shore, among them the *Nympha*, a very rich prize, taken by the Royal Family privateers, at Beachy Head; but the gold on board her, with other valuable effects were saved. Multitudes flocked to the wreck for plunder and several perished with the cold on the shore. And on their way homeward, many more were taken up as if dead but recovered by warm beds. A woman was found dead with two children crying by her. But the plundering was soon stopped. Mr. Belchier, member for Southwark and part owner, on the first news of this shipwreck, going down with a warrant from the secretary of war, for all soldiers on the coast to assist him, he met about 12 smugglers, with their loading, which they abandoned at sight of the soldiers. But on the next day, they returned in great numbers to retake it, on which, the soldiers firing, killed 2 and dispersed the rest. The *Portsmouth* storeship, laden with naval stores for the fleet in the Mediterranean, to a very great value, was sunk in 18-foot water. She had on board also Rear Admiral Forbe's baggage. Many ships were also cast away on the coasts of *Zealand*, *Denmark* and in the *Texel* in *the Netherlands* among them were lost two Dutch privateers, just fitted, with all their men. Vast damage was also done at land and the sea ran so high at Rotterdam in *the Netherlands*, as to top two stories of many houses. The hurricane extended to Brussels, *Belgium*, where it blew down the palisades and tumbled the [guard] sentries with their boxes into the ditch. The Rhine [River] carried away the bridge at Cologne, *Germany* with carts, wagons and 100 people upon it.<sup>293</sup>

In 1747, the people of *France* have suffered great distress on account of the scarcity of bread.<sup>294</sup>

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**Winter of 1747 / 1748 A.D.** In 1747, the winter was recorded as being intensely cold throughout *Europe*.<sup>1</sup>

In December 1747, the barometer went down 36 millimeters in less than two days. Strong winds from the south and southwest dominated Paris, *France* around the same month.<sup>79</sup>

The winter of 1747 was very severe in *Russia*.<sup>2, 40, 41, 43</sup>

On the morning of 13 January 1748, the Seine River in *France* began to ice up. On the 15<sup>th</sup>, the river was completely frozen. On 7 March, the ice drove home.<sup>62</sup>

The winter of 1748 was long and pretty hard. The Seine River in *France* was on 15 January was completely frozen over. On 7 March drove on strong ice. The late cold in March delayed the fieldwork.<sup>62</sup>

In 1748 the cold of winter reached 14° F (-10° C) in January in the region of olive groves in southern *France*. Many of these trees died.<sup>79</sup>

At Tholouse [Toulouse, *France*], the temperature fell to 14.9° F [-9.5° C] on 14 & 15 January 1748.<sup>295</sup>

On 1 December 1747, the temperature at Tooting in south London, *England* fell to 0° F [-18° C]. The

snow was 5 inches [13 centimeters] deep. From 29 December to 10 January 1748, there was a hard frost in London. On 3 January, it snowed at Nottingham. On 29 January, multitudes of sheep were lost under the snow in Derbyshire and Southdowns of Sussex. January was an excessively cold month. From 15-26 February, the weather was cold in London, especially on the 15<sup>th</sup> and 16<sup>th</sup>.<sup>212</sup>

During the winter of 1747-48 in New England in what was to become the *United States*, snow whirled above deep drifts around half buried houses. There were around 30 snowstorms and they came storm after storm until the snow lay four to five feet [1.2-1.5 meters] deep on the level. On 22 February 1748, snow measured 4½ feet [1.4 meters] deep in the woods and on the 29<sup>th</sup>; no one would travel unless they were wearing snowshoes.<sup>199</sup>

In February 1748, several people have been found dead this month [in *England*] due to the excessive cold. Multitudes of sheep in Derbyshire, the south downs of Sussex, and other parts have been lost under deep snow.<sup>294</sup>

In Central and Southeastern Illinois in the *United States*, the winter of 1830-31 produced great snowstorms. According to the oral history kept by the Indians, approximately 75 years earlier, there was another great winter. There was a snowfall, which swept away [exterminated] the immense herds of buffalo and elk that then roamed over these prairies. This history was verified by the vast quantity of buffalo and elk bones found on the prairies in different locations when first visited by white men. [This might have been the severest winter to strike the American Midwest in the past 500 years. The exact date of this winter is unknown. It might line up with several great winters in the New England states about this approximate timeframe. They were the winters of 1740-41, 1747-1748, 1757-1758, and 1761-62.]<sup>245</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1747 on December 24<sup>th</sup> – the snow, though settled considerably, was a full three-feet (0.9 meters) deep. December 30<sup>th</sup> – this was a very unpleasant month. January, 1748 – a cold, snowy month. February – a cold, snowy, uncomfortable month. February 11<sup>th</sup> – there is a surprising body of snow upon the ground. [There was a great depth of snow in February and it was difficult to travel. Sometimes travel was limited to snowshoes.] March 1<sup>st</sup> – comes in smiling; the rest of the month, generally cold and snowy. April 1<sup>st</sup> – comes in joyfully. April 8<sup>th</sup> – the snow is all gone, except in a few drifts. April 23 – the earth looks beautifully green. May 15<sup>th</sup> – unusually hot, dry weather. May 20<sup>th</sup> – it was about seven weeks since there were 5½ feet (1.7 meters) of snow on the ground.<sup>78</sup>

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**1748 A.D.** On 25 January, the River Teviot [or Teviot Water in *Scotland*] (2 miles before it joins the Tweed) became dry for 9 hours. It left the fish on dry ground. On 20 February, the rivers Sark [or Sark Water] and Liddall [Liddel Water] stopped their current, and the shallows became dry. This happened on the River Sark near Philipston and at the River Liddell [Liddel Water] near Penton [in *Scotland*]. The River Eske and the River Line [Lyne] were both dry on the 25<sup>th</sup>. This occurred at Longtown [on the English/Scottish border] and Longholm [Langholm, *Scotland*] on the River Eske and near Westlinton [West Linton, *Scotland*] on the River Line [Lyne]. The river Kirtle [Kirtle Water] was dry on the 17<sup>th</sup>, near Springhall, *Scotland*.<sup>212</sup>

In *Scotland* and *Ireland*, in 1748, several rivers temporarily dried up. On 25 January, the River Teviot, for two miles before it joins the Tweed, stopped its current, and its channel became dry, leaving fishes, &c. on dry ground, many of which were taken up by the country people, and sold at Langtown [Longtown] and other places. It continued in this condition for the space of nine hours, and when it began to resume its course, it began gradually, till it ran as usual again; but in no greater quantity from its stopping, as might be expected. How to account for this phenomenon we know not; for there are no mines of any sort, or any other cavities in the whole country; and if the waters had been stopped by any rising of that part of the ground by an earthquake, they would have been heaping up in such quantities, in a minute's time, that upon the ground's descending, the whole country must have been overflowed. On

19 February, the River Kirtle [Kirtle Water] was dry for six hours, leaving fishes, &c. at the bottom. This alarmed the whole country, insomuch that Sir William Maxwell, who lives within 500 yards [457 meters] of it, and many rode with him along the banks of the river, and saw it dry for 7 miles [11 kilometers], but could not find out the cause of the water's stopping. And on 23 February, the River Eske itself stopped its course, and the channel was quite dry (except some deep holes, where the water could not get out) for the space of six hours, to the admiration of the whole country; the more so, because this large river is as rapid as most in England.<sup>294</sup>

In February 1748, it was noted that the severity of the weather has kept the troops inactive in *the Netherlands*. Marshal Lowendahl forces were at Sas van Ghent to descend upon Zealand.<sup>294</sup>

In Bergen, *the Netherlands* in March 1748, provisions were very scarce. Bread was 8 *d.* per pound and fresh meat was 12 or 14. An egg was 6 *d.*, and that very often that was the price before it was laid. The inhabitants lived on roots, and whatever vegetables they could pick up in the fields.<sup>294</sup>

In April 1748, the French laid siege to the Hague, *the Netherlands*. It is said that they lost nearly 10,000 troops through the inclemency of the weather, inundations in the camp, and want of necessaries [food], besides those killed by [gun] fire from the besieged. "The weather's bad; the ground is damp; which makes a sickness in the camp: Their men want bread; their horses hay."<sup>294</sup>

In May 1748, the joy was much increased in Bourdeaux [Bordeaux], *France* when 30 English ships laden with wheat arrived. Bread at the time cost 12 sols per pound and at the arrival of the ships it dropped down to 3 sols.<sup>294</sup> [A sol is an ancient coin valued at 12 deniers. It roughly has the buying power of a Euro today.]

On 18 May 1748, a most violent storm struck Joigny in Champagne, *France*. Houses, gardens, vineyards, &c. were destroyed to the value of 2 million livres.<sup>294</sup>

In 1748, there was a famine in *Britain*.<sup>212</sup>

In *England* in 1748, there was an extended famine.<sup>57, 90, 91</sup>

In 1748, the cattle plague continued in *England*. Seven thousand cattle were killed per month. In June, the plague was very violent in Yorkshire. On 22 September, it again broke out at Burton-on-Trent, Camberwell, and in Buckinghamshire.<sup>212</sup>

On 11 June 1748, a severe thunderstorm struck Sussex, *England*. The next day [12 June] another thunderstorm struck Streatham in Surrey. Two houses were struck [by the lightning]. The preceding day had been very hot. At Springfield, near Chelmsford, the storm was very violent and produced hail. At Addington Place in Surrey, the hailstones were 7 inches [18 centimeters] in circumference. These hailstones rebounded 2 feet [61 centimeters] from the ground when they struck. Great damage was done to windows and gardens. At Warwick and between Scarborough and Malton, the storm was very destructive. Ailsbury church steeple was nearly destroyed. In Reading, the hail was broken ice in flat pieces 2 inches [5 centimeters] across. At Paris, *France*, there was very great heat followed by a terrific hailstorm.<sup>212</sup>

On 11 June 1748, in *England*, an individual reported that the day was very hot and sultry. In the morning the temperature was 78° F [25.6° C], and at noon 80° F [26.7° C], and during the evening it was 78° F [25.6° C]. "This was as great a heat as any where between the tropics. The marble chimney-pieces below stairs were all so wet, that they ran with water, and the stone pavement in the hall was as if wash'd: my key rusted in my pocket." The wind in the morning was east, about noon south and southwest, then

threatened rain, but none fell. The next day, Sunday, it rained hard, with much thunder and lightning; and great damage was done. At Springfield in Essex, a person was killed, and some others much hurt.<sup>294</sup>

On Sunday, 12 June 1748, a violent thunder and lightning storm with hail in some places struck *England*. At Springfield near Chelmsford, a lad was killed by the lightning in a church during divine service. A waterman on the river [a river worker who transferred passengers across and along the city rivers] lost the sight of an eye by the flash. At Streatham in Surrey, the lightning singed the hair off a boy's head, without hurt, and the painting off a landscape over a chimney-piece, and the gold off the frame, but did no further mischief. At Addington Place in Surrey, there fell hail 7 inches [18 centimeters] in circumference, rebounding 2 feet [0.6 meters] from the ground. This hailstorm did much damage to the gardens and windows. The day before a grazier riding to Boroughbridge-fair was struck dead with his horse by the lightning. A person also at Ferrybridge, and another with his horse in the East Riding of Yorkshire, had the same fate on Sunday. At Fullbrook Park, near Warwick, a flash set on fire and burnt the house, barn, stables and ricks, and singed the master's hair as he sat in the house. By the same tempest the steeple at Ailsbury was so damaged that it must be taken down and rebuilt. Near Reading was a storm of broken ice, in flat pieces, about 2 inches [5 centimeters] broad. In the morning of the 12<sup>th</sup>, the greatest storm of thunder and lightning also struck between Scarborough and Malton. One traveler was killed instantly from a lightning strike and his companion who was 3 yards [2.7 meters] away was also struck. The companion suffered the loss of sight in his left eye and the loss of speech for 8 hours. The heat at Paris, *France* was so great that same day as to confine the people within doors, and was followed by a terrible storm of hail. It was also very hot in *England* at the same time.<sup>294</sup>

On 12 June 1748 in *England*, there was a great hailstorm in Berkshire and Surrey.<sup>93</sup>

At Tholouse [Toulouse, *France*], the temperature rose to 95.9° F [35.5° C] on 25 June 1748.<sup>295</sup>

On 27 June 1748 about sunset, a terrible storm of rain, thunder and lightning struck Crawford, *Scotland*. Thomas Brown in Comphead, had his eldest son, about 20, and 320 ewes [female sheep] all killed at one time. The ground 50 yards [46 meters] in length and 20 [18 meters] in breadth was covered over with dead sheep, and some were lying above one another in the strangest confusion imaginable. The young man who lost his life was standing about 40 yards [37 meters] from the flock of sheep, and, his brother close by his side, who was so stunned that for a long time he did not recover. When he did, he found his brother breathing his last [breath] at a distance, a dismal smook [smoke] arising from among the sheep, and a most strong smell of sulfur. The young man's body was entire, only some blue spots on his skin. The sheep also were without wounds or broken bones. Only their bellies could be seen covered in blisters, out of which issued bluish water. Yet there was no breach on the ground, not a grass pile broken, nor were the fleeces of the cattle [sheep] in the least singed.<sup>294</sup>

On 27 June 1748, there was a terrible thunderstorm at Crawford [Crawford, *Scotland*]. A flash of lightning killed 320 ewes [female sheep], killed lying 59 yards [54 meters] in length and 20 [yards] [18 meters] in breadth, and also a man 40 yards [36 meters] off.<sup>212</sup>

In June 1748, there was a plague of insects at Norwich, Shropshire, and Staffordshire, *England*. They destroyed the leaves and fruit. The orchards and oak trees were as bare of leaves as at Christmas. On 4 & 5 August, great swarms of locust invaded the streets of London. They consumed the vegetables. They were 3 times the size of grasshoppers.<sup>212</sup>

There was a heat wave during the summer of 1748 in London, *England*. On 21 July, the temperature reached 77.2° F [25° C]. On 22 July, it peaked at 78° F [26° C]. Then on 23 July, the temperature peaked at 85° F [29° C].<sup>212</sup>



The summer of 1748 in Denainvilliers, *France* was characterized by:

Hot days           48 days

Very hot days    4 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:

Quebec, *Canada*                   ( 99.5° F, 37.5° C) in July

Paris, *France*                       ( 98.4° F, 36.9° C) on 23 June

Toulouse, *France*                 ( 95.7° F, 35.4° C)

Denainvilliers, *France*           ( 92.8° F, 33.8° C) on 23 June

The cereal harvest in the area of Orleans in north-central *France* did not exceed half a normal crop, and the quality of the grain was mediocre, and the oats was missing in part. The year produced little fruit. In Burgundy, the harvest began on 25 September, its yield was weak, but of good quality.<sup>62</sup>

In July 1748 it was reported that a swarm of locust lately fell near Bristol, *England*, much resembling those that fell sometime ago [22 August 1747] in Transylvania [now central *Romania*] and now ravage that country. A sort of locust also had done great damage in Shropshire and Staffordshire, by eating the blossoms of the apple and crab-trees, but especially the leaves of oaks, which look as bare as at Christmas. The rooks [a type of crow] devour these locusts in prodigious numbers.<sup>294</sup>

There were several large fires reported in June and July 1748 [which may have been related to the weather]. The city of Moscow, *Russia* burned on 1-4 June destroying 32 churches, 1924 house, 13 hospitals, 14 breweries, 5 baths, 12 taverns, and 482 people lost their lives. Fires happened at the same time in Jaroslaw [Yaroslavl, *Russia*] and Veronitz [about 100 miles north of the River Don in *Russia*]. The city of Vilna in *Lithuania* was burned destroying 12 churches, 4 convents and 2364 houses, and 313 persons perished. On 26 June, a fire broke out in the palace of Aranjuez, in *Spain* and consumed a great part of it. It was so sudden that the king, queen and infant don Lewis, and the infantas [sons of a Spanish king other than the heir of the throne] with great difficulty escaped the flames.<sup>294</sup>

On 23 July 1748 at Curdisso in Glamorganshire, *Wales* there was a terrible shower of hail and rain, accompanied with thunder and lightning, as can be remembered by any man, there being scarce a house or cellar that was not filled with rain, and very few windows that escaped being broke or cracked by the hailstones. Some hailstones were two inches and a quarter [6 centimeters] round. It was remarkable that there was no wind.<sup>294</sup>

Around 23 July 1748 on the edge of Cheshire and Derbyshire, *England*, there was the greatest flood ever known. The River Goit [Goyt] overflowed, and carried all the bridges, mills, and several houses away, besides washing out of their graves, at Hawfield churchyard, 14 bodies, which were found hanging upon hedges some miles from the church. Two maiden sisters were carried away from their door and drowned, and immense damage was done to the hay, corn, &c.<sup>294</sup>

Another account reports “At Meller in the north west part of Derbyshire [*England*] on Saturday the 23<sup>rd</sup> of July last [1748] there was a very great storm of rain, attended with constant lightning and thunder, and some hail, several stones of which were measured to two inches [5 centimeters] in circumference, and were of a flat irregular form. The hail lasted but a short time, but the rain, thunder and lightning, four hours, with very little intermission. The brooks in that neighbourhood, and the river Goit [Goyt] were swell’d much higher than ever was known in the memory of man, by which several thousand pounds damage was done to the mills, bridges, houses, fences and corn; several acres of land were entirely swept away, and nothing left but the bare rock, and others were covered with large heaps of gravel. At Heyfield the church yard wall was broken down, a house adjoining to the steeple carried away, and several corpse washed out of their graves and carried to a great distance down the brook, four of which are already found. An overshot mill belonging to the D. [Duke] of Norfolk, fix’d on a small brook, which in the



summer time was frequently very near dry, was entirely destroyed (except the gable end) and all the materials carried away; the great wheel dash'd to pieces, and the shaft of a very large size carried half a mile [0.8 kilometers] down the stream; one of the mill stones was found upwards of a quarter of a mile [400 meters] from the mill, the other is not yet discovered; but what is most remarkable, the mill stood on a rock consisting of very large stones, some of them several tuns [tons] weight, with open joints two or three inches [5-8 centimeters] wide. This was tore up more than half the compass of the mill by the fall and force of the current, the rock carried away, and a pond of water upwards of three yards [2.7 meters] deep left in its room. Two poor women in Meller whose house stood very nigh to a small brook, in attempting to save an earthen vessel were drowned, being carried away by the stream; and one of them was found in the river Mersey upwards of seven miles [11 kilometers] from the place of her habitation, having all her cloaths [clothes] entirely torn off, and stript [stripped] naked of ever thing but a necklace. The river Goit [Goyt], which separates the counties of Derby and Chester swelled to the degree at the confluence of three brooks, that it covered the highest battlements of Marple bridge, upwards of 22 feet [6.7 meters] from the surface of the water when at a common height; it washed away every thing on the Derbyshire side of the bridge, except the bare arch stones, which tho' founded on a rock at each end, 'twas surprising they were left, as much bigger were torn away. The highway leading to the bridge was guarded by a good wall upwards of three hundred feet [91 meters] in length and founded on a rock nineteen feet [5.8 meters] higher than the river, the rock and wall for some roods [roads] were carried away and the road rendered impassable for any carriage. There was one stone torn away from the rock and carried several roods [rods] down the river that contained 169 cubic feet [4.8 cubic meters]. While divers [diverse] small bridges were broke down and carried away, one strangely escaped, being entirely covered with sand gravel and stone, in such a manner that there was no appearance of it, but upon removing the gravel, &c. it was found to be not at all damaged. [This storm of rain, &c. which was felt at Cardiff, in *South Wales*, extended to Yorkshire, *England* and *Scotland*.]"<sup>294</sup>

On 23 July 1748, two melancholy accidents happened in the neighborhood of Saline in Fifeshire, *Scotland*. William Reid was killed by thunder and lightning. The lady Wardlaw of Craighouse, and her man-servant, in their return from hearing sermon at Toryburn [Torryburn], was unfortunately drowned in the Cowsland Burn, overflown [overflowed] by the great fall of rain in the time of the thunder, and were carried two miles [3 kilometers] before they were found. On the same day at Easingwold in Yorkshire, *England*, they had a like storm. Once crack of thunder particularly was exceedingly terrifying. It broke just over the town, and forced its way into the house of Thomas Jackson, a tanner, tore off several splinters of shares [shards], and drove them into the thatch, and struck his wife dead below stairs, while making the cradle for her infant, who was not hurt. It tore her shoes off, and her stays [corset], and made her breast in a manner black.<sup>294</sup>

On 23 July 1748, there was a great flood at Cheshire and Derbyshire, *England*. "The greatest ever known. The River Goit overflowed and destroyed all the bridges and mills. At Hawfield, fourteen bodies were washed out of their graves."<sup>212</sup>

On 28 July 1748, there was a thunderstorm at Cardiff in Glamorganshire, *Wales*. "As terrible a shower of rain, hail, thunder, and lightning, as can be remembered by any man. Very few windows escaped the hailstones (some 2½ inches round [6 centimeters]). The houses were full of water. No wind." At Mellor in Derbyshire, *England*, there was a very great storm of thunder, lightning, rain and hail. Some of the hailstones were 2 inches [5 centimeters] in circumference. The rain lasted four hours, and the River Goit, at Marplebridge was 22 feet [6.7 meters] above the common height and a wall, 19 feet [5.8 meters] above the ordinary water level, was washed away. At Saline in Fifeshire, *Scotland*, the storm was very violent with much thunder and lightning. The Cowsland Burn overflowed. At Easingwold in Yorkshire, *England*, the storm was also very violent.<sup>212</sup>

On 28 July 1748, a tornado struck Pepperell, Massachusetts in what was to become the *United States*.<sup>199</sup>

On 23 August 1748 in *Wales*, there was a great hailstorm in Glamorganshire.<sup>93</sup>

In 1748, the price of wheat [in *England*] averaged 27 shillings per quarter [quarter ton].<sup>212</sup>

On 1 September 1748, there was a violent but short-lived thunderstorm that struck Ipswich in Suffolk, *England*.<sup>212</sup>

On 1 September 1748 between 8 and 9 o'clock, there was a short but most violent storm of thunder and lightning at Ipswich in Suffolk, *England*. It did considerable damage to St. Clement's church, and to 3 or 4 houses in different parts of the town.<sup>294</sup>

On 10 October 1748, there was a gale that struck at night with thunder, lightning, and much snow at Norfolk, *England*. Many trees were blown down.<sup>212</sup>

In 1748 during the period between 29 March and 26 April, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow. During the period between 27 May and 25 June, a drought engulfed Chekiang province at Chia-hsing and Ch'ung-tê. During the period between 26 June and 24 July, a drought engulfed Shansi (now Shanxi province) in northern *China* at Jui-ch'êng and Chahar province (now eastern *Inner Mongolia*) at Huai-lai.<sup>153</sup>

In 1748 during the period between 27 May and 25 June, floods struck several regions of *China* including:<sup>153</sup>

— Shantung (now Shandong province) on the east coast of *China* at Jih-chao, Chin-hsiang, Yü-t'ai, Fan, Chi-ning, Ning-yang, Shou-kuang, Chiao and Fei-ch'êng.

— Jun-tê [possible misprint, unknown province].

— Shensi (now Shaanxi province) in central *China* at Ch'i-shan.

— Hupeh (now Hubei province) in central *China* at Ch'ien-chiang, Han-ch'uan, T'ien-mên, Mien-yang, Chiang-ling and Chien-li.

— Shansi (now Shanxi province) in northern *China* at Taiyuan.

Then during the period between 22 October and 20 November, floods struck Hupeh province at Yün-hsi and Fang.

In 1748 during the 7<sup>th</sup> moon in the vicinity of Shanghai, *China*, there was a storm [typhoon] of great wind. The sea overflowed, and drowned over 20,000 people.<sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 31<sup>st</sup> – melancholy time; all the talk is about the heat and drought—never the like [seen before]. June 2<sup>nd</sup> – exceeding raw and cold. June 14<sup>th</sup> – an epidemic cold prevails. June 20<sup>th</sup> – dry time comes on again: there were [light] showers frequently, but no rain in the country this year. July 4<sup>th</sup> – fine showers. July 10<sup>th</sup> – dying hot. It was a most melancholy dry time; the grass in the pastures was all burnt up. July 19<sup>th</sup> – a steady rain. July 31<sup>st</sup> = the lightning killed Mrs. Hicks of Westbrook and her child. Her father, Mr. Giddings was much burnt and near dead. None escaped unhurt but a little child [Joseph], which by crying brought in the people, who found Mrs. Hicks and three of her children prostrate on the hearth, and Mrs. Giddings appeared dead. August 31<sup>st</sup> – dry, dry, very dry, and very hot. September 6<sup>th</sup> – reviving rains. September 24<sup>th</sup> – a white frost. September 29<sup>th</sup> – wonderful, hot summer day; the grass grows as fast as ever I saw it. October 2<sup>nd</sup> – we dug our potatoes; no appearance of moisture in the ground.<sup>78</sup>

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**Winter of 1748 / 1749 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1748 on October 10<sup>th</sup> – the ground froze hard this morning. November 22<sup>nd</sup> – a moderate fall day. December – generally pleasant. December 30<sup>th</sup> – severe snowstorm. December 31<sup>st</sup> – cold, and the year ends stingingly. In

1749 on January 3<sup>rd</sup> – a very cold month. The river froze over on the 3<sup>rd</sup> day, and was still frozen on the 19<sup>th</sup>. February – a cold month. March 11<sup>th</sup> – an uncommon springlike day, but most of March was very cold. March 30<sup>th</sup> – snow gone.<sup>78</sup>

On 10 October 1748 at night, much snow fell at Norfolk, *England* accompanied with high winds, thunder and lightning, by which the steeple at Westwick was beaten down. Several trees were split and many blown down by the wind. The horses of the Wells carrier took fright at the lightning, and overturned the cart, by which a man in it was killed.<sup>294</sup>

From 11-14 November 1748, there was a severe frost in London, *England*.<sup>212</sup>

The winter of 1749 was severe in *Switzerland* and in Friesland (*the Netherlands*). In *France*, the weather remained nearly constant fairly mild.<sup>62</sup>

On 16 December 1748, a storm of wind did considerable damage to the small craft and boats on the River Thames [in London, *England*] and some watermen were drowned. On land, some houses and stacks of chimneys were blown down by which several persons were dangerously wounded. At Ramsgate, a fisherman, his two sons, and his [?] were lost in their smack [traditional fishing boat]. The storm did great damage in and near the Downs. The *John and James*, Captain Grant; the *Hawk*, Captain Edwards from London to Bristol; and the *St. George*, Captain Johnson, were lost. The *Bennet*, Captain Lesly, for Marseilles, the *Pretty Betsy*, for the Straits (which since got off); the *Delight*, Captain Bailey, and the *Stubbs*, Captain Eliot, for Marseilles, drove ashore at Ramsgate and Sandwich Flats. A Dutch East-Indiaman, with two Lisbon traders, drove ashore at Dungeness (the first got off). The *Stephen and Sarah*, Captain Clinch; the *Margaret and Anne*, Captain Butler, from London to Marseilles; the vessels of Anthony Bayle, and Roger Bayle, damaged. The brigantine, *Stephen and Sarah*, on shore at Margate, and three others (which were since got off) the people saved. The transports with the forces from Williamstadt, which had been embarked above a month, and suffered very much, met with the storm soon after they set forth, and were in great danger; particularly one with some troops of horse, in which by keeping the hatches close all the horses were suffocated, except 4, which they killed and threw overboard with the rest. Many horses were lost in the others, but the ships all got safe into different harbors. At the time of the storm there were nearly 100 sailing ships in the Downs.<sup>294</sup>

Great damage was done in *Great Britain* in January 1749 by high winds and floods and many lives were lost. The *Wolf* sloop of war was shipwrecked on the coast of *Ireland*. Captain Veachel, with 90 of his men, his wife and his sister-in-law, were drowned and not an officer saved but the gunner. The *Neptune*, Captain Whittle, from Chester to Dublin, with near 100 passengers, was cast away, and all perished. The *Hope*, from Curasao [Curaçao] to Amsterdam, 30 guns, and 100 men, worth above 100,000 *l.* was lost on the 16<sup>th</sup> of January off Weymouth in Dorset, *England*. At Shepperton in Surrey, *England*, by the high winds and floods, the ferryboat for passing the River Thames, was sunk, with a wagon and 5 passengers in it. The people were saved but the 5 horses drowned. The temporary bridge at Walton was also very much damaged. At Barnstaple in Devon, the tide overflowed many houses. At Appledore, not far thence, the floods washed away a whole street and drowned many inhabitants. At Folkstone, in Kent, on the 11<sup>th</sup>, the wind strong at southwest and a spring tide attended with an extraordinary swell (the tide running with the wind), the surge of the sea carried away almost all the beach from before the town and did but little more damage. On the 12<sup>th</sup>, the tide washed away part of a house, at the south head of the town, and smashed the boats. His Majesty's watch-house was in so much danger that the officers quitted it. When the tide abated, the beach was carried clean away, almost knee-deep all along the town. Goods were washed out of the houses, as coppers, barrels, tubs, wearing cloaths [clothes], &c.<sup>295</sup>

From 10 to 13 January 1749, the cold was so severe in and about Petersburg [Saint Petersburg, *Russia*], that de Lisle's thermometer sunk to 206 degrees [206°D, -35° F, -37° C]. Over 100 people were found

dead in the streets. The last division of the guards and the retinue of the ambassador from Vienna, *Austria* were forced to stop on their march for Moscow, *Russia*. Several perished on the road, some having their noses and ears, others their hands and feet frozen, and others deprived of speech. In several villages of the northern provinces, all the inhabitants and beast were frozen, and even bakers in the bake houses. Other accounts from Petersburg say, that after a thaw accompanied by southern and western winds, the wind of 23 December, turned to the north-northeast, and two clouds like rainbows, a sure sign of extreme cold in these climates, appeared. [The prismatic color effects of a cloud of diamond dust?] On 25 December, the thermometer exposed to the air sunk to 18.5 degrees below the zero mark [-18.5° C, -1.3° F]. On the 26<sup>th</sup> and 27<sup>th</sup> it was -20° C [-4° F]. On the 29<sup>th</sup> at 7 p.m. it fell to -30° C [-22° F]. On the 30<sup>th</sup> of December it was -28° C [-18.4° F]. On the 31<sup>st</sup>, it was -27° C [-16.6° F]. In Lapland, and other northern provinces of *Sweden*, numbers [of people] perished. The works in *Finland* were suspended. Bears and wolves were forced [by the cold] from their retreats, and did much mischief [destruction] in the country villages. Perhaps it is by guarding against the severe cold, that so many destructive fires happened in these countries. On the 7<sup>th</sup> [of January] the Russian Marine Hospital at Cronstadt [Kronstadt], a wooden structure, together with many stores, and several of the patients were consumed by fire.<sup>295</sup>

On 7 February 1749, about 4 o'clock in the morning, a violent storm blew such a vast amount of snow from the top of Mount Romond in Swisserland [Mount Romont in *Switzerland*] onto a village nearby completely covering it. Fifty-four houses and 28 people were buried in the snow. Eight were dug out alive, and 17 dead. The others are not found. About 50 cows and 200 calves, sheep and goats also perished.<sup>295</sup>

In May 1749, some frost did prodigious damages to the gardeners about London, *England*. The walnut trees in Hyde-Park were almost killed. On 3 June, snow lay on the ground till 7 o'clock in the morning, particularly near Carlisle in northwest *England*. On 15 June, there was a great snowfall on Mount Skiddow [Skiddaw] and the snow laid until 3 o'clock in the afternoon. On 16 June, ice was taken up in large pieces. Peas, &c. in the gardens were blasted, and even ferns on the heaths shriveled up. The likes of which was not remembered by the oldest man. Ice on the River at Stockport in Cheshire was strong enough to support the weight of a dog. Near that place, snow was two inches [5 centimeters] deep.<sup>295</sup>

On 24 and 25 May 1749, a most violent snowstorm struck Cromar, Badenoch, and Strathspey, *Scotland*. Eight hundred to nine hundred cattle perished. On 3 June, the snow lay till 7 a.m. at Carlisle [at the border between *England* and *Scotland*]. On 10 June, there was a sharp frost in London, *England*. "A saucer of water frozen over." On 15 June, there was a snowstorm at Skiddaw [the fourth highest mountain in *England*]. The snow lay on the ground until 3 p.m. On 16 June, there was ice in large pieces; the gardens were blasted. The like of which was not remembered by the oldest man. At Stockport, the ice on the river was strong enough to bear the weight of a dog, and snow 2 inches [5 centimeters] deep.<sup>212</sup>

On 6 June 1749, Edinburgh, *Scotland* reported, "They write from the North that the week before last was a most violent storm of snow, in the counties of Cromar, Badenoch, and Strathspey, in which between 800 and 900 black cattle perished."<sup>295</sup>

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**1749 A.D.** On 11 January 1749, there was a lightning storm in London, *England* with "uncommon flashes". A violent gale struck Folkestone [a port located on the English Channel, in Kent in southwest *England*].<sup>212</sup>

On 16 January 1749, a violent gale struck Weymouth in Dorset, *England*. It produced severe floods.<sup>212</sup>

On 13 April 1749, a violent storm struck Bombay, *India*. It caused the loss of 3 of his Britannic Majesty's ships – the *Namur*, *Pembroke*, and *Apollo* hospital ship. It struck at St. David's road [sea road]. The following is a list of the ships and vessels lost and damaged in the storm on the Coromandel coast, the 14<sup>th</sup> of April, 1749: <sup>296</sup>

— At Colderoon near the [sea] road of Fort St. David, his Majesty's ship *Namur*, of 74 guns, foundered in nine fathom [54 feet, 16.5 meters] of water. She went out of Fort St. David road, after having taken in [?] water the 13<sup>th</sup>, at 7 p.m. Captain Marshal, her third lieutenant Mr. Gilchrist, Captain of Marines, surgeon, purser, chaplain, boatswain, and about 40 other people were saved; and also the 70 sick ashore in the hospital. The first, second, and fourth lieutenants, master, gunner, and two lieutenants of marines, in all 520 were drowned.

— His Majesty's ship *Pembroke*, of 60 guns, struck on Colderoon point, and overset, having parted her cable the 13<sup>th</sup>, at 6 p.m. She made sail out of Fort St. David road, but could not clear the point. Twelve men only were saved. Captain Fincher, and about 330 men were drowned, and all the officers except a Captain of Marines.

— Fifty swam to land from the wrecks of the *Pembroke* and the *Namur*.

— A large ship drove on shore near the point, supposed to be the *Apollo* hospital ship of 40 guns. She had onboard 350 men, and was seen near the point without mast between Cudalore [Cuddalore] and Fort St. David.

— At Cudalore [Cuddalore] and Fort St. David, the *Winchelsea*, Captain Barow, the *Lincoln*, Captain Nansan, both company ships run ashore and most of the crew saved. *Princess Augusta*, a country ship, belonging to the company, run ashore. *Fanny*, a country ship, Captain Rennie, was run ashore. A Portuguese ship from Macao run ashore, only one third unladen [unloaded]. Twenty-four brigantines, sloops and grain vessels run ashore.

— At Pondicherry Road [sea road], one French ship of 64 guns, run ashore, three men lost. Two other ships and one brigantine run ashore. The *Edgebaston*, a company ship, now at anchor near Pondicherry, without any mast, but cannot tell what further damage she has sustained; from the governor of which place, Mr. Dupleiz, she received great assistance in her distress.

— At Sadras [Sadras] Negapatnam [Nagapattinam], Portonuovo [now Parangipettai] and Puliacatt [Pulicat], two Moors and one Armenian ship lost. Four Dutch ships lost. A Dutch ship, of 50 guns, dismasted at sea, and put in after the storm was over.

— At Madras [Madras], two French ships and several grain vessels lost.

— Ships that were disabled and put into Fort St. David since the storm were: *Tartar* man-of-war, her topmasts and heads of her lower mast gone. *Deal Castle* man-of-war, main and mizzenmast gone. *Swallow* man-of-war, all her mast gone. Rhoda, company ship, all her topmasts gone. The factories on land also suffered much.

On 27 April 1749, a storm of thunder and lightning caused much damage to the Cheltenham church, and at Ewe Elm [Ewell?] in Oxfordshire, *England*. In a violent shower of rain, the earth on the plowed lands was carried away by the current, quite to the gravel, and the corn [grain] thereon entirely destroyed. In many houses, the furniture was swept away. <sup>295</sup>

On 27 April 1749, there was a violent thunderstorm with rain at Cheltenham and Oxfordshire, *England*. <sup>212</sup>

On 3 May 1749 O.S. [Old Style – Julian Calendar], Oporto [Porto, *Portugal*] reported, “Sunday last, after dinner, it began to thunder and lighten [lightning] very much, and a black cloud from the south threatened a heavy shower; a squall of wind soon came on, and it began to hail very large stones, and in less than a minute they came down as big as hens eggs, and with such impetuosity that the house-top seem'd to be beating in. The noise they made, confounded with the thunder, was as if the heavens were fighting against the earth; after the shower, which happily lasted but a few minutes, we measured hailstones of 4 and 5 inches, and some 6 inches [10-15 centimeters] in circumference; some spheroidal, others oval, and all tending to round; but a league or two to the southward, the hailstones were as big as large oranges,



and one weigh'd 3 pounds [1.4 kilograms]; they tore up the ground, cut the corn [grain] in pieces, destroyed the fruit-trees, and killed several persons.”<sup>295</sup>

On 14 May 1749 at Frewin in Lincolnshire, *England*, close to 20 sheep were struck dead by lightning, and a barn caught fire [from lightning] but the fire was extinguished by the rain. On 15 May, a storm of thunder and lightning, attended with hail and rain struck Brendon in Worcestershire, *England*. It damaged the corn [grain] in that parish valued at 200 or 300 *l*. A poor woman in the storm, either through fright or the violence of the hail, died as soon as she got home. At Brabram, a village six miles [10 kilometers] from Cambridge, on the 16<sup>th</sup> of May, the rain did great damage to the farmers, and the road. In less than an hour after the storm began, the water was up to the belly of a horse.<sup>295</sup>

On 15 May 1749, a violent storm of hail struck Derbyshire in the east Midlands of *England*. The hailstones measured 4 inches [10 centimeter] round, and did vast damage to fruit trees, pease [vegetable peas], &c. At Dunnington Park, a seat of the Earl of Huntington, it broke many windows and killed a great number of rooks. At Chesham and Amersham, and Bucks, there was a dreadful storm of thunder and lightning, with such violent rains, that both towns appeared like a sea. The water ran into houses, and half filled the cellars. At Amersham, there was a fair; the sheep pens and large pieces of beech were carried through the town by the currents. The like shower was in Cambridgeshire and Gloucestershire. And in Northumberland, the violence of the rain tore the ground two feet [0.6 meters] deep.<sup>295</sup>

On 15 May 1749 in *England*, there was a great hailstorm in Derbyshire and Worcestershire.<sup>93</sup>

In May 1749, there was a remarkable thunderstorm at Nottingham, *England* with hailstones 4 inches [10 centimeters] in circumference. On 14 May, there was a thunderstorm at Frewin in Lincolnshire. On 15 May, a hailstorm struck Nottinghamshire, Derbyshire, and Leicestershire. It caused much damage. The hailstones, or rather pieces of ice were 4 inches [10 centimeters] in circumference. At Breedon in Worcestershire, the storm of thunder and hail caused great damage to the corn [grain] crop. Also on 15 May, a hailstorm struck in Derbyshire. The stones were 4 inches [10 centimeters] round. At Dunnington Park, it broke many windows and killed many rooks. Also on 15 May, a thunderstorm struck Chesham and Amersham in Buckinghamshire. There was dreadful thunder and lightning, and such violent rains that they half filled the cellars. The storm was also violent in Cabridgeshire, Gloucestershire, Northumberland, and Richmond (Yorkshire). On 16 May, a thunderstorm struck Brabram in Cambridge. It caused great damage by floods. On 18 May, there was a flood at Riponden [Ripponden] near Halifax. The River Beck was raised 20 feet [6.1 meters], and fifteen persons were drowned, and many bridges and mills were carried away.<sup>212</sup>

On 26 May 1749 about two in the afternoon, a dreadful storm of thunder, lightning, rain and hail struck Aix la Chapelle [Aachen, *Germany*]. In only a few minutes it raised the rivers Gulp and Guele [Geul or Gueule] [These are rivers of *Belgium* and *the Netherlands*] to such a surprising height, that the village of Gulpen, situated at their confluence, and half way between this city and Maestricht [Maastricht, *the Netherlands*], was entirely destroyed, and much more damage done by it.<sup>295</sup>

On 29 May 1749 in the afternoon, Cologne, *Germany* was struck by a most dreadful storm of thunder, lightning, rain and hail that has happened in the memory of man. Within the space of half an hour, the water rose so high in all the streets, that it was impossible to go from one house to another. The violence of this storm lasted for about two hours. During that time there was a great deal of damage done. It appears that adjacent areas of the countryside were also affected because several dead bodies and a great number of cattle were brought down by the rapidity of the flood.<sup>295</sup>

On 14 June 1749, Rome, *Italy* reported, “Last Wednesday, about two hours after midnight, we had a tempest here, which threatened the return of all the elements into their first chaos. Besides lightning



[lightning] and thunder-claps, which continued without ceasing from the different points of the heavens, besides a deluge of rain, which overflowed the whole city, filling the cellars, and even many houses, and besides a terrible hail, which broke the windows and the [roof] tiles which cover'd the houses, a hurricane or tourbillion of fire and wind, beginning near the Calesio [Calascio] whe [where] it made the first ravages, extended itself along the great street which leads to Santa Maria Majora, and afterwards broke on the gardens of the house of Negroni, and on the other gardens, vineyards and buildings on each side of Porto Pia, carrying off the roofs of houses, throwing down entire walls, breaking the doors, the [door] frames and glass of windows, rooting up the largest trees, and carrying them to a great distance; in one word, leaving in every part of this city marks of its fury, which we shall long feel, and ever remember.”<sup>295</sup>

On 21 June 1749 at 3 o'clock in the morning, lightning struck Breslaw [now Wrocław, *Poland*]. The lightning struck a magazine, which stored 580 quintals [58 tons] of gunpowder. One half of the town was destroyed by the explosion. Its houses, convents, and churches are demolished and over 400 lives are lost. And where the shock was felt with less violence; windows, and roofs were shattered to pieces.<sup>295</sup>

The summer of 1749 in Denainvilliers, *France* was characterized by:

Hot days           41 days

Very hot days    1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The peak temperature occurred in Paris on 23 July at 98.4° F (36.9° C); in Toulouse at 98.4° F (36.9° C); and Denainvilliers at 92.8° F (33.8° C) on 13 July. In Burgundy, the grape harvest began on 29 September. The wine was by no means abundant, and was of medium quality. Little wheat was available in the area of Orleans, *France*, but of sufficient quality. In Burgundy, the harvest began on 25 September, its yield was weak, but of good quality. The year produced very few vegetables and almost no fruit.<sup>62</sup>

The summer of 1749 brought temperatures in the range of 98.6° to 100.4° F (37° to 38° C) to Languedoc, *France*.<sup>79</sup>

In 1749, the price of wheat [in *England*] averaged 29 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

A heat wave struck *England* on 2 July 1749. At London, the temperature reached 88° F [31° C] in the shade. At Lydon in Rutland, the temperature reached 84° F [29° C].<sup>212</sup>

On 2 July 1749 at Milford Haven in Pembrokeshire, *Wales*, there was an unusual tide. At 11 a.m., near low water, the sea being smooth and no wind, “there was a sudden hideous noise, and in one minute the tide ran up to the high water mark, and returned again as rapidly; and this was repeated seven times in three-quarters of an hour.”<sup>212</sup>

On 5 July 1749, Charlestown, South Carolina in what was to later become the *United States* reported dismal rice crops. “It was generally expected, early in the spring, that 100,000 barrels of rice would be made this year, in this province; but some rains that fell the latter end of May, and beginning of June, have sadly disappointed the planters, by overflowing their dams and low lands, and either drowning, or bringing the craw-fish among the young plants. At a moderate computation, the crop will be reduced to less than one third. Most people have planted the seed, even to a third time, (when the season was almost too far advanced) and have lost all.”<sup>295</sup>

On 1 August 1749, there was a thunderstorm at Highgate [a suburb of London, *England*]. On 21 August, it was extremely hot at Keswick in Cumbria, *England*. On 22 August, a thunderstorm struck Wolverhampton in West Midlands, *England*. The storm lasted 3 hours and caused an inundation the like

never known before. The violent storm also struck Worcestershire, Oxfordshire, Shrewsbury, Bridgenorth [Brignorth], and Drayton [Market Drayton] in *England* and Magrofeld [Magherafelt] in *Ireland*. On 22 August, there was a flood at Keswick in Cumberland, *England*. “With most terrible thunderstorm and tremendous rain at 9 p.m., causing a great flood in the valley. Most violent at Legburthat Fells [Legburthwaite Fells] (lasting two hours). A small stream, called Catcheety Gill, swept away a mill. Rocks, larger than a team of ten horses could move, were carried a considerable way into the fields; one measured nineteen yards almost. Damage from £1000 to £1500. This storm was the most remarkable in man’s recollection.” The next day, thunderstorms struck in the same towns and at Oldham in Greater Manchester, *England*. It was more violent than on August 22<sup>nd</sup>.<sup>212</sup>

On 22 August 1749, there was extreme rainfall in the Valley of St. John’s near Keswick in Cumberland in northwest *England*. Before the rainfall, the weather was extremely hot and sultry. Two hours before the storm struck, there was a strange buzzing noise like that of a malt mill, or the sound of wind in the tops of trees. The valley is next to a high, steep, rocky mountain. The rainwater came roaring down 4 small brooks in the space of 1½ hours that at the bottom of Catcheety Gill, a mill and kiln were entirely swept away. The torrents of rain opened up a great chasm, 4 yards wide and 8 to 9 yards deep. Some of the large rocks carried into the fields, a team of 10 horses could not move. At Lobwath, one of these stones was measured and was 19 yards in circumference. There was great damage done to the grounds, houses, walls, fences, highways and crops.<sup>236</sup>

On 22 August 1749, a terrible inundation occurred in the valley of St. John’s near Keswick in Cumberland [now Cumbria] in northwest *England*. “There was the most terrible thunder, and incessant lightning, ever known in that part in the memory of man, the preceding afternoon having been extreme hot and sultry. The inhabitants of the vale heard a strange buzzing noise, like the working of a maltmill, or wind in the tops of trees, for two hours together, before the breaking of the clouds, which was accompanied by the water-fall. From the havock [havoc] it made in so short a time (for it was all over in less than two hours) it must have far exceeded any thunder shower ever seen; most probably it was a spout, or large body of water, which by the lightning incessantly rarefying the air, broke at once on the tops of the mountains, and so descended upon the valley below, of about three miles long, half a mile broad, and lying nearly E. and W. closed in on the S. and N. side, with prodigious high, steep, rocky mountains. Legburthet Fells on the N. side had almost the whole cataract, and the spout did not extend above a mile in length, and swelling chiefly four small brooks; but to that amazing degree, that the greatest of them, called Catcheety Gill, swept away a mill and a kiln in five minutes, leaving the place where they stood covered with huge rocks and rubbish, 3 or 4 yards [2.7-3.7 meters] deep; so that one of the mill stones cannot be found. In the violence of the storm, the mountain tumbled so fast down, as to choak [choke] up the cold course of this brook, the water forcing its way through a shivery rock, and now runs there in a chasm 4 yards [3.7 meters] wide, and betwixt eight and nine deep. These brooks have lodged such quantities of gravel and sand on their bordering meadows, that they can never be recovered. Many vast pieces of rock have been carried a considerable way into the fields, larger than a team of ten horses can move; one of these measured nineteen yards [17.4 meters] about. The damages alone to the grounds, houses, highways, &c. are by some computed at 1000, by others at 1500 pounds. [In present currency, that would be equivalent to £134,000 to £202,000 in damages based on the retail inflation price index.] One of the said brooks, called Mose, or Mosedale Beck, which rises near the source of the others, but runs North from the other side of Legburthet Fells, continues still foul and muddy, probably from having worked its channel into some mineral substances, which gives it the colour of water gushed from lead mines, and is so strong as to tinge the river Derwent, even at the sea, near twenty miles [32 kilometers] from their meeting.”<sup>297</sup>

On 22 August 1749, a vast storm of thunder, lightning, and rain for 3 hours struck Wolverhampton in West Midlands, *England*. This caused an inundation in the lower part of town greater than was ever known there. Part of it reached Worcestershire, Oxfordshire, Manchester, Shrewsbury and Bridgenorth

[Bridgnorth]. The storm at Bridgenorth on the 23<sup>rd</sup> was more violent and the lightning penetrated the roof and broke the windows of a church. At Manchester on the 22<sup>nd</sup>, the lightning was dreadful and continued all night with little thunder. The whole heavens seemed in flames. During the night of the 23<sup>rd</sup>, it was much the same, but an abundance of wet, which swelled the small rivers and carried away great quantities of reaped corn [grain]. At Oldham, six miles [10 kilometers] off, a man was killed and 7 children injured, and a barn full of hay consumed [from lightning].<sup>295</sup>

On 22 August 1749, a terrible storm of thunder and lightning struck Magherafelt [Magherafelt], *Ireland*. A ball of fire came down a chimney into a room, where was a woman and her two sons, and another person. It burnt off the skirt of the coat of one sitting by the fire and lighting on the floor. The ball of fire rolled about several times; then dividing into two parts, one burst, and scorched another of the company. The other ascended, forced its way through the floor of the chamber, where were two young women, and bursting with a great explosion, struck one of them instantly dead. And though no wounds appeared on the body, but part of her skin scorched similar to gunpowder, yet the bones were all broken as if pounded.<sup>295</sup>

In September 1749, Germany reported, “The locusts, after ravaging part of *Poland* and Vienna [*Austria*] took their flight, darkening the air, towards Bohemia [now western *Czech Republic*] and Bavaria, and did vast damage about Pilsen in Bohemia [now Plzeň, *Czech Republic*]; being driven away from Budweis [now České Budějovice in the *Czech Republic*] by the noise of bells, and discharge of cannon, they settled a league [3 miles, 4.8 kilometers] off on trees, the branches of which broke down with their own weight, and tho’ 160 sacks of them were destroyed in the night by burning straw under the trees, they came next morning near the town, and soon devour’d two cart loads of hay. They have advanced in Bavaria to Ratisbon [now Regensburg, *Germany*] and Aichstet [now Eichstätt, *Germany*], and cover’d 300 acres [121 hectares] of land in Franconia [eastern part of the historic Duchy of Franconia in *Germany*].”<sup>295</sup>

On 15 September 1749, a waterspout was observed at Hatfield in Yorkshire, *England*.<sup>212</sup>

A drought struck New England in the *United States* in 1749. The spring was uncommonly dry, and by the end of May pastures were all scorched and burned in eastern Massachusetts. The drought probably continued longer and was felt more severely than any one that the people had before experienced. June 9 was appointed as a day of public fasting and prayer. Between 1 and 6 July, plenty of showers fell in New England, and the period of drought was brought to an end. A small crop of hay, barley, and oats and a good crop of Indian corn were harvested; flax and herbs of all kinds were a failure; cattle were killed in the autumn to save the great expense of keeping them through the winter.<sup>138</sup>

A drought struck New England in what was to become the *United States* in 1749. Spring was uncommonly dry. By the end of May, pastures yielded little feed for the cattle. The grass was so scorched and burned by the sun that the ground looked white. Water was also scarce. Brooks, springs and even small rivers dried up. Many wells failed. The heat was so severe and everything was so dry, that when fragments of broken glass fell on the ground, they would cause any combustible material to catch fire. The drought came to an end towards the end of June.<sup>199</sup>

In 1749, a severe drought, attended in many places with swarms of devouring insects, caused great distress in New England in the *United States*. Many brooks and springs dried up. The first crop of grass harvested was one tenth of what had been normally harvested. Some of the inhabitants imported hay from Pennsylvania or *England*.<sup>174</sup>

On 29 September 1749, a hurricane struck the *Gulf of Honduras*. The *Centaur* from the Bay of Honduras for Leghorn, met with a violent hurricane soon after he left the Bay, in which he lost all the masts and sails, and put into Carolina to refit on 3 November. Captain Cullam, of the *Arthur*, writes from the Bay

on 18 September that the same storm put most of the vessels ashore at the Bay, but he rode it out without damage, and that several vessels bound for Europe & North America were not so fortunate.<sup>141</sup>

On 7-8 October 1749, a great storm struck the Ocanwik inlet on North Carolina in what was to become the *United States*. Nine vessels were lost. Two were drove over the bar and lost aground 5 miles [8 kilometers] to the northward of it. The water having rose above 10 feet [3 meters] higher than ever known. Several other vessels drove some miles upon the low lands, so that it was impossible to get them afloat. Scarce a vessel in the country escaped being driven on shore or lost. The same storm did very great damage at Boston [Massachusetts], and drove 7 ships ashore at the Vineyard, which were feared, would be lost. Several ships were also lost at Barbados, particularly the *Nancy* and *Bristol* to Jamaica.<sup>296</sup>

On 8 October 1749, an Atlantic hurricane struck Massachusetts and North Carolina in the *United States*. During the hurricane, seven were wrecked on Martha's Vineyard and many lives were lost. Two merchantmen were wrecked north of Ocracoke, North Carolina. The *John & Jane* foundered 9 leagues seaward of the Cape Fear, North Carolina bar.<sup>141</sup>

On 31 October 1749, the cattle plague again broke out in a vast number of places in most *English* counties.<sup>212</sup>

On 15 November 1749, there was a sharp frost in London, *England*.<sup>212</sup>

In 1749 and 1750 on the island of *Madeira* in the North Atlantic Ocean were extremely dry years. The corn [grain] was destroyed and the fruit trees suffered much, particularly the peach trees. The fruit either fell to the ground while green, or remained longer on the tree, being full of white worms.<sup>236</sup>

In 1749, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 17 April and 15 May, floods struck Shantung (now Shandong province) on the east coast of *China* at Shou-kuang and Wu-ti; Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ch'üan; and Anhwei (now Anhui province) in eastern *China* at T'ai-hu.  
— During the period between 12 September and 10 October, floods struck Hupeh (now Hubei province) in central *China* at I-tu, Mien-yang, Ch'ien-chiang, T'ien-mên, Chiang-ling, Chien-li and Han-ch'uan. At I-tu, over 100 families were flooded.

In 1749 during the period between 10 November and 9 December, a drought engulfed Shansi (now Shanxi province) in northern *China* at Tatung.<sup>153</sup>

The year 1749 was a year of abundance in the vicinity of Shanghai, *China*. Rice had double heads; some with six or seven.<sup>166</sup>

In 1749 during the 12<sup>th</sup> moon on the 8<sup>th</sup> day in the vicinity of Shanghai, *China*, a dragon was seen during a storm of great thunder and rain. The following winter night was very cold. Then followed a three days snowstorm. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 8<sup>th</sup> – the ground is fit for plowing. April 21<sup>st</sup> – planted potatoes. May 31<sup>st</sup> – a melancholy dry time. June 9<sup>th</sup> – the same. June 24<sup>th</sup> – the grasshoppers cause more spoilage than the drought. June 29<sup>th</sup> – they have eaten up entirely an acre of potatoes. July 3<sup>rd</sup> – I reckon my poultry (about one hundred) eat ten thousand grasshoppers every day; very hot; the most remarkable time that ever we or our fathers saw. July 13<sup>th</sup> – as many grasshoppers as ever, but they are a new growth. July 24<sup>th</sup> – the ground begins to look green, but there are many grasshoppers yet. August – I never saw the earth change its face so much any day as this; the whole country is renewed and revived. October 14<sup>th</sup> – our potatoes turn out universally small.<sup>78</sup>

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**Winter of 1749 / 1750 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1749 on October 18<sup>th</sup> – snow. November 22<sup>nd</sup> – cold day. November 25<sup>th</sup> – severely and unusually cold. November 29<sup>th</sup> – it is thought winter never sat in so early; Presumpscot River is frozen so that a man can walk over it. (December does not appear to have been so severe.) January and February 1750 – nothing remarkable as to the weather. March 11<sup>th</sup> – warm, calm and pleasant for this time of the year. March 18<sup>th</sup> – raw [cold]. March 23<sup>rd</sup> – snow. March 28<sup>th</sup> – more snow.<sup>78</sup>

The winter in Philadelphia, Pennsylvania in the *United States* was very open and mild; but all the spring months were cold and stormy. As late in the season as the 30<sup>th</sup> of May, snow lay on the ground.<sup>1</sup>

In 17 March 1750, the Meuse River overflowed its banks from the melting of heavy snow from the winter. In *Austria*, Bohemia [now western *Czech Republic*] and *Hungary*, the winter was severe. In *France*, the cold was neither sustained nor severe.<sup>62</sup>

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**1750 A.D.** On 16 January 1750, Manheim [Mannheim, *Germany*] reported, “The waters of the Rhine [River] being fallen much lower within these few months than they were ever known to be in the memory of man, hath given us an opportunity of discovering the ruins of an old castle in the middle of the Rhine, a league and a half [4.5 miles, 7.2 kilometers] from this place, near Neckerau [Neckarau], opposite to Altrip. Several lovers of antiquities have been curious to see it, as we have no historian that makes mention of a castle in that place. All the ancient history furnishes with relation thereto, can only serve for a foundation to conjecture that it is the fort which the Romans built on an eminence called Sandberg, near Altrip, then known by the name of Alta Ripa, and provided with a strong garrison; and that, consequently, it is one of the fifty castles which the celebrated Drusus [Nero Claudius Drusus Germanicus], general, in the reign of Augustus (and the first Roman general, who advanced on the other side of the Rhine as far as the ocean) erected to cover his conquests against the attempts of the Germans.”<sup>296</sup>

On 28 January 1750, there was a remarkably high tide at Hull, *England*. It caused a flood tide of 21 feet [6.4 meters]. On 27 February, there was another remarkable high tide at Hull. This time the flood tide was 21.5 feet [6.6 meters].<sup>212</sup>

On 30 January 1750, Cork, *Ireland* reported, “The tide here yesterday swelled to such a prodigious height, that all the streets were under water. In the houses on Dunscomb marsh the water was 4 feet [1.2 meters] deep, and 3 [0.9 meters] in the middle of the city. The damage to the merchants is incredible. At Carrickfergus, the key was almost leveled, and several houses, and part of the town wall washed down.”<sup>296</sup>

On 31 January 1750, Bristol, in southwest *England* reported, “this city were struck into a consternation by the most terrible claps of thunder, lightening [lightning], hail and rain, that the oldest man living can remember at this season of the year. The most shocking time of the thunder held about a quarter of an hour; but the continuance of this dreadful tempest, ‘tis computed, lasted about half an hour, or, more. The lightning continued the whole time to a surprising degree, flashing from the element at very short distances. It set fire to a hay-rick at Long-Ashton, the greatest part of which was consumed. A man who usually brings pork and bacon to our market, being at that time in the storm, was beat off his horse, which taking fright, ran into a drain of water, with his lading of pork, &c. and was drowned. The same afternoon they had at Norwich, a great shower of rain, attended with thunder and lightening.” At the same time, between Biddeford [Bideford] and Abbotsbury [in southwest *England*], a French 20 gun ship, called *Le Carpe* of about 400 tons was driven ashore. Captain Burel, with 35 of his hands were saved, and 14 drowned. Around 2,000 country people showed up in mass and plundered the ship.<sup>296</sup>



On 31 January 1750, there was a very violent thunderstorm at Bristol and Norwich, *England*. On 10 February, a southwest gale struck Bristol. It began on Sunday [8 February] at 5 a.m., with rain and hail. It caused much damage. It created floods for miles around. On 11 February, a violent thunderstorm with rain and hail struck Newport in Monmouthshire, *Wales*. On 20 February, it was very warm in London, *England*. The fruit was in blossom. On 25 February, there was a flood at Boston, *England* that did considerable damage. On 8 March, a thunderstorm struck London. On 3 June, a great thunderstorm struck Hertford, *England*. On 10 June a severe thunderstorm struck Sittingbourne, Kent and London. On 26 June, another thunderstorm struck London. On 30 June, another thunderstorm struck [near London]. It rained for 2 hours and the rainfall was 5.3 inches [13 centimeters].<sup>212</sup>

Bristol, *England* reported, “Last Sunday morning [4 February 1750, Julian calendar], about 5 o’clock, there came on such a violent storm of wind at S.W. that the houses in general were very much shaken, as were also several people in their beds, as if an earthquake had happen’d. A great many houses have received damage by the fall of chimnies [chimney’s], as well as by the impetuosity of the extreme forcing blasts, which carried off part of their coverings [roofs]. Several sheets of lead were blown down from St. Nicholas steeple; which falling on the house adjoining damaged the same; several other sheets of lead now hang loose. A chimney in George’s-street, without Lawford’s Gate, beat down the roof, ceiling and beam of a house, where a man and his wife were in bed, who were buried in the ruins near an hour before their cries could make any one sensible of their misfortune. The poor woman was the first they took out; but the man was so much press’d with the beam, and the weight upon it, which lay on his belly and thigh, that a carpenter was obligated to saw the beam in two before he could be released. He is greatly bruised, and also his wife, whose nose is fractur’d, but both are likely to recover. The country, for a large extent round, has also felt the effects of this storm, where several houses, we are inform’d are laid waste, and a great many trees blown down. This storm was intermixed with heavy showers of hail and rain, so that the waters were out [out of their banks].”<sup>296</sup>

On 11 February 1750, a violent storm of thunder, lightning, hail and rain struck Newport in Monmouthshire, *Wales*. In the moors near the seat of Vaughan, Esq. some hundreds of tame and wild ducks, geese and widgeons, were killed by the storm.<sup>296</sup>

On 20 February 1750, it was reported, “the season was so warm that the wall fruit was in blossom; a swarm of bees was taken and hived at Mr. Role’s in Bisham, near Maidenhead, Berks [*England*], and the ladybird insects were in plenty about London, and the roads very dusty.”<sup>296</sup>

Around 25 February 1750, great floods happened in several parts of *England*, corresponding to the moon’s perigeon [perigee], which produces very high tides. A letter from Boston in Lincolnshire indicated that cattle were saved by driving them to high ground.<sup>296</sup>

On 17 March 1750, Brussels reports, “Letters from Ostend [*Belgium*] acquaint us, that on Wednesday last between the hours of eleven and two, the sea was agitated with such violence, that the waves piercing the dykes [dikes] of the exterior platform, the ditches were immediately filled, and the whole town laid under water. The dykes have suffered very much; as well as the ships in the harbour, one of which, a three masted vessel, laden with salt, was sunk.”<sup>296</sup>

A ship journeying between *Canada* and *England* reported, “We arrived here [Boston, northern *England*] the 16<sup>th</sup> inst. [16 April 1750], after a tedious, hard passage. We had not thirty hours fair wind the whole time. Capt. Fonds arriv’d a fortnight, Capt. Frail ten days, and Capt. Dunn four days, before us, in good health. We all fell in with many large islands of ice [iceberg] on the banks of Newfoundland [*Canada*]. Capt. Frail, by running foul of one in foggy weather, and getting to leeward of it, becalm’d his sails, so that his main topsail got into a cavity of the island, and carried his yard away, and it was with great difficulty he got clear without other damage. Capt. Fonds likewise got in so far with it, that he lost his



cutwater, and, by many hard strokes amongst the ice, was very much damaged, and very leaky. Capt. Dunn also fell in with many ice islands, but got clear without any considerable damage. In lat. 42d. 20m. north, and long. 49d. 50m. W. of London [latitude 42° 20' North, longitude 49° 50' West], on the 8<sup>th</sup> inst. [8 April] we fell in with several of these islands, but by good fortune it was in the daytime, though hazy weather. We got very near one large island, which was a surprising sight, on account of the many cavities in it, and the great numbers of fowls upon it. We were then within musket-shot; so that we had a full view of it, indeed more than we desir'd; for the prospect was far from being pleasant. At the same time we saw another to the southward of us, which, as near as we could compute, was three leagues [9 miles, 14.5 kilometers] in length, and appear'd like a mountainous land, with many openings and valleys, and hills shaped like sugarloaves of a prodigious height. We saw many other small islands of ice but happily steer'd safe through them all.”<sup>296</sup>

On 21 April 1750, South Carolina in what would become the *United States* reported, “we have almost constant and very terrible thundering and lightning. Several Negroes (in different parts of the country) were last week killed by lightening [lightning], and many high pine trees were shiver'd to pieces.”<sup>296</sup>

On 31 May 1750, Philadelphia, Pennsylvania in what would become the *United States* reported, “This has been the coldest May in the memory of man. Last week there were frosts in several places, which have done considerable damage, and in some places snow.”<sup>296</sup>

On 3 June 1750, at Mile End in the parish of Rickmansworth in Hertfordshire, *England*, there was a great storm of thunder and lightning, which began at 9 and lasted until noon. Ten sheep were struck dead, others wounded. The bark of an elm was shivered, and much other mischief done in other places.<sup>296</sup>

On 10 June 1750, a great storm of thunder and lightning caused much damage in Kent, *England*. Near Sittingbourn [Sittingbourne], 17 sheep were killed, and a man walking in Kennington Lane was struck dead by the lightning. Another at Lambeth was struck blind and deaf. A drawer [a person who draws liquor] at the star and garter [Star and Garter Public House or Tavern] in New Palace Yard was dangerously burnt by the lightning. In Abingdon buildings Westminster, it split a stack of chimneys, and at the house of Davis, Esq.; while the family was drinking tea in the back parlor, the windows were shattered to pieces in an instant, the shutters fell into the room, the tea furniture was broke to pieces, and the partitions all scorched.<sup>296</sup>

On 26 June 1750, between 6 and 7 in the evening, at West End, by Harrow on the Hill [in northwest London, *England*], a barn, belonging to farmer Greentree filled with corn and hay, was set fire by the lightning, and entirely destroyed, together with a dove house and 2 stacks of hay. With difficulty the dwelling house was saved. Near Acton, a barn full of wheat, and 3 stacks of hay, were set on fire, and burnt to the ground. Several sheep killed on Finchley Common.<sup>296</sup>

On 28 June 1750, at Sydenham in Kent, *England*, a whirlwind [tornado] took up part of a haystack into the air, higher than the highest tree, and some of it was carried a mile [1.6 kilometers] from the place.<sup>296</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:  
 March 30<sup>th</sup> – pleasant. April – some cold and some pleasant weather. May 31<sup>st</sup> – a wet and cold month, and yet there are millions of little grasshoppers not killed [by the cold]. June 30<sup>th</sup> – there was a happy intermixture of heat and wet for three weeks past. July and August – nothing remarkable. September – cold the latter part of the month, but the corn is like to be good.<sup>78</sup>

The summer of 1750 in Denainvilliers, *France* was characterized by:

Hot days	45 days
Very hot days	9 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The maximum temperatures observed during the summer were:

Toulouse, <i>France</i>	( 95.7° F, 35.4° C)
Paris, <i>France</i>	( 95.0° F, 35.0° C) on 26 June and 22 July
Denainvilliers, <i>France</i>	( 93.9° F, 34.4° C) on 22 July
Moscow, <i>Russia</i>	( 84.7° F, 29.3° C) on 11 July

In Burgundy, the grape harvest began on 24 September. The harvest was fairly abundant and of very good quality. In the south, the harvest yielded very little wine or wheat, but the maize harvest was excellent. Fruit this year was rather abundant.<sup>62</sup>

On 5 July 1750, Sirkes in Lorraine [Lorraine], *France* reported, “a little rivulet [very small stream] which runs thro’ that town into the Moselle [River], rose in less than an hour, 22 feet [6.7 meters], carried away above 30 houses, damaged 27 others, and drowned 20 people. Supposed to be occasioned by a waterspout, or the eruption of water from the adjacent mountains.”<sup>296</sup>

[Another account gives what looks like a different date. But 5 July in the Julian calendar matches 16 July in the Gregorian calendar.] On 16 July 1750, a brook which runs through the little town of Sirkes, in Lorraine, *France* situated on the banks of the Moselle River flooded. The brook which is usually no more than two or three feet [0.6-0.9 meters] deep, swelled on a sudden so prodigiously, that the water rose to the height of 22 feet [6.7 meters], and the stream became 80 yards [73 meters] wide. It overturned the town wall, which was very thick, and all the houses that stood in its way. Having an arch of only 18 feet [5.5 meters] wide for its usual passage through the wall on the other side of town, it rose to such a height as to overset that also, together with a tower, and forced its way out of the breach with such impetuosity, as for some moments to stop the course of the Moselle River, and carry over to the other side of that river, the ruins of the buildings it had washed down. It was fortunate that this part of the wall was not able to resist the waters; otherwise the whole town would have been destroyed. Thirty-three houses were leveled with the ground, and 27 more so far undermined, that it was found necessary to pull them down. As this accident happened in the daytime, only 21 persons were drowned. But the unfortunate survivors lost their houses and all their effects.<sup>300</sup>

From 8 to 23 July 1750, a heat wave struck *England*. On 11 July at Norwich the temperature was 92° F [33° C] in the shade and 111° F [44° C] in the sun. Several horses dropped down dead [from the heat]. On 10 July, the temperature was 84° F [29° C] at Stoke Newington [a London Borough] and 84° F [29° C] in the shade at London. On 13 July, there was excessive heat in London. On 15 July, the temperature at Lyndon in Rutland in central *England* reached 85° F [29° C]. The first three weeks of July at Lyndon was the hottest ever known. In general, the summer (except for a few very hot days) was exceedingly cold, and there was scarcely a day without rain. The weather was similar at London and Plymouth, *England*, and Dublin, *Ireland*.<sup>212</sup>

On 11 July 1750, there was a thunderstorm in London, *England*. It caused great flood and hail damage. The hailstones were flat, three inches [8 centimeters] in circumference, and more properly called “ice cakes”. On 12 July, a thunderstorm struck Alnwick in Northumberland, *England*. On 16 July, a very violent thunderstorm struck Cambridge, Huntingdonshire, Northampton, Worcester, Gravesend, Gosport (very large hail), Epping (pieces of ice), and Darking in Surrey. On 24 July, a violent thunderstorm with hail and rain struck London and caused a great flood in houses.<sup>212</sup>

On 11 July 1750 in *England*, there was a hailstorm in Middlesex and Surrey.<sup>93</sup> [Middlesex today is mostly a part of the London metropolis.]

On 11 July 1750, at Tooting in south London, *England*, the temperature reached 88.75° F [31.5° C]. This same heat wave also struck Norwich from 8 July and continued for 12 days. On the 11<sup>th</sup>, the hottest day,

the temperature in the sun stood 11° above the heat of the human blood [109.6° F, 43.1° C]; and in the shade only 8° below it [90.6° F, 32.6° C]. Several horses dropped down dead under their masters, overcome by the violent heat.<sup>236</sup>

On 11 July 1750 about 5 o'clock in the afternoon, a violent storm struck London, *England*. The storm of thunder, lightning, rain and hail caused the streets of London to overflow and the water filled many cellars. Over 4,000*l.* of damage done to the gardeners in and near Southwark. [In present currency, that would be equivalent to £533,000 in damages based on the retail inflation price index.] Numbers of fish of all kinds were seen floating the next day in the river, and were taken out dead. Several hailstones measured over 3 inches [8 centimeters] about. They were of a flat form, so as to be more properly called ice cakes.<sup>296</sup>

On 12 July 1750, a violent shower of rain proceeded by thunder and lightning struck Alnwick in Northumberland, *England* that killed a man in a boat.<sup>296</sup>

On 13 July 1750, it was reported, “The excessive heat of this and some preceding days, so affected the fish in the [River] Thames, that they gather'd in shoals to the bank side, and bury'd [buried] themselves in the ooze [ooze] and mud, and were easily taken in great quantities; loads of fish perish'd in the fens of Cambridgeshire [*England*], and one person lost 300*l.* by the death of jacks and pikes.” [In present currency, that would be equivalent to £40,000 in damages based on the retail inflation price index.]<sup>296</sup>

On 16 July 1750, terrible storms swept through *England*.<sup>296</sup>

— “Was a terrible storm of thunder and lightening [lightning], by which the lead [roofing] of several houses in Bishopsgate-street were melted, and a turret on the top of a house shivered [vibrated]. In Cambridge and Huntingdonshires, it lasted with a heavy rain from 9 in the morning till 10 at night, a ball of fire fell on St. Ives steeple, and split it about the middle, burnt a house and damag'd others.”

— “At Harleston field, near Northampton, 9 sheep killed; 6 miles [10 kilometers] from Coventry, a barn was burnt, and 30 sheep and three calves killed, and a shepherd struck dead in Marton field, not far from them; at Worcester the storm began between 10 and 11 o'clock the night before, and continu'd till near 5 the next morning, and was very terrifying; numbers of cattle broke out of their pasture, and two were killed under a tree, the bark of which was much scorched.”

— At Worcester in Worcestershire, “Last night we had the greatest storm of thunder and lightning (attended with little rain) ever known. It began about ten, and continued, with short intermissions, 'til four this morning. So loud was the thunder, and the lightning so fierce, that every body was exceedingly terrified; several families that were gone to bed, soon arose, being shook in their beds. Balls of fire issued from the lightning, one fell in or very near one of our principal streets.”

— At Gosport in Hampshire, “Last night about 9 o'clock, it began to lighten [lightning], and continued at intervals, till past 2 o'clock, without either thunder or rain; but soon after it began to thunder, lighten, hail and rain, without intermission, till half an hour past 3. Such dreadful thunder the oldest man living declared they never heard. The lightning was so violent, that the firmament seemed a blaze of fire; the hail stones were of very uncommon sizes and forms, and fell with great impetuosity, did some damage to the corn [grain], gardens, and windows. Half an hour after four this morning the sky began to clear, and the sun shone bright. We had a fine day, but most sultry hot.”

— At Cambridge in Cambridgeshire, “About 9 in the morning began lightning and thunder, attended with heavy rain, and lasted most part of the day, and till 10 at night. Several fire balls were seen in the air. Great damage was done at Colton in Hildersham, and the neighbouring towns. Kill'd by the lightning at Broadbury, in the county of Durkaine, John Thompson; in Cambridgeshire, Mr. Neville Fuller, of Haddenham. Some pigeons [pigeons] at Halton, and the dove-house fired, but extinguished by timely help.”

— At Epping in Essex, “About 8 o'clock in the morning began a severe storm of rain, hail, thunder and lightning, and continued, (with some intermission) 'till the evening; in some places, pieces of ice fell

about an inch and a half square. I don't hear of any damage it has done, but laying the corn [grain], which is trivial, as it is so near harvest. In Belcham Roding [Beauchamp Roding?], half an oak was driven by the lightning at some distance from the tree; it was shivered into small withs [withes] of a great length, much resembling in shape and size a two penny cord, somewhat untwisted."

On 24 July 1750, a storm of hail and rain fell in London and Westminster, *England*. The storm did much damage to many people, by filling their cellars with water, which in some places stood a foot above the shop floors.<sup>296</sup>

In Norfolk and Suffolk, *England*, about the beginning of August 1750, there was a very great scarcity of water.<sup>296</sup>

Two Spanish register ships, which sailed from Havannah [Havana, Cuba] in August 1750 with a ship-of-war and a snow [a merchant sailing vessel] were driven ashore in a violent storm near Cape Hatteras off the coast of North Carolina in what would become the *United States*. Don Boneta, the Spanish commander, employed some of the country sloops to save his effects, and one of them Zebulon Wade, master, of [the ship] *New England*, went away with 55 chests of money, some trunks of gold and silver plate, and 155 bales of cochineal [a scale insect, from which the crimson-colored dye carmine is made]. Another sloop was under sail with the same base design, but was prevented. The snow, which had 200,000 dollars on register, went ashore at Cape Lookout, only three men and a boy saved. The ship-of-war sunk, and only four men drowned.<sup>297</sup>

On 5 August 1750, some miles above Altyr, in the county of Murray [Altyre in Muray or Elginshire county, *Scotland*], fell so much rain, "that a small river by that place rose 22 feet [6.7 meters] above the common level, and did incredible damage to the field soil, carrying off some and covering other, with sand and gravel, swept away several houses and mills, and corn [grain] off whole possessions. It is imagined that a waterspout fell."<sup>296</sup>

On 5 August 1750, heavy rains struck Murray, *Scotland*. It raised the river 22 feet [6.7 meters] and did incredible damage. On 2 September, heavy rains struck Gloucester in southwest *England*. It was the most violent rain ever known. It lasted for 3 hours. The streets were 3 feet [0.9 meters] deep in water. Large trees and hedges were washed away.<sup>212</sup>

In 1750, the price of wheat [in *England*] averaged 25 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

On 11 August 1750, Posnania [Poznań], *Poland* reported, "A prodigious quantity of locusts has appeared in the neighbourhood of Novogrodech; which within 4 days devour'd all the fruits of the earth, and even the leaves of the trees, and having nothing more to subsist on, went off in two flights, one towards Woynitz [Wojnicz], and the other toward Ynowadislow [Wodzisław?]."<sup>296</sup>

On 15 August 1750, Vienne in Dauphiny, *France* reported, "the little river that runs thro' [through] that city, swelled so prodigiously a fortnight [14 days] ago, that above 100 houses, with the powder-mills, flatting-mills, forges for arms, a fuller's mill and a paper-mill, were all carried away by the rapidness of the torrent, which overflowed the country for ten leagues [30 miles, 48 kilometers] round the city. This sudden inundation made terrible ravages in all the adjacent villages, and above 130 souls perished in the waters, and the damage is computed at 3 millions of livres."<sup>296</sup>

On 16 August 1750, Edinburgh, *Scotland* reported, "They write from Aberdeen, that last week the river Den rose to such a height, that, in the middle of the night, it carried off about half of a large house, furniture and all. The gentlewoman of the house was providentially abroad, and her youngest son narrowly escaped with his life, the water having surrounded his bed."<sup>296</sup>

On 17-18 August 1750, an Atlantic hurricane struck offshore in North Carolina in the *United States*. Four Spanish vessels were wrecked off the Outer Banks. No lives were lost from the *Nuestra de Solidad*, with unknown losses from the *El Salvador* and two other ships.<sup>141</sup>

Gloucester, *England* damaged by a violent rain on September 2, 1750.<sup>41</sup>

On 2 September 1750, the most violent rain ever known struck Gloucester in southwest *England*. The rainstorm “lasting 3 hours, with very little intermission, by which the principal streets were above 3 feet [0.9 meters] deep in water, so that most of the cellars were filled, and many of the shops. At Stroud and Painswick, several mills were much damaged, large trees and hedges carry’d away, and walls thrown down by the torrent; some had 30 ton of coal wash’d away, others their furnaces carry’d out of the stacks, and a bridge, called Dedbridge, was forced up; the damage computed at several thousand pounds.”<sup>296</sup>

On 3 September 1750, a violent rain fell on Neuschâtel [Neuchâtel, *Switzerland*], “by which the waters rose in the lower city to the first story, and carry’d away bridges, mills, walls, and even a tower, and made incredible ravages in the adjacent part of Swisserland [Switzerland].”<sup>296</sup>

On 12 September 1750, Genoa, *Italy* reported, “The weather is so extremely hot in this city, that most of its inhabitants have deserted it, in order to breathe a cooler air in the country. The great forest of Casetta is entirely destroyed by fire.”<sup>296</sup>

In Charlestown, South Carolina in the *United States*, there is little rain except during thundershowers. On 30 June 1750, during a thunderstorm, 5.335 inches of rain fell in 24 hours. On 16 September 1751, 9.955 inches of rain fell in 24 hours, but the greatest part in 6 hours. On 15 September 1752, during the time of the most violent hurricane that was ever felt in this town, the depth of rain which fell, was only 3.740 inches, and the greatest part of that was the spray of the sea.<sup>236</sup>

On 10 November 1750 at Charles-Town [Charleston], South Carolina in what would become part of the *United States*, A.B. wrote, “I have observed, that since I have been in Carolina, we never had so little lightning and thunder as this spring and summer. I think in those five months, we have not had 20 distinguishable claps, and I am sure they have been innumerable in the same space for years past. I have questioned some of the oldest settlers on this point, and they too observe, we never had near so little, (in 45 years of their remembrance). [Normally] thunder and lightning are very common, sharp, and dreadful here. About 3 years ago, 7 houses in different parts of the town were struck in one night, besides the church, and several vessels in the harbour. Every year there are some houses damaged, and the men of war [ships] were frequently.”<sup>297</sup>

On 30 November 1750, high winds on land and water caused much damage in *England*. A Gravesend boat was run down by a French [trader?], and 29 persons drowned; 10 or 11 were saved by boats, but one woman dy’d [died] soon after. Mrs. Slack of Finsbury had both her legs and several ribs broke by the fall of a stack of chimnies [chimneys], and she dy’d [died] on the 18<sup>th</sup> instant [December].”<sup>296</sup>

On 30 November 1750, a gale struck Gravesend, *England*. On 3 December, a gale struck Axbridge in Somerset, *England*. It produced a very high tide that did great damage.<sup>212</sup>

On 3 December 1750, an estate near Axbridge in Somersetshire, *England* was ruined by the wind and high waters, which broke down a great fence wall, and destroyed a whole warren of rabbits. About Chepstow, in Monmouthshire, *Wales*, and Berkley [Berkeley] in Gloucestershire, *England*, great numbers of sheep were drowned by the breaking of the sea banks.<sup>296</sup>



In 1750 during the period between 5 February and 6 May, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hui-lai. During the period between 4 June and 3 July, a drought engulfed Hopei (now Hebei province) in northern *China* at Chiao-ho and at Ch'i-ch'êng [uncertain name and province]. During the period between 8 August and 8 November, a drought engulfed Kwangtung province at Lien.<sup>153</sup>

In 1750, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 7 April and 5 May, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at P'ing-yüan [uncertain name]. Houses and fields were damaged by the floodwaters and innumerable people and cattle drowned.

— During the period between 4 June and 3 July, floods struck Hopei (now Hebei province) in northern *China* at Yüeh-t'ing, Su-ning and Fou-p'ing; Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin; Anhwei (now Anhui province) in eastern *China* at Fou-yang and Ying-shan; and Chekiang (now Zhejiang province) on the east coast of *China* at Ch'un-an. At Yüeh-t'ing and Ch'un-an, the crops were damaged by the floodwaters. At Ying-shan, houses and fields were damaged.

— During the period between 4 July and 1 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Jih-chao; Hupeh (now Hubei province) in central *China* at Sui; Shensi (now Shaanxi province) in central *China* at Fu-p'ing; and Hopei province at Jung-ch'êng and An-kuo. At Sui, houses and fields were damaged by the floodwaters.

**Winter of 1750 / 1751 A.D.** From 26 January to 8 February 1751, there was a severe frost in London, *England*.<sup>212</sup>

**1751 A.D.** In France there was a flood. In January 1751, the Seine River in Paris, *France*, at the bridge “Pont de la Tournelle” reached a height of 6.7 meters (22.0 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

In the year 1751 Paris, *France* received 24.7 inches (627 millimeters) of annual rainfall instead of average 20.9 inches (530 millimeters).<sup>79</sup>

Around the beginning of January 1751, over  $\frac{3}{4}$  of the town of Fiume, a port in Istria, [now the city of Rijeka, *Croatia*] belonging to the emperor, was swallowed up, [by a tsunami] together with most of the churches, religious houses, and magazines. During the time of the earthquake, the sea, which was extremely agitated, swallowed up a small island near the town, and all the inhabitants of it perished. For the next day, when it was a profound calm, not the least traces of this island were to be perceived; so that it is imagined it was quite torn from its foundation by the violence of the earthquake.<sup>297</sup>

The maximum temperature during the summer in Cap [Cape Town, *South Africa*], was 110.8° F (43.8° C) on 23 February.<sup>62</sup>

On 26 February 1751, a severe gale struck *England*. At Oxford, it damaged the steeple of St. Mary's Church. At Lichfield, it caused much damage to the cathedral. At Worcester, it caused great damage. At Bromyard, the storm was very violent. At York, the storm did £500 damage to the minster. At Nottingham, it destroyed many trees and unroofed houses. This gale caused a large number of shipwrecks at Limerick and Dublin, *Ireland* and at London, *England*. On 27 February, a thunderstorm at Truro in Cornwall, *England* almost ruined the churches of St. Etham and Ladock. On 21 April, a hailstorm struck London. During the month of May in London, there was heavy rain until 18 May. The corn [grain] was much damaged and about 6 million acres were unsowed. On 6 May, there was much snow preceded by thunder and lightning at Newcastle-on-Tyne. On 9 May in London, there was a sharp frost. In Yorkshire, there was much snow and thick ice. On 20 May at Pontefract in west Yorkshire, there was a violent rain and terrible hail. The hailstones measured about 13 inches [33 centimeters] about



[in circumference]. The flood threw down walls. On 21 and 22 May it was warm in London. The temperature reached 64° F [18° C] at noon. On 6 June, at South Moulton in Devonshire in southwest *England*, the weather was extremely hot. In June in London, the weather was warm and dry. On 19 September in London, there was a thunderstorm with heavy rain. On 1 November at Whitby in North Yorkshire, there was a gale. On 21 November in London, there was a thunderstorm with snow, hail and much lightning and thunder. It caused a flood.<sup>212</sup>

The turbulent weather during the end of February 1751 has done great damage to edifices in several parts of *England*. On 27 February, a storm of thunder and lightning almost ruined the churches of St. Etham and Ladock near Truro in Cornwall. At Oxford, the high wind on the 26<sup>th</sup> so damaged the steeple of St. Mary's that it was expected to fall. At Litchfield, the gilt ball on one of the spires of the cathedral was blown down, and the vane on another spire, the glass and stonework of one of the windows greatly suffered. At Worcester, two prebendal houses [manors] near the cathedral were quite demolished, large stacks of chimneys were blown down, and a multitude of windows shattered to pieces. At Bromyard, in Herefordshire, a chimney fell upon an adjacent school, where the mistress was sitting in a chair with a child in her arms with several scholars, who were all buried in the ruins, but very little hurt. In York, a pinnacle of the northwest tower of the minster, with the battlements, fell through the roof and two lofts, and broke the pavement, the damage above 500*l*. In the adjacent country and in Nottinghamshire, the hurricane did much damage unroofing houses, blowing down some, dispersing stacks of corn [grain] and hay, and tearing up large trees by the roots, and throwing down park [pales?]. At Limerick in *Ireland*, in the hurricane, a Dutch dogger was beat to pieces, 5 or 6 vessels forced on shore, and all the shipping damaged. Many houses were blow down, besides loss of cattle, and much damage to the bank on both sides of the River Shannon. The same hurricane did considerable damage to the shipping in Dublin and other ports of *Ireland* and also on the River Thames. This storm was still more violent abroad, particularly at Nantz [Nantes, *France*] and its neighborhood, where on the 24<sup>th</sup> of February in the night a terrible hurricane began at southwest and at three the next morning turned to northwest, accompanied with thunder, lightning, and such terrible noises both at sea and land, as seemed to proceed from an earthquake. It did a great deal of mischief in the country, by overflowing of rivers, tearing up woods and corn mills, and overthrowing of houses; but the greatest damage happened in the road of Paimbœuf; where out of 70 ships, only 4 rode it out successfully. Several were left on the rocks. Some were forced upon the quay [wharf]. A few were driven out to sea and escaped. Some foundered [sunk], and others were forced on the shore in different places and lost. Nearly 800 sailors perished. The chamber of insurance loses 1,200,000 livres by this storm, and the town of Nantes ten million [livres].<sup>297</sup>

In 1751, it rained in Leyden [Leiden, *the Netherlands*] no less than 163 days during which 41 inches of total rain fell.<sup>236</sup>

On 7 March 1751, there was a terrible storm in Nantz (Nantes in western *France*), which destroyed 66 square-rigged vessels, and 800 seamen perished. On 8 December, a still more destructive storm occurred at Cadiz in southwestern *Spain* in which 100 vessels were lost, and three thousand sailors perished.<sup>1</sup>

The drought of 1751 was intense in southern *France*.<sup>79</sup>

There was a storm at Nantz (Nantes in western *France*), where 66 vessels and 800 sailors were lost on March 7<sup>th</sup>.<sup>40, 41, 43, 56</sup>

Charles Town, Carolina [Charleston, South Carolina in the *United States*] reported that there was no rain between the middle of January until 28 April 1751. Because of the dry weather, planters were able to plant rice in a great many swamps and lowlands that had never were planted before.<sup>297</sup>

On 6 May 1751, “Much snow fell in and about Newcastle on Tine [Newcastle upon Tyne in northeast *England*], preceded by thunder and lightening, by which near North Dissington, Northumberland, 9 ewes [female sheep] and a lamb were killed.”<sup>297</sup>

In May 1751, the cattle plague was raging in Yorkshire, Lancashire, Westmorland, Wiltshire, and Oxfordshire, *England*. In Cheshire, 30,000 cattle died since last October.<sup>212</sup>

On 20 May 1751 in *England*, there was a hailstorm in Yorkshire.<sup>93</sup>

On Monday, 20 May 1751 “At Pontefract [in West Yorkshire, *England*], by a violent shower of rain at this place, many cellers [cellars] were almost filled with water; a collection of waters at the meeting of two sloping streets in the market place, overflow’d and taking their course down a narrow lane, bore down some strong garden walls, and did incredible damage; the cut from the river that turns the mill, being filled with the flood from the hills descending with the mill dam drove down part of the mill, and what is most surprizing [surprising] carry’d one of the mill stones the distance of 15 yards [13.7 meters]; the rain which lasted about 4 hours, was preceded [preceded] by a terrible storm of hail which measur’d 31 inches [depth of hailstones?], and attended with loud claps of thunder, and lightening [lightning].”<sup>297</sup>

In May 1751, *England* reported, “The season has been very cold, and wet for most part of this month, the corn [grain] in the ground being much damaged in many places by the rain, and above 600,000 acres [243,000 hectares] were computed to remain unsowed; cattle also, especially the woolly kind, have suffer’d greatly by the inclemency of the weather; one farmer, particularly, in Sussex, lost 400 lambs by the cold dews.” “The great rains also have made land carriage so dear, that the poor and working people have been greatly distressed, by the high price of coals, which, in the wet season at Derby, rose from 4*d.* to 8*d.* per hundred; at Rugby, Warwickshire, from 8*d.* to 14*d.* at Northampton from 10*d.* to 18*d.* and in other places.”<sup>297</sup>

Meteorological observations taken at the royal observatory in Paris, *France* for the year 1751 provide the following: The depth of rainfall for the year was 23 inches 2 lines, which indicates a wet year. The mean annual depth is normally 16 inches 8 lines. The greatest cold occurred on 10 February in the open air taken with a Reaumur thermometer was [-10°Re, 9.5° F, -12.5° C]. The greatest heat occurred on 17 June was [29.5°Re, 98° F, 37° C]. The greatest height of the barometer occurred on 23 February at 28 inches 6 lines. The least height of the barometer occurred on 18 March at 26 inches 11 lines. On 16 & 17 June 1750, a 4-inch long [magnetic] needle declined from the North 17° 15’ westward.<sup>302</sup>

Around the beginning of July 1751, in and near Dublin, *Ireland*, there was a violent storm of hail, rain, lightning, and thunder, as had ever been known, which did incredible damage to the corn [grain], fruits, and gardens, cutting off the cabbages and other greens as if with a knife.<sup>297</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:  
January 6<sup>th</sup> – no snow on the ground. January 7<sup>th</sup> – snowstorm. January 12<sup>th</sup> – thaw. January 15<sup>th</sup> – the frost is entirely out of the ground. January 21<sup>st</sup> – weather like found in May. January 24<sup>th</sup> – this winter will go down memorable to posterity. February – this month has been more like spring than winter; moderate generally, and several days as warm as May. February 28<sup>th</sup> – pleasant weather still. Thus winter ends, a wonder through the whole. March 5<sup>th</sup> – snowstorm. March 13<sup>th</sup> – fine spring weather the rest of the month, except the four last days. April – a cold blustery month. May 8<sup>th</sup> – our English cherries did but today begin to bloom. May 17<sup>th</sup> – they are now in all their gaiety of blooming. May 23<sup>rd</sup> – growing season. May 30<sup>th</sup> – never did things grow faster, nor never a better prospect. June 5<sup>th</sup> – very cold. June 15<sup>th</sup> – a wonderful time for grass, but the Indian corn wants heat. June 26<sup>th</sup> – seasonable weather. July 31<sup>st</sup> – the freshets [floods] have carried away many bridges, hay, etc. on Presumpscot River. Saccaribig bridge and the Presumpscot great dam broke. October 4<sup>th</sup> – we began to dig our potatoes. November 16<sup>th</sup> – moderate weather. November 24<sup>th</sup> – another wonder of a day, so calm, warm and delightful.<sup>78</sup>

On 24 July 1751, a hurricane struck St. Kitts in the *West Indies*. During a violent gale, the brig *Friendship* was wrecked and none of the crew survived. The storm was also felt off Havana, *Cuba*.<sup>141</sup>

In August 1751, the cliffs at Charmouth in Dorset, *England* were on fire. “After some time of remarkably hot and dry weather, and a sudden heavy rain, the cliffs began to smoke, and soon after to burn like a subtle flame (only to be seen at a distance) and did so at intervals after heavy rain, till winter. (On examination in 1759, the cliffs were found to consist of much pyrites, marcasites, and yielding one-tenth of common sulphur [sulfur]. On putting 100 lb. [100 pound, 45 kilograms] weight in a heap, and sprinkling it every day with water, in ten days the heap grew hot, caught fire, and fell into dust. The same flame has been seen from the Lodes, in Cornwall.)”<sup>212, 237</sup>

In 1751, the price of wheat [in *England*] averaged 25 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

On 30 August 1751, it was reported, “The River Elbe at Hamburgh [Hamburg, *Germany*] having risen 16 feet [4.9 meters] by the late rain, has overflow’d all the ware houses [warehouses] and cellars in the city, and the damage done thereby is computed at 90,000*l*.<sup>297</sup> [In present currency, that would be equivalent to £12 million in damages based on the retail inflation price index.]

A hurricane struck *Jamaica* on August 10, 1751, causing 300,000 pounds of damage.<sup>40, 41, 42, 43, 56</sup>

On 2 September 1751, a hurricane struck *Jamaica*.<sup>124</sup>

A letter from a ship at Kingston in *Jamaica* reported, “On the 10<sup>th</sup> instant [10 September 1751] in the evening, the whole firmament appeared of a very livid colour, horrible to behold, and the greatest part of that night was attended with hard squalls of wind. About 6 in the morning of the 11<sup>th</sup> it blew very hard at north, which brought off great quantities of leaves and sprays of trees from the mountains to the ships which rode at anchor a mile and half [2.4 kilometers] distant from the town, and were seen in the air like flocks of birds. At half an hour after 8 the wind shifted to the east, and after that to the south-east, when instantly it blew a hurricane which raised the sea in the harbour to a most surprising height, and in a few minutes it grew totally dark, so that at noon day the ships cou’d [could] not be seen that were driving foul of each other, and we were scarce capable of keeping ourselves fixed to any thing, the wind roaring above us as if the most tremendous thunder had been bursting on our heads, so that no man could be heard to speak. The height of the gale lasted till between 11 and 12, when it something [somewhat] cleared; and looking round us, nothing was to be seen but death and destruction, numbers [of people] lying on the shore drown’d, and others floating on the sides and pieces of wrecks, till the following afternoon, when we ventured out our small boats to bring them off. The violence of the wind was so great, that only 3 ships out of 40 sail of vessels [sailing ships] rode out the gale, *viz.* the *Corwall*, [Capt.] Duncomb, the *Mercury*, [Capt.] Matthews, and the *Queen Mary*, who had suffered not the least damage. The proprietors of what small canoes [boats] were saved in the town, ask[ed] 6 and 8 pistoles each to carry any man aboard or ashore, or to endeavour to save those that were perishing on the water. Of the vessels that were lost; some were drove ashore in the woods, upset and stove to pieces, to the number of 27; and there are now riding before the town without mast 14 [ships]. Some days since several vessels arrived with jury masts [jury rigged masts] and in a very shatter’d condition, who met with the gale between Hispaniola [now the island of the Dominican Republic and Haiti] and Porto-Rico [Puerto Rico], so that it is to be feared the Windward Islands have suffered the same fate. At the same time the *Fox* man of war from the Havannah [Havana], Mr. Manning on board, with a great quantity of [newly discovered] species, was obligated to cut away all her masts, and let go all her anchors, and after driving over two or three keys, brought up between two rocks, where it pleased God to preserve their lives, although they had taken leave of each other, and were preparing for their last moments. She is bulged, and her hold full of water. They have saved some of the species, but whether they will get up the rest is doubtful. Another letter ads, that

the loss in the inhabitants of *Jamaica* have suffer'd amounts to 300,000 *l.*<sup>297</sup> [In present currency, that would be equivalent to £40 million in damages based on the retail inflation price index.]

On 11 September 1751 the following ships were lost at *Jamaica* in a hurricane: *Sally*, Captain Randal; *Jamaica Paquet*, Capt. Lindsey; *Molly*, Capt. Car; *Port Royal*, Capt. Penniston; *Mercury*, Capt. Snow; *Adventine*, Capt. Cawdwell; *St. Anne*, Capt. Nelson; *Betty*, Capt. McLean; *Self Interest*, Capt. Strahan; *Rebecca*, Capt. Neale; *Moses*, Capt. Craigs; all of *Jamaica*. *Dolphin*, Capt. Burchal; and *Virgin*, Capt. Smith, of New York. *Page*, Capt. Smith, of Glasgow. *Betty*, Capt. Williams; and *Fanny*, Capt. Dorham, of Bermudas. *Diamond*, Capt. Dorset, of Curasoa. *Mount Edgcomb*, Capt. Levers, of Plymouth. *Hazard*, Capt. Harris; *Charming Sage*, Capt. Silvester; and *Betty*, Capt. Macky, of Boston. *William*, Capt. Wright of Cape Fare. *Byrne*, Capt. Boats of Liverpool. *Adventure*, Capt. Brice, of Portsmouth. *Fox* man-of-war, 20 guns.<sup>297</sup>

On 21 November 1751 in *England* it was reported, "About this time fell heavy rains, which swelled the brooks and torrents, and several people were drowned in attempting to past the common road."<sup>297</sup>

The quantity of rain that fell on the island of *Antigua* was: 51.8 inches [132 centimeters] in 1751, 43.3 inches [110 centimeters] in 1752, 32.8 inches [83 centimeters] in 1753, and 75.1 inches [191 centimeters] in 1754.<sup>303</sup>

There was a storm at Cadiz, *Spain*, where 100 ships lost on December 8<sup>th</sup>.<sup>40, 41, 43, 56</sup>

In the hurricane that lately happened at Cadiz [Cádiz, *Spain*], above 100 ships, of different nations, were lost, among which were two French ships that had upwards of 500,000 dollars on board.<sup>298</sup>

In 1751, floods struck several regions of *China* including:<sup>153</sup>

- During the period between 27 March and 25 April, floods struck Shantung (now Shandong province) on the east coast of *China* at Wei and Yeh. At Yeh, there was a great storm and people & cattle drowned.
- During the period between 26 April and 24 May, floods struck Shantung province at P'ing-tu and Tzū-yang.
- During the period between 21 August and 18 September, floods struck Shantung province at Jih-chao, Liao-ch'êng, Li-ching, Chan-hua, Hui-min, P'u-t'ai and Shou-kuang; and Hopei (now Hebei province) in northern *China* at Cho and Luan.

In 1751 during the period between 6 May and 8 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chien-tê, Sui-an, Ch'un-an, Shou-ch'ang, T'ung-lu and Fên-shui. The drought damaged the crops. During the period between 21 August and 18 September, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Li-shui and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lien and Hui-lai.<sup>153</sup>

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**Winter of 1751 / 1752 A.D.** In *China*, it was an ancient custom to celebrate the sixtieth year of the Emperor's mother, with the most amazing pomp. The last three months of the year 1751 were taken up in making preparations for this approaching grand festival. The whole distance from one of the Emperor's houses of pleasure, to his palace in the center of the Tartar city of Pekin [Peking, now Beijing, *China*], being about 12 English miles [19 kilometers], was to be decorated in the most superb manner; and as the procession would be, in great part, along the river, it was foreseen, that the barks constructed to carry the Emperor, the Empress Mother, and the whole court, were likely to be of very little use, on account of the ice, the time of the ceremony falling out in the most rigorous season of the year. However, certain Mandarins undertook the removal of these obstacles, by employing, night and day, for more than three weeks together, some thousands of hands in continually beating the surface of the water to prevent its

freezing, and a like number in breaking the ice already formed. But in spite of all these precautions, the cold prevailed; the whole river was set fast, and the project abandoned.<sup>305</sup>

On November 9 in 1751, Monsignor Demidoff measured the temperature at Soliskamsky on the border with Siberia, *Russia* and it stood at -34° F [-37° C]. Professor Gmelin spent 9 years on an expedition into Siberia. He observed the following cold temperatures. In the southern part of the country near Selinga, it fell to 226 on the de L'Isle's scale [-59.2° F, -50.7° C]. At Kirenginshi on 10 February 1738, the temperature fell to 240 de L'Isle [-76° F, -60° C]. At Kirenginshi on 11 December 1736, the temperature fell to 254 de L'Isle [-92.8° F, -69.3° C] and on 20 December, the temperature fell to 263 de L'Isle [-103.6° F, -75.3° C]. On 9 January 1735, the temperature fell to 275 de L'Isle [-118° F, -83.3° C] and on 6 January, the temperature fell to 280 de L'Isle [-124° F, -86.7° C].<sup>236</sup>

During the winter of 1752, in the area of Toulouse, *France* "We had unusually cold weather, very heavy frosts, very abundant and frequent snow. From the beginning of December to 14 April we had only seven to eight days bearable, and even in the latter days it was still cold and snowing." In Paris, *France* the lowest cold day was on 10 January with a temperature of 20.7° F (-6.3° C).<sup>62</sup>

Richmond in Yorkshire, *England* reported, "The snow began to fall the 15<sup>th</sup> [15 January 1752], and save very little intermission the next morning, hath continued falling ever since; and tho' [though] we have a strong north-east wind, which drives the snow into hollow, sheltered places, yet in the middle of a plain field, into which I got with some difficulty this evening, to measure the depth of the snow, I found it to be 27 inches [69 centimeters] deep, very heavy, and close. If it had fallen light, and with little wind, it must have lain above a yard [91 centimeters] deep upon the plain ground, which is more by above one half than most people here have ever seen, and it still continues snowing."<sup>298</sup>

In January 1752, the coldest temperature in Charles Town [now Charleston] South Carolina, in the *United States* was 18° F [-7.8° C].<sup>300</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1752 on January 1<sup>st</sup> – the harbor froze over this morning; the whole bay was shut up. January 12<sup>th</sup> – people, since the 1<sup>st</sup>, constantly passed over to Purpoodock [now Cape Elizabeth] on the ice. January 14<sup>th</sup> – went to Brunswick on the ice, and returned without Macqua's island (Mr. Smith gave an account of an excursion with his wife and others to North Yarmouth and Brunswick on the ice, passing over Harrisicket [Harraseeket] Bay in going, and venturing on their return to come directly from Brunswick across the Bay bypassing Marquoit Island to New Casco, and over thence to the beach home.) January 27<sup>th</sup> – ice broke up as far as Mr. Fox's wharf (Last night there was a smart southerly wind which brought in a swell and broke the ice, and the ebb tide carried it away, so that the harbor is all open as high as across Captain Pearsons' to Sawyer's Dock, and where the people were passing yesterday – and where teams and horses might have passed, there is no ice.) February – much snow; the roads blocked up, and travelling bad.<sup>78</sup>

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**1752 A.D.** On 14 January 1752, there was a south gale in London, *England*. From 15-21 January at Richmond in Yorkshire, it snowed for 5 days with a northeast gale. The snow was 27 inches [69 centimeters] deep on the level. On 12-14, 16-17, and 21-23 January in London, it was windy. Then on the 23<sup>rd</sup> there was a violent gale. On 18 February at Oxford, it was very stormy and hailed. On 20 July, a thunderstorm struck London. This was the only thunderstorm in London during the year. At Vauxhall [the inner city area of Central London], this storm "and a whirlwind, which lifted two boats out of the [River] Thames many feet high; and one was dashed to pieces, falling on the shore." It was cool and damp during the summer of 1752 in London. The weather in October was dry and warm.<sup>212</sup>

*Scotland* reported, about the middle of January 1752, "at St. Andrews, for three days they had a most violent storm of wind, hail and snow, from the N.E. great quantities of fish of different kinds were drove



on shore, some dead, others alive, which the country gathered up, and great numbers of lobsters were cast on shore between Kinghorn and Anstruther [in Fife, *Scotland*].”<sup>298</sup>

Cadiz [Cádiz, *Spain*] reported, “On the 15<sup>th</sup> ult. N.S. [15 January 1752, new style – Gregorian calendar] at nine in the evening, wind E.S.E [east southeast] began the most furious hurricane that was ever remember’d in this bay, which drove all the ships from their anchors and foul of one another. All fired guns in signal of distress, but the night was so dark that none could help another; next morning nothing was to be seen but vessels wreck’d and others ready to be swallowed up in the waves, the horror of which was increased by the dismal cries of unfortunate men, who endeavoured to swim to the walls of this city, against which they were violently dash’d, and so perish’d. The night between the 16<sup>th</sup> and 17<sup>th</sup> was no less terrible, but on the 18<sup>th</sup> the wind fell, and the shore discover’d nothing but pieces of wreck and dead bodies. 50 vessels, large and small, with a prodigious number of small craft were lost in the bay. Above 200 houses were blown down at Ceuta [north coast of *Africa*]; a Dutch ship of war of 20 guns was cast away on the Barbary coast [*North Africa*], 10 persons drowned, and the captain and the rest of the crew in number 234 made prisoners.”<sup>298</sup>

On 8 March 1752 at Dublin, *Ireland*, there was a gale. More gales struck on 13-17 March. There were hailstorms in Dublin on 13, 15, 18, 22 and 28 March. On 22 and 30 March, more gales struck Dublin. On 23 and 25 March, there was snow. On 8, 21, 24 and 25 April, there was hail in Dublin. On 10 April, there was a gale. On 7 May, there was a thunderstorm with hail at Dublin. Another thunderstorm struck on 4 June. On 26 July, there was lightning at Dublin. On 9 August, there was another thunderstorm. On 14 and 26 August, there were gales. On 1, 19, 20 and 21 September, there were gales in Dublin. On 9 and 10 October, there was snow in Dublin. On 10 and 11 October, there were gales. From 19 to 29 October, there was fog. On 4, 8 and 10 November, there were gales in Dublin. These gales continued into December and struck on the 12<sup>th</sup>, 14<sup>th</sup>, 18<sup>th</sup>, 19<sup>th</sup>, 23<sup>rd</sup> and 26<sup>th</sup>.<sup>212</sup>

On 15 March 1752, by a violent high wind great damage was done in *England*. “Two tier of ships were blown from their anchors at Tower-Dock [London], many stacks of chimnies [chimneys] were blown down, a woman in Holborn [area of central London] was killed by a brick falling on her head, two chairmen were knocked down by the ruins of an alehouse beaten down by the fall of a stack of chimnies in St. James’s-street, and one of them died the next day in St. George’s Hospital; a man by a like accident had his leg broke, and a child was killed; the beautiful painted west window of Westminster-Abbey was greatly damaged; several hundred weight of lead was blown off Chelsea Hospital; 160 feet [49 meters] of the wall of the King’s-Bench prison fell down; several hundreds of trees were torn up by the roots, and many hundred yards of wall fruit blown down about Walton, Waybridge, and other places up the river; a Sandwich hoy [a heavy barge used for freight] was run down by a collier [a bulk cargo ship which carried coal], and all in it perished. Two servants of Lord Effingham Howard were killed at his house between Guildford and Leatherhead, by the fall of a stack of chimnies; a great number of windows were broke at Norwich, besides other damage.”<sup>298</sup>

In February 1752, there was a cattle plague in Gloucestershire, Buckinghamshire, Lincolnshire, Derbyshire, Yorkshire and Lancashire, *England*. In May, the plague struck Somersetshire and Berkshire.<sup>212</sup>

On 5 May 1752, there was a waterspout in Deeping Fen in Lincolnshire, *England*. “It spouted out water to the height of two yards, ascending with a terrible noise. It carried away straw and hay into the air, which fell down again in regular showers. It looked like a pillar of smoke; ending at Molton chapel, having passed over Flowbit Wash. The waterspout was succeeded by a violent storm of hail and rain.”<sup>212</sup>

On 5 May 1752, four waterspouts [tornadoes] were seen in the region of Deeping-Den in Lincolnshire, *England*.<sup>236</sup>



On 24 May 1752, a whirlwind, or tornado, struck Calvert County, Maryland in what would become the *United States*. The tornado passed in a very narrow vein, and in its course blew down all the buildings at the plantation of John Groves, Esq. By the fall of his dwelling house, his eldest daughter, and a child in her arms, were killed, and his wife and another child dangerously hurt.<sup>298</sup>

On 29 June 1752, a dreadful storm of thunder, lightning, rain, and hail struck Bristol, *England*. The storm turned the roads into rivers. Four men and two boys, retired for shelter into the body of the new church being erected at Kingswood. As they stood facing the church door, they were struck down by lightning. They soon recovered without injury, except for a boy who bled at the nose and ear. Six horses and the driver of a wagon were struck down in the Bath road, and three of the horses killed, and another blinded, a haymaker was also struck blind with a flash of lightning.<sup>298</sup>

Meteorological observations taken at the royal observatory in Paris, *France* for the year 1752 provide the following: The depth of rainfall for the year was 18 inches  $16 \frac{2}{3}$  lines, which indicates a near average year. The greatest cold occurred on 16 January in the open air taken with a Reaumur thermometer was  $[-5.25^{\circ}\text{Re}, 20.2^{\circ}\text{F}, -6.6^{\circ}\text{C}]$ . The greatest heat occurred on 29 June was  $[27^{\circ}\text{Re}, 92.8^{\circ}\text{F}, 33.8^{\circ}\text{C}]$ . The greatest height of the barometer occurred on 31 October at 28 inches 4.5 lines. The least height of the barometer occurred on 27 June at 27 inches 1 lines. On 15 & 16 June 1752, a magnetic needle declined  $17^{\circ} 15'$  to the northwest.<sup>303</sup>

In 1752, the price of wheat [in *England*] averaged 22 shillings 6 pence per quarter [quarter ton].<sup>212</sup>

In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.<sup>1</sup>

The maximum temperature during the summer in Aleppo, *Syria*, was  $95.0^{\circ}\text{F}$  ( $35.0^{\circ}\text{C}$ ).<sup>62</sup>

On 20 July 1752 in the afternoon, a storm of thunder struck London, *England*. At the neat houses opposite Vauxhall, a whirlwind lifted two boats out of the River Thames many feet high. One of them fell on the shore and was dashed to pieces. The other was heaved over the high causeway [causeway] into the gardens.<sup>298</sup>

On 23 July 1752, Charles Town [now Charleston] South Carolina, in the *United States* reported, "We have had the greatest drought here ever known, which still continues, where by the crops of rice, corn, and indigo have suffered extremely. It is so great that the beasts of the field are almost starved in the pastures, and travellers call in at houses to draw water out of the wells for their horses wherefore tomorrow is, by proclamation, appointed for a solemn fast on this occasion throughout the province." Another letter indicated that from the 23<sup>rd</sup> to the 28<sup>th</sup> of July, Charleston had very fine rains, so that their crops were recovering fresh vigor.<sup>298</sup>

In July 1752, the hottest temperature in Charles Town [now Charleston] South Carolina, in the *United States* was  $100^{\circ}\text{F}$  [ $37.8^{\circ}\text{C}$ ].<sup>300</sup>

On 23 July 1752, Annapolis, Maryland in what would become the *United States* reported, "For a week past we have scarcely had a day without lightening [lightning] and thunder; which, has done much damage. On Saturday evening we had as violent a gust as any that can be remembered, accompanied, as usual, with lightening and thunder, which struck several places in this city; particularly the house of Benedict Calvert, Esq.; taking off the top of a chimney, and descending between the chimney and the wainscot (which last it split in two of the rooms) it set fire to a bed, where Mr. Calvert and his wife usually lay, but they happened providentially to be out of town. It melted the blade of a hanger. It then

descended into a lower room, and split a looking glass in pieces, and the handle of a broom at the head of the cellar stairs. Mr. Inch's house was also struck, one of the chimnies [chimneys] split, and some of the bricks carried a considerable way; three persons sitting near the fireplace were much affected by it, but received little hurt. A large poplar tree near the dock, was much shattered, and set on fire." On 30 July, they reported, "Monday last in the afternoon, there was a most violent gust of thunder and lightening in Baltimore County, which enter'd the house of Mrs. Buchanan, about three miles [5 kilometers] from Baltimore town; whereby she was struck speechless for some time, and a young woman who was sitting in the room, was instantly struck dead. Two Negroes were likewise struck down in the kitchen, but the building received no damage. A decanter standing on a chest of drawers, was split to pieces and a china bowl was flung to the ground without being broke or crack'd." <sup>298</sup>

On 29 July 1752 in *England*, there was a hailstorm in Goucestershire and Somersetshire. <sup>93</sup>

On 31 July 1752, at Skellefsen [Ellefsen] in the western Bothnia [the northernmost arm of the Baltic Sea] in *Sweden*, wind at S.W. fell a prodigious shower of hail, many of the hailstones being as large as hens eggs. A thing very extraordinary in these cold climates. <sup>298</sup>

On 1 August 1752, Charles Town [Charleston], South Carolina [in the *United States*] reported, "As the dry weather began last Oct., I shall compare the quantity of rain, by its depth in inches and decimals, which fell in this town from the first of the month to this day, with that which fell in the same ten months, ever since 1738." The greatest quantity of rain, which fell in these ten months, was from 1 October 1748 to 1 August 1749, and amounted to 47.775 inches [121.4 centimeters]. The least quantity was 26.981 inches [68.53 centimeters], which fell from 1 October 1746 to 1 August 1747. The mean quantity, which fell in these ten months in the 13 preceding years, was 35.842 inches [91.03 centimeters]. But the total depth of rain, which fell in this town from 1 October 1751 to 1 August 1752 was 16.891 inches [42.9 centimeters], a quantity not equal to one half of that which fell, at a medium, in the same space of time, in the 13 preceding years. Last month we had no rain in the town till the 22<sup>nd</sup>, since which time, the whole quantity amounted only to 1.483 inches [3.77 centimeters]. But the mean quantity of rain in the month of July, taken from the last 14 years, was 6.482 inches [16.46 centimeters]. <sup>299</sup>

On 6 August 1752, Philadelphia, Pennsylvania in what would become the *United States* reported, "Last Friday morning, the lightning struck two houses on Society Hill, but hurt no person. In its passage from the roof to the ground, it seemed to go considerably out of a direct course, for the sake of passing thorough metal; such as hinges, sash weights, iron rods, the pendulum of a clock, &c. and that where it had sufficient metal to conduct it, nothing was damaged; but where it passed thro' plastering or wood work, it rent and split them surprisngly." <sup>298</sup>

On 26 August 1752 in the morning there was a violent wind, which blew down thousands of hop poles in Kent, *England* and drove a Dutch ship ashore near Ramsgate. <sup>298</sup>

On 25 and 26 August 1752, the violence of the storm so swelled the River Tyne at Newcastle in *England*, that the like cannot be remembered by the oldest man living. The flat ground about Newburgh is laid underwater, by which the farmers sustained great loss. <sup>298</sup>

Durham in northeast *England* reported, "The storm which was felt in the south on 26 August [1752], began here on the 24<sup>th</sup> at night, and continued without intermission till the 26<sup>th</sup> at night, and so swelled the River Wear, that it laid all the flat country under water, and rendered the roads impassable. The distress of the poor country people is very great; their standing corn [grain] is entirely ruined, and the whole stacks of it shorn, together with cocks of hay [a small cone-shaped pile of hay left in the field until dry enough to carry to the barn], sheep, swine, &c. swept away by the torrent." <sup>298</sup>

“By the storm on the 26<sup>th</sup> past [26 August 1752] great part of the hundreds of Essex [in Essex, *England*, the county was divided for administrative purposes into 19 *hundreds* or districts] were laid under water, and much damage done there.” Many vessels were lost on the coast of *England*, *Scotland*, and *Ireland*, and particularly in Bristol Channel the following: *Napps and Jeffery*; *Mary and Susannah*, Capt. Gwyther; *Two Friends*, Capt. Cunningham; *Endeavour*, Capt. Baney; *Lilly*; *Friendship*, Capt. Wilcox; two vessels with grocery; a vessel with coal from Penzance; *Satisfaction*, Capt. Hamet; *Elizabeth*, Capt. Christian. The following vessels have been wrecked on the coast of Cornwall in southwest *England*: *Daniel*, Capt. Pamouret; *William and John*, Capt. Dare; *Unity*, Capt. Diamond, and all her crew lost; *Two Brothers*, Capt. Gardiner; a new brig. Capt. Randal, and only one man saved; five vessels to the westward of St. Ives, and the crews of two of them entirely perished. The *Esther*, Capt. Ball; and the [?], Capt. Norman, are ashore, and the *Margaret*, Capt. Bongey, from Bristol, with all the crew.<sup>298</sup>

On 25 and 26 August 1752, there was a gale at Newcastle [Newcastle upon Tyne in northeast *England*]. “The [River] Tyne so swelled that the like cannot be remembered by the oldest man living. The flat ground round Newburgh laid under water. Gale violent. Kent. Thousands of hop poles [tall poles to support wires on which the hop plant is trained] blown down, and much of Essex flooded.” Another account from Durham in northeast *England* reports that from the night of August 24<sup>th</sup> to the night of the 26<sup>th</sup> a gale struck. The River Wear laid all the flat country under water, ruining the corn [grain], and where cut, sweeping it away by the torrent, together with sheep and swine. Many vessels were wrecked on the coasts of *England*, *Scotland*, and *Ireland*, especially in the *British Channel* and Cornwall.<sup>212</sup>

In September 1752, it was reported that vast quantities of rain that lately have fallen, have caused the Danube River to overflow its banks, and do incredible damage. The river Nesse, near Cologne [Cologne, *Germany*] also overflowed some time before, laying a great tract of land underwater, with such violence, that most of the bridges were carried away, and many of the inhabitants of the villages. An account from Prague [*Czech Republic*] relates great damage done by the overflowing of the Moldau [Vltava] River.<sup>298</sup>

In 1752, a great hurricane struck Charleston, South Carolina in the *United States*.<sup>204</sup>

On 15 September 1752, a hurricane struck South Carolina and North Carolina in the *United States*. [Various accounts give differing fatality figures of 103 and 28.]<sup>141</sup>

In 1752 there was a remarkably hot summer at Charlestown [Charleston], South Carolina in the *United States*. During the months of June, July and August, the temperature in the shade often rose above 90° F and at one time reached 101° F. Then the winds blew hard at the northeast during the night and continued with increased violence until the morning. At about 9 o'clock in the morning, a flood with great impetuosity came rushing in. In a short time, the water rose ten feet above the high water mark of the highest tides. The waters inundated Charlestown covering the streets with boats, boards, and the wrecks of houses and ships. Before 11 o'clock, all the ships in the harbor were driven ashore by the hurricane and the smaller vessels were dashed against the houses in Bay Street. The inhabitants, expecting the tide to flow until 1 o'clock in the afternoon, its usual hour, retired to the upper stories of their homes in despair. But soon after 11 o'clock, the winds shifted; in the space of 10 minutes, the water fell 5 feet; and the town was saved from destruction. “Had the waters continued to rise, and the tide to flow until its usual hour, every inhabitant of Charlestown must have perished.”<sup>174</sup>

In 1752, the most dreadful hurricane struck Charleston, South Carolina in the *United States*.<sup>124</sup>

[Another account refers to this event in 1753.] Charleston, South Carolina in the *United States*, was severely injured by a hurricane on September 15<sup>th</sup>, 1753.<sup>42</sup>

France reported, “The advices from our *American colonies* are very far from being agreeable. About the middle of September last [1752] they had such violent storms that upwards of sixty of our vessels most of them richly laden, have been lost.”<sup>299</sup> [This passage appears to describe the loss of French vessels and the American colonies may relate to the French colonies in the West Indies.]

Charles Town [Charleston], South Carolina [in the *United States*] was struck by a terrible hurricane on 15 September 1752. “On the 14<sup>th</sup> in the evening it began to blow very hard, the wind being at N.E. and the sky looked wild and threaten[ing]. It continued blowing from the same point, with little variation, ‘till about 4 o’clock in the morning of the 15<sup>th</sup>, at which time it became more violent, and rained, increasing very fast till about 9, when the flood came in like a boar, filling the harbour in a few minutes. Before 11 o’clock, all the vessels in the harbour were on shore, except the *Hornet* man of war, which rode it out by cutting away her main-mast; all the wharfs and bridges were ruined, and every house, store, &c. upon them beaten down, and carry’d away (with all the goods, &c. therein), as were also many houses in the town; and abundance of roofs, chimneys, &c. Almost all the tiled or slated [roofs] houses were uncovered; and great quantities of merchandise, &c. in the stores on the Bay-street damaged, by their doors being burst open. The town was likewise over flowed, the tide or sea having rose upwards of ten feet [3 meters] above the high-water mark at spring-tides, and nothing now was to be seen but ruins of houses canoes, wrecks of pettiaugas [small vessels generally propelled by rowing or poling] and boats, masts, yards, incredible quantities of all sorts of timber, barrels, staves, shingles, household [household] and other goods, floating and driving, with great violence, thro’ the streets and round about the town. The inhabitants finding themselves in the midst of a tempestuous sea, the wind still continuing, the tide (according to its common course) being expected to slow till after one o’clock, and many of the people being already up to their necks in water in their houses, began now to think of nothing but certain death. But (here we must record a signal an instance of the immediate interposition of the divine providence, as ever appeared) they were soon delivered from their apprehensions; for, about 10 minutes after 11 o’clock, the wind veered to the E.S.E. [east southeast] and S.W. [southwest very quick, and then (tho’ it continued its violence, and the sea beat and dashed every where with amazing impetuosity the waters fell above 5 feet [1.5 meters] in the space of 10 minutes, without which unexpected and sudden fall, every house and inhabitant in this town, must, in all probability, have perished. And before three o’clock the hurricane was entirely over. Many were drowned, and others much hurt by the fall of houses. At Sullivan’s island, the post house [a house or inn where horses were kept for postriders] was carried away, and of 15 people that were in it, nine were lost, the rest saved themselves by adhering strongly to some of the rafters of the house when it fell, upon which they were driven some miles beyond the island of Hobcaw. At Fort Johnson, the barracks were beat down, most of the guns dismounted, and their carriages carry’d away. At Craven’s and Granville’s bastions, and the batteries about this town, the cannon were likewise dismounted.”<sup>298</sup>

— “The *Mermaid* man of war, which had just gone up to Hobcaw to heave down, was drove ashore not far from the careening place. The ship *Lucy*, of and for London, John Bulman master, which lay wind bound in Rebellion road, dragg’d her anchors, drove by the fort and this town, and ran ashore upon a marsh about 7 miles [11 kilometers] up Cooper River. A new vessel was drove off the stocks, and wrecked at Mr. Wright’s. The schooner *Nancy*, John Braddelcy, three other schooners, and the sloop *Nancy*, John Babb master, all of this port, ashore in Col. Heron’s pasture. Another new vessel was wreck’d near Mr. Scott’s. And one but lately begun, with the snow *Industry*, belonging to Mr. David Brown, ashore on the green near his house. Capt. Walker’s pilot-boat against the governor’s house; and his sloop, the *Endeavour*, bound for Jamaica, after beating down his Excellency’s coach-house, stables, &c. was dash’d to pieces against Mr. Raper’s house, whose balcony door her mast entered. Two or three pettiaugas were wreck’d against Dr. Caw’s house. A small schooner drove up against the old Custom-house door; and one of Mr. Edward’s pilot-boats to Mr. Tho. Smith’s. Several boats, &c. against Mr. Price’s. The sloop *Katharine* of New York, Rich Manley master, bound for Halifax, and the sloop *Industry*, of and for Rhode Island, ashore upon the head of Mr. Beresford’s wharf. The snow *Charming Nancy*, of and for Hull, on the head of Capt. Simmons’s, near the Council-chamber. The brig. *Peggy and*

*Sally*, of and for Bristol, Wm. James master, against the curtain-line [sea wall], between Mr. Tho. Elliott's and Mr. Motte's. The sloop *Henry*, Henry Crepier master, of and for New York, against the Exchange or New-market; where Mr. Edward's other pilot-boat is wreck'd. The snow *Dove*, John Tuppen [master], bound for Cape-Fear, on the head of Mr. Eveleigh's wharf. A small schooner against the curtain-line near the *Dove*. The brig *Two Friends*, of and for Falmouth, Robert Johns master, beat down some houses, and lies on the west side of Church street, along side of Mr. John Mathews's. The ship *Upton*, of Liverpool, lately arrived from Rotterdam, which lay up Ashley River, was dove a great way into the marsh near Wappoo. The sloop *Polly*, George Gore [master], bound for Barbadoes [Barbados]; the schooner *Elizabeth*, Alexander McGilhivray [master], of this port, for Jamaica; the sloop *Susannah*, Amos Minet [master], also of this port; the schooner *Bank* with 8 or 10 other small schooners, own'd here, and 3 or 4 pilot-boats, are drove, some into the woods, some into corn-fields, and others far into the marshes, on and about James Island, Wappoo, &c.

— “For about 30 miles [48 kilometers] round Charles-Town, there is hardly a plantation that has not lost every house upon it. All our roads are so filled with trees blown and broke down, that travelling is rendered extremely difficult; and hardly a fence was left standing in the town or country. Our loss in fine timber-trees, is almost incredible; and we have suffered greatly also, in the loss of cattle, sheep, hogs, and all kinds of provision.”

— “From Winyaw and Port Royal [in South Carolina], our accounts are much more favourable than were expected, no damage having been done to the shipping in those harbours, and very little to the houses, as the hurricane was hardly felt at either place.”

— “Yesterday arrived Capt. Gardner, from Providence, who says he felt the hurricane near St. Augustine [Florida], but received no damage; that he spoke with a large brig. off this bar, in the morning, belonging to Whitehaven, and bound from Antigua for Cape Fear; and that he saw part of a wreck, whose quarter was painted green.”

— “This day arrived Capt. Comer, from Port Royal, who has brought in five Negroes and two seamen, which he took out of the ship *Africa*, of and from Barbadoes [Barbados] for this port, John Dorrington master, lying at anchor amongst the breakers off North-Edisto [river inlet]. And Miles Tedar, master of the snow *Debby and Betsy*, of and for this port, from Jamaica. Capt. Dorrington met with a violent storm, about 7 leagues [21 miles, 33.8 kilometers] to the eastward of this place, on the 13<sup>th</sup> that continued till the next afternoon, in which his ship lost all her masts, sails, and rigging, had one of her sides beat in, and five seamen, one negro, with all her boats, &c. wash'd over-board. On the 15<sup>th</sup> he came to an anchor off Edisto [River]; and the ship *Cunliffe*, of Liverpool, (with Germans from Rotterdam) coming to the same place in the evening, he with his mate quitted the *Africa* and went on board of her. Capt. Tedar has lost his masts, &c. and carried his vessel into St. Helena inlet, near which place he met with the hurricane. He spoke with the *Cunliffe*, and a sloop from Jamaica which she had in tow, on White master, that also with the sloop *Charles Town*, Capt Steel; which vessels are now coming in.”

— “A sloop is said to be ashore on Long Island; and great quantities of wreck have been met with upon the coast.”

— “The *Mermaid*, and most of the other vessels on shore here, may be got off again.”

The rain was so violent in *Wales* that it destroyed 10,000 sheep on 19 September 1752.<sup>40, 41, 47, 56</sup>

On 19 September 1752 in *Wales*, there was a great rainstorm; 10,000 sheep drowned.<sup>92</sup>

On 26 September 1752, a hurricane struck *Cuba*. During the hurricane, sixteen ships were lost near Havana. One of the ships lost was the *Speedwel*.<sup>141</sup>

On 22 October 1752, a hurricane struck off the coast of Florida in the *United States*. The ships lost during the hurricane included *Alexander*, *Lancaster*, *Dolphin*, *Q. Anne*, *May*, *Rhode Island*, *Stratia*, a Spanish schooner, and three other vessels. Ships missing included *Mary and Priscilla*, *Pompey*, *Phillis* (7 drowned), *Three Friends*, *Kingston*, *Ruby*, *Boston*, a schooner, a ship, and a Spanish Man of War.



Another account reported a total of 12 ships lost in the Gulf of Florida. The storm also affected North Carolina.<sup>141</sup>

Charles Town [Charleston], South Carolina [in the *United States*] was struck by a second hurricane on 30 September 1752. “On Sept. 30 we had another terrible hurricane, which began, with wind and rain, about 4 o’clock in the afternoon, but ceased soon after 7 in the evening. For 2 or 3 days before, the violence of the wind (which blew from N.E. and E. and at last settled at S.E.) and the great quantity of rain that had fallen, kept the tides from ebbing their due course and time, so that when this hurricane began to abate, tho’ the water should have been low, it was higher than at common spring-tides; and had the wind rose, as was expected, when the flood should have come in, our situation would have been most deplorable indeed! But the same providence that interposed before, was again visible here.” A later account reported, “The hurricane which happened on the 30<sup>th</sup> ult. has done greater damage at sea and to the southward, than that of the 15<sup>th</sup>. Abundance of trees and several houses having been blown down that did not suffer before. At Port-Royal [South Carolina], the water rose 4 feet and an half [1.4 meters] higher than usual, and a sloop was drove ashore that entirely beat away Mr. Purry’s wharf. A sloop from Rhode-Island, Waldron master, bound for this port, put into Edisto, lost all her anchors, bowsprit, sails, boat, &c. The captain wash’d out at one of the portholes, and thrown in again. The schooners *Betty*, John Mills master, from Maryland, with German passengers, and *Minerva*, Isaac Colrock [master], from Philadelphia, were obligated to put into Edisto. The snow *Bristol Merchant*, Capt. Parsons, from Bristol for this port, with a very valuable cargo on board, that sail’d to come round from Port-Royal after the first hurricane, lost her bowsprit, top-masts, sails, &c. in this; and is since beat to pieces upon Edisto-bar, the vessel and cargo entirely lost. A large sloop, whose quarter was painted green and white, drove ashore and beat to pieces upon Kaywab Island, none of the people, but many limes, found. Capt. Tedar’s snow, drove into a marsh at St. Helena; near which inlet another snow, from sea, is said to be beat to pieces. A large ship beat to pieces, upon the Hunting Islands. And another sloop said to be ashore upon the southern coast. ‘Tis reported, that a ship and sloop are also ashore upon the Racoon keys. The ship *Africa*, of Barbadoes [Barbados, and snow *Vine*, of Liverpoole, drove ashore on the 30<sup>th</sup> ult. are since beat to pieces; but their cargoes have been saved. Tucker’s schooner has been got off. All the books, surveys and papers &c. in the surveyor-general’s office, were 5 feet [1.5 meters] under water, in the first hurricane, many of them wash’d away, and the rest are in a perishing condition, tho’ the utmost care has been taken of them.” Then later it was reported, “By a storm that happen’d on the 1<sup>st</sup> of October, much damage has likewise been suffer’d in North Carolina and at Cape Breton, at the latter of which places no less than 57 vessels were driven on shore, none of which can ever be got off. On the 9<sup>th</sup> of October, much loss was sustained also, by a storm on the coast of New England amongst the shipping.”<sup>298</sup>

*Russia* reported, “The calamities of this empire are frequent and severe; the City of Petersburg [St. Petersburg] and the country adjacent have suffer’d greatly by a hurricane and inundation which happen’d on the 2<sup>nd</sup> and 3<sup>rd</sup> of November past [2-3 November 1752]. More than 1000 people have perish’d, the fortifications have been almost destroy’d, and most of the houses situated near the Neva [River] ruin’d; nor has the mischief, been less considerable at Cronstadt [Kronshtadt, *Russia*], Nerva, Revel [now Tallinn, *Estonia*], and other parts of the empire, where most of the ships at anchor were beaten to pieces against each other; more than 100 ships are damag’d, and will probably be detain’d so long, as not to be able to sail before the frost locks them up, which will be an incredible loss to their owners.”<sup>298</sup>

*Denmark* reports, “By a violent hurricane on the 10<sup>th</sup> of November [1752], much damage has been done upon our coasts; and many pieces of wrecks are daily driven on shore.”<sup>298</sup>

On Tuesday 12 December 1752 [Gregorian calendar], a terrible storm of thunder, lightning, rain and hail struck Bristol, *England*. The storm was attended with a hard gale of wind. One of the claps of thunder was exceedingly loud between 5 and 6 in the evening, and the lightning at the same time very much surprised many people in the streets and houses. A great ball of fire was seen to issue from the clouds,



which shot with great swiftness to the northward. Several people on the road, coming to this city, were struck with such a panick [panic], that, they got off their horses to shelter themselves from the tempest. 'Tis thought that the lightning came with such large flashes, as to exceed any thing of the kind ever seen here before.<sup>298</sup>

On [12 December] 1752, there was a terrible thunderstorm and gale at Bristol, *England*.<sup>212</sup>

On 20 December 1752, there was a thunderstorm at Ludgvan in Cornwall in *England*. There was a dreadful thunderstorm with hail at Penzance.<sup>212</sup>

On 20 December 1752 at Penzance, *England*, there was a dreadful storm of hail, thunder and lightning for two hours. At Gulval, about 3 miles [5 kilometers] distant, lightning entered a house, hurt a man and his wife, killed their son and a dog, and beat down the chimney.<sup>299</sup>

On 30 December 1752 at Bristol, *England*, there was a flood. "The road from Bristol to Oxford so flooded, the coaches stopped travelling along it."<sup>212</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 2<sup>nd</sup> – raw, cold; everything was backward. May 15<sup>th</sup> – the trees do but now begin to blossom. May 30<sup>th</sup> – raw, easterly weather, as it has been all the month. June 15<sup>th</sup> – there was a promising prospect of grass, and the Indian corn started wonderfully. July 9<sup>th</sup> – begun to mow the upper ground. August 12<sup>th</sup> – in the evening there was dismal thunder and lightning, and abundance of rain, and such a hurricane as was never the like in these parts of the world; it blew down houses and barns, trees, corn, and everything in its way. August 21<sup>st</sup> – there has been more thunder and lightning, and it has done more harm this summer all over New England, than ever was known. August 31<sup>st</sup> – dry weather. September – dry, dry, dry; melancholy drought. September 30<sup>th</sup> – it rained and stormed in the night a great deal. October 9<sup>th</sup> – a storm of rain. October 30<sup>th</sup> – we wonderfully fail in our sauce by reason of the drought.<sup>78</sup>

In 1752, there was a famine in *India*.<sup>156</sup>

In 1752, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 15 February and 15 March, floods struck Hupeh (now Hubei province) in central *China* at Yün, Chung-hsiang and Ching-shan.

— During the period between 14 May and 11 June, floods struck Shensi (now Shaanxi province) in central *China* at Lo-ch'uan.

— During the period between 11 July and 8 August, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hai-k'ang; Shantung (now Shandong province) on the east coast of *China* at Wên-têng, Jung-ch'êng, Ling, and Lin-i; and Hopei (now Hebei province) in northern *China* at Tsun-hua. [Lin-i is located at longitude 116.52° East and latitude 37.13° North.]

— During the period between 9 August and 7 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow and Hai-ning. Crops were damaged by the floodwaters.

— During the period between 8 September and 6 October, floods struck Hupeh province at Hsiang-yang, Tsao-yang, I-ch'êng, Ku-ch'êng and Chün; and Kwangtung province at Lung-ch'uan.

— During the period between 8 November 1752 and 5 February 1753, floods struck Chekiang province at T'ung-hsiang.

In 1752, droughts engulfed many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Hupeh (now Hubei province) in central *China* at Fang.

— During the period between 12 June and 7 September, a drought engulfed Shansi (now Shanxi province) in northern *China* at Chieh.

— During the period between 8 August and 8 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hai-ning, Yü-hang, Hangchow and Fu-yang; Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Hai-k'ang; and Shensi (now Shaanxi province) in central *China* at Hsiang-ning.

In 1752 during the 6<sup>th</sup> moon on the 16<sup>th</sup> day in the vicinity of Shanghai, *China*, there was a great typhoon that continued a day and a night. It threw down walls and houses innumerable; the sea overflowed.<sup>166</sup>

**Winter of 1752 / 1753 A.D.** This winter in December and January the weather was severe: the lowest measured temperature in Paris, *France* was 10.9° F (-11.7° C). The region of Toulouse, *France* had severe frosts.<sup>62</sup>

On 22 December 1752, a frost began at Aberdeen, *Scotland*. “Till this day it had been uncommonly mild; the magpies laid eggs and the July flowers were in full bloom.”<sup>212</sup>

On 22 & 23 December 1752 at Aberdeen, *Scotland*, the first frost of winter struck. Up until that time, the weather was so uncommonly mild, that on the 22<sup>nd</sup> [of December], a July flower was observed in full bloom in a gentleman's garden and on the Lovat estate; magpies laid eggs and hatched them.<sup>299</sup>

On 25 December 1752 at four in the afternoon, a remarkable meteor was observed in Glasgow, *Scotland*. The “meteor being a large ball of fire with a long tail, past over this place, in direction from the N.E. to the S.W. and after having exhibited, for some time, the various colours of the rainbow, it burst into a thousand sparks of fire, and was immediately follow'd by a great shower of hail.”<sup>298</sup> [Possible comet atmospheric impact]

On 30 December 1752, Bristol, *England* reported by the late rains, the roads from Oxford, &c. to this city, were so overflowed that the post [mail] from those places were detained 10 hours.<sup>299</sup>

On 1 January 1753, Boston [Massachusetts in the *United States*] reported, “A shower of rain fell lately, to the eastward, which turned into ice, or congeal'd, as it fell [freezing rain]; and many flocks of wild geese that were flying, had their wings suddenly frozen, and fell down as if shot.”<sup>299</sup>

On 1 January 1753 at Boston, *England*, there was a freezing rainstorm. “A shower of rain fell lately to the eastward, which turned into ice, or congealed as it fell; and many flocks of geese that were flying had their wings suddenly frozen and fell down as if shot.”<sup>212</sup>

On 24 January 1753, there was a severe frost in London, *England*. The frost continued to the middle of February with snow. The frost struck Lyndon in Rutland on 25 January and lasted until 9 February. The coldest day was 6 February, when the temperature fell to 15° F [-9° C].<sup>212</sup>

The weather in Dublin, *Ireland* in January 1753 was: on the 3<sup>rd</sup>, hail and snow; 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup>, foggy; 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup> and 13<sup>th</sup>, gales; 12<sup>th</sup>, hail; 19<sup>th</sup>, snow; 24<sup>th</sup>, 25<sup>th</sup>, 29<sup>th</sup> and 31<sup>st</sup>, gales. In February: on the 1<sup>st</sup>, there was a west-southwest gale; 2<sup>nd</sup>, north-northwest gale; 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup>, snow; 11<sup>th</sup> and 12<sup>th</sup>, hail and snow; 13<sup>th</sup>, 14<sup>th</sup>, 16<sup>th</sup> and 24<sup>th</sup>, gales; 18<sup>th</sup>, hail. In March: on the 1<sup>st</sup>, snow; 11<sup>th</sup>, 12<sup>th</sup>, 14<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup>, 19<sup>th</sup>, 23<sup>rd</sup>, 25<sup>th</sup>, 27<sup>th</sup>, 29<sup>th</sup> and 31<sup>st</sup>, gales; 18<sup>th</sup>, 26<sup>th</sup> and 31<sup>st</sup>, hail. In April: on the 1<sup>st</sup>, 2<sup>nd</sup> and 29<sup>th</sup>, gales; 3<sup>rd</sup>, 6<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup> and 29<sup>th</sup>, hail.<sup>212</sup>

On 1 February 1753, there was a violent thunderstorm at Ludgvan in Cornwall, *England*.<sup>212</sup>

On 15 February 1753, in Edinburgh, *Scotland*, the roads were almost blocked up with snow.<sup>212</sup>

On 15 February 1753, “The post boy with the London mail, in his way from Edinburgh [*Scotland*] to Haddingtoun [Haddington, *Scotland*], fell into a snow wreath [snowdrift] where he almost perished. The mail did not arrive from London till late last night, the roads being almost impassable for snow. The post boy from Linlithgow with the Glasgow mail, lost his horse in the snow, and with much difficulty sav’d himself and the mail.”<sup>299</sup>

On 17 February 1753, there was a flood at Yarm in Yorkshire, *England*. The flood was caused by the sudden rain melting the snow. The water was seven feet [2.1 meters] deep in the highest part of town. Many houses were washed away, most of the bridges destroyed, and many persons, horses and cows drowned. Floods were also great at Doncaster and throughout the north of *England*.<sup>212</sup>

On 20 February 1753, there was a flood at Dublin, *Ireland*. “By great snow last Monday, and heavy rains next day, the river Liffey became overflowed.”<sup>212</sup>

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**1753 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: January and February – though there has been some cold, blustering weather, this season, it was, upon the whole, a moderate winter. March – the first of this month mostly cold; the last, moderate and pleasant. March 31<sup>st</sup> – the spring surprisingly warm and forward. May 18<sup>th</sup> – the first pleasant day this spring. June – the season is uncommonly forward. August 26<sup>th</sup> – the grasshoppers have done much damage. October 24<sup>th</sup> – the frosts held off wonderfully.<sup>78</sup>

In February 1753, *Spain* reported, “We have a greater drought in this kingdom than has been remembered for many years. In Estremadura [Extremadura], they have killed all the lambs, in order to have subsistence enough for the sheep; and in Andalusia, provender [feed] is so scarce, that they have been obliged to send most of their horse into other provinces.”<sup>299</sup>

On 7 February 1753, Glasgow, *Scotland* reported, “The River Clyde rose here, last night, higher than has been known these 40 years, occasioned by the rains melting the great falls of snow, and happening at the full of the moon, and a strong wind from the south, all the lower part of the city was overflow’d.” “Much mischief has happened in many parts of the north of *England*, from the late snows and the succeeding heavy rains; particularly at Doncaster, where 4 men were lost crossing the river, which was swell’d to a surprising degree, and their post [mail] was detained by the floods, near a day and a half.”<sup>299</sup>

On 17 February 1753 at Yarm in Yorkshire, *England*, “At four this morning the banks of our river were broken, and the stream ran thro’ the town. The water continued rising till noon, and it was with great difficulty we got the [occupants of] houses out of the town to some higher ground. When the flood was highest we had 7 feet [2.1 meters] water in the highest part of the town; all the lowest part was under water, and the current thro’ the town so rapid, that many houses were wash’d away. Horses, cows, dogs, cats, and all sorts of household furniture were floating and no one able to save them; some horses indeed were saved in chambers. Most of the bridges are broken down, and many lives lost. It was occasion’d by a sudden rain melting the snow on the neighbouring hills.”<sup>299</sup>

On 17 February 1753, the great bridge over the Danube River in Vienna, *Austria* was carried away by the shoals of ice, which came down the river after the thaw, and the same day the like accident happened to another bridge at some distance.<sup>299</sup>

On 20 February 1753, Dublin, *Ireland* reported, “By the great fall of snow, last Monday, and the heavy rains of the next day, the [River] Liffey became so rapid, that many stairs were carried away, some lighters and ships were sunk, and several drove to sea which have not yet been heard of.”<sup>299</sup>

On 27 February 1753, the river dried up at Peebles, *Scotland*. “The river Tweed on Wednesday sev’night was dry’d up near Peebles, from 6 a.m. till 6 p.m., the current being entirely suspended.”<sup>212</sup>

In March 1753, *Portugal* reported, “the extraordinary drought which still prevails here, and the fear of an indifferent harvest, has induced the court to send for a [secure?] provision of corn to foreign countries, which is to be deposited in magazines in different parts of kingdom, from which it will be delivered at a reasonable price. (This drought has been since succeeded by plentiful rain.)”<sup>299</sup>

On 6 March 1753, Naples, *Italy* reported that in Sicily, the tides were so strong, and the sea so agitated, for some days past, that the waves rose above the dikes, and overflowed the city of Palermo, which occasioned much damage, especially to the fortifications.<sup>299</sup>

On 22 March 1753, [London, *England*] reported that a great spring tide overflowed the public offices and cellars about Whitehall and Westminster. Then on 24 March, it was reported that because of an inundation of the River Dee, several houses and works have been carried away.<sup>299</sup>

On 22 March 1753, there was a flood at Whitehall in the *United Kingdom* [might be Whitehall in Dublin, *Ireland*, Whitehall on Orkney Islands in *Scotland*, or the Palace of Whitehall in London, *England*].<sup>212</sup>

On 24 March 1753, there was a great flood on the River Dee. Several houses were carried away. [The River Dee flows through *Wales* and *England*.]<sup>212</sup>

In May 1753, *Spain* reported, “The plentiful rains we have lately had, promise a fine harvest, and the price of corn [grain] is since fallen one third. This rain has also corrected the unwholesomeness of the air, and put a period [end] to the fevers occasioned by the late great drought.”<sup>299</sup>

On 20 May 1753, a terrible hailstorm struck Hall [Halle], Mersburgh [Meersburg] and Luzen [Lützen] in *Germany*. The hailstones were of a prodigious size and made sad devastation in those parts.<sup>299</sup>

On 24 May 1753 in *England*, there was a great hailstorm at Hoxton near London; windows broken and trees greatly damaged.<sup>93</sup>

Beginning on 28 May 1753, a group including Sir Charles passed from Lanslebourg-Mont-Cenis, *France* over the Rhône-Alpes to Novalesa, *Italy*. On their journey “Then, tho’ the sky was clear when we passed the mountain, yet the cold wind blew quantities of frozen snow in our faces; insomuch that it seemed to me just as if people were employed, all the time we were passing, to wound us with the sharpest needles [diamond dust ice crystals]. They indeed call the wind that brings this sharp-pointed snow, *The Tormenta*.” The mountains were covered in deep snow and they took a sledge down the slope, like a toboggan ride, covering 4 Italian miles in less than 5 minutes. “Sir Charles observed to me, when we were on the plain or flat top of Mount Cenis, that, had not the winter been particularly long and severe, we should have had, instead of this terrible appearance of snow there, flowers starting up, as it were under our feet, of various kinds, which are hardly to be met with any where else.”<sup>299</sup>

On 30 May 1753 in *Saxony*, there was a terrible hailstorm in Mersburg and Luzen. The hailstones were of prodigious size and caused much devastation.<sup>93</sup> [Mersburg is now located in east-central *Germany*. Luzen, now Luzenau, is also in east-central *Germany*.]

On 31 May 1753 in Rome, *Italy*, there were hailstones as big as hens’ eggs; great devastation to grain and fruit crops. The storm was accompanied by a hurricane and shocks of earthquake.<sup>93</sup>

On 31 May 1753, Rome, *Italy* reported, “we had here a terrible hurricane, during which there fell a great quantity of hail, some of the stones were as big as a hen’s egg. The damage which it did to the vines and other fruits of the earth is very great.”<sup>299</sup>

On 1 June 1753, there was a thunderstorm at Tiverton in Devon, *England*.<sup>212</sup>

On 2 June 1753, there was a hailstorm at Sherborne in Dorset, *England*. “Prodigious hailstones, lasting two hours (weather very sultry); some stones 3 inches [8 centimeters] about; thunder and lightning. At Downton some stones 6 inches [15 centimeters] about. At Bridgewater many stones were 6, 7, 8 and 9 inches [15, 18, 20 and 23 centimeters] about [in circumference], which made holes in the ground. Persons were injured by the stones, and most of the windows were broken.”<sup>212</sup>

On 2 June 1753 in *England*, there were hailstorms at Bridgewater (Somerset). The day had been very sultry, and wind northwest. The storm began gradually about 6 o'clock; by 7 it was at its height, and hailstones measuring 6, 7, 8, and 9 inches in circumference were found. Many of these had made holes in the ground like cannon shot. The storm continued nearly half an hour effecting great damage to buildings, trees and grain crops. Broken windows estimated at £500. The storm extended into Dorsetshire.<sup>93</sup>

On 2 June 1753 about 7 o'clock in the evening, the weather extremely sultry, there fell a prodigious shower of hail, which lasted for nearly 2 hours at Sherborne, *England*. Some of the hailstones measured 3 inches [8 centimeters] about. The storm was attended with thunder and lightning. At Downton, in Wilshire, some of the hailstones measured 6 inches [15 centimeters].<sup>299</sup>

On 2 June 1753, Bridgewater, *England* reported, “This day, being exceeding hot, and the wind N.W. about 6 o'clock, a storm of rain and hail, with thunder and lightning [lightning], began moderately; but at 7 was at a dreadful height. Many of the hail stones were 6, 7, 8 and 9 inches [15-23 centimeters] about, and have made holes in the ground like cannon balls. It continued for half an hour with this rapidity, and made great devastation, to the ruin of many farmers. Divers [Diverse] persons were bruised by the larger hail stones.”<sup>299</sup>

On 8 June 1753, Francfort [Frankfort, *Germany*] reported, “the extraordinary heats [hot weather] we have had for sometime past, have done much damage to the corn and fruits, and have consequently raised the price of provisions.”<sup>299</sup>

During the summer of 1753, an immense swarm of locusts made havoc in Posnania [Poznań, *Poland*] with the corn [grain] and fruits of the earth. But while the inhabitants were mourning over their desolated fields, a flight of storks providentially came to their assistance, and devoured all those destructive insects.<sup>299</sup>

At Rouen in northern *France*, “The continual northerly winds of the year 1752 occasioned a long and dry winter. The ensuing March [1753] was mild and rainy, but in April the wind fixed again in the northern quarter, and made the ground so hard, that the hopes of a plentiful harvest which March seemed to promise were then much abated. May brought on great heats [hot weather], which continued all June, July, and the beginning of August, during which space there were for the most part southerly winds, with very little rain. It is remarkable however, that on June 23 the thermom. [thermometer] was something below the freezing point, and the cold so sharp, that the plants were frozen on our hot beds [sunboxes], and many sheep, which had been lately shorn, died in the meadows. But suddenly again the heat and drought was so considerable, that the herdsmen were obliged to fetch water for their cattle from the rivers. The corn [grain] ripened so fast, as to be cut a month before the usual time, and the vine-dresser [a person who cultivates and prunes grapevines] had the satisfaction of filling his casks by the 20<sup>th</sup> of September.

The autumn proved so dry as to last till November, but then incessant rains came on, except seven or eight days of hard frost. A thick fog arose the 21<sup>st</sup> of this month [December], in the morning, of a very stinking, sulphureous [sulfurous] smell, which increased to that degree in the evening, that the lights could not be discerned in the streets. Three or four days after this fog our epidemic disease made its first appearance, and advanced so rapidly as to threaten a great mortality [dying].”<sup>301</sup>

On 24 June 1753 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>

On 24 June 1753, a great storm of hail fell, by which the windows on the west side of the haberdashers alms houses, Haxton [a district on the east end of London, *England*], were all broke. And the trees were cut, as if done with a knife. Most of the hailstones measured an inch and a half about.<sup>299</sup>

In 1753, the price of wheat [in *England*] averaged 32 shillings per quarter [quarter ton].<sup>212</sup>

In July 1753, *France* reported, “On the 7<sup>th</sup> the heat was so excessive that the thermometer rose to 30.5 [° C, 86.9° F], being a degree higher than has been known here in the warmest summers, such as those of 1706, 1748, and 1749.”<sup>299</sup>

On 9 July 1753, a terrible storm [and tornado?] struck Sandomir [Sandomierz], *Poland*. Most of the houses in the city were overturned, the roof of the churches torn off, bridges broken down, and much cattle, and some of the inhabitants, were lifted from the ground, and carried by the violence of the wind into the Vistula [River] and drowned.<sup>299</sup>

On 11 July 1753 in Toul in northeastern *France*, the hailstones were 3 inches in diameter.<sup>93</sup>

On 27 July 1753, *Russia* reported that a strong north wind began to blow and four days after snow fell to the depth of 18 inches [0.5 meters], and the succeeding night was as hard a frost as can be remembered.<sup>299</sup>

In August 1753, Bohemia [now western *Czech Republic*] reported that such a large quantity of hailstones of enormous size upon the village of Strechow, near Tabor [Tábor, *Czech Republic*], belonging to Prince Lobkowitz, as to entirely ruin the fruits of the earth for 2 miles [3 kilometers] round.<sup>299</sup>

In July 1753 in *Bohemia*, hailstones of enormous magnitude fell at Streckow near Tabor [now in the *Czech Republic*], estate of Prince Labkowitz, destroying fruit and grain for some miles round.<sup>93</sup>

In August 1753 in *France*, there was a violent hailstorm near Lyons; some of the stones weighing over a pound.<sup>93</sup>

In *Ireland*, there were great inundations through the country.<sup>47, 92</sup>

In *Germany* and Holland [now *the Netherlands*], there was a great overflow of the Rhine River.<sup>47, 92</sup>

On 4 August 1753, heavy rains caused a flood in the River Liffy [Liffey] in *Ireland*. It caused considerable damage to the shipping. The bridge of Turvey near Drogheda, and several hay-ricks, were washed away.<sup>299</sup>

On 22 October 1753, Halifax in Nova Scotia, *Canada* reported, “At Cape Breton, for six hours, on the 7<sup>th</sup> instant [7 October], the wind at S.E. [southeast] they had so violent a storm that near 40 sail of vessels [sailing ships] were drove ashore and some of them lost. The same storm did great damage here also, and tore up all the trees on the Citadel hill.”<sup>300</sup>



On 12 October 1753, a most violent storm of rain struck Honiton in Devonshire, *England*. It swelled the rivers to such a degree, that the floodwaters swept away several hayricks and a great number of cattle and also several bridges and houses. Some people were drowned. Many of the people that lived near the bridge in town were obliged to get out at the tops of their houses. The damage done here and in the neighborhood cannot be less than 3000*l*.<sup>299</sup> [In present currency, that would be equivalent to £387,000 in damages based on the retail inflation price index.]

On 18 October 1753, there was a prodigious swelling [flood] of the River Teame [Teme], that the waters overflowed all the meadows, and low grounds about Powick, &c. near Worcester, in the West Midlands of *England* and drowned a great number of sheep.<sup>299</sup>

This year was one of the hottest summers of the 18<sup>th</sup> century. The summer of 1753 in Denainvilliers, *France* was characterized by:

Hot days	70 days
Very hot days	2 days
Extremely hot day	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

These figures indicate a very high average temperature of the summer in the middle of *France*. The maximum temperatures observed during the summer were:

Toulouse, <i>France</i>	(101.1° F, 38.4° C)
Denainvilliers, <i>France</i>	( 97.3° F, 36.3° C) on 7 July
Mulhouse, <i>France</i>	( 96.4° F, 35.8° C) on 8 July
Paris, <i>France</i>	( 96.1° F, 35.6° C) on 7 July

A severe drought prevailed in the south from June to November. The corn harvest was mediocre, but the grain harvest pretty good along with the crop of grapes. In Burgundy, the grape harvest began on 19 September, the wine was available and the quality good. In the area around Orleans the harvest of cereals was equal to half of a good harvest, and grapes three-quarters of a good harvest.<sup>62</sup>

In December 1753, *Denmark* reported, “We have had very stormy weather lately, in the Sound, by which many ships of different nations have been driven ashore on our coasts.”<sup>299</sup>

In 1753, there were an unusually high number of reports of fires across *Europe* from *Russia* to *England* that reduced entire cities to ash.<sup>299</sup> The drought and hot temperatures that were recorded in this year may have been a contributing factor.

In December 1753, *Spain* reported, “Many provinces are still in the greatest want of rain, particularly those in the inland part of the kingdom, where man and beast are daily perishing for want of a necessary supply of provisions, on which account the king, to prevent as much as possible the miseries of famine, has ordered quantities of corn [grain] to be bought up in Naples and Sicily [in Italy], at his expence [expense], to be sold to the people at a moderate price.”<sup>299</sup>

On 12 December 1753, Navan, *Ireland* reported, “The floods have carried away the nearer and further arches of the new bridge over the [River] Boyne; great damage has been done, and the roads are almost impassable.”<sup>299</sup>

In 1753, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 8 November 1752 and 5 February 1753, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at T’ung-hsiang.

— During the period between 5 March and 3 April, floods struck Kiangsi (now Jiangxi province) in southern *China* at Hsia-chiang and Chi-an; and Hupeh (now Hubei province) in central *China* at Mien-yang, Ch’ien-chiang, T’ien-mên and Ch’i-shui.

— During the period 1-29 July, floods struck Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Jao-p'ing. Over 650 house-sections damaged by the floodwaters.

— During the period between 28 August and 26 September, floods struck Shantung (now Shandong province) on the east coast of *China* at Wu-ti, Lin-i, T'an-ch'êng [possible misprint, "Yen-ch'êng"], Shou-kuang, Pin, Li-ching, Chan-hua, and Jih-chao. [Lin-i is located at longitude 118.24° East and latitude 35.07° North.]

— During the period between 27 September and 25 October, the Huai River in Anhwei province flooded damaging houses and the Su River in Shantung province flooded causing several villages to flood.

During the same time period, floods struck Anhwei (now Anhui province) in eastern *China* at T'ai-hu, Fêng-yang and Wu-ho; and Kwangtung province at Hsin-i. At Hsin-i, over 200 house-sections were damaged by the floodwaters and over 50 persons drowned.

— During the period between 26 October and 24 November, floods struck Hopei (now Hebei province) in northern *China* at Ch'ing-yün. During the same time, the Yellow River flooded damaging many houses.

— During the period between 24 December 1753 and 22 January 1754, floods struck Hupeh province at T'ien-mên.

In 1753, droughts engulfed several regions of *China* including:<sup>153</sup>

— During the period between 5 February and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at T'ung-lu. Crops were damaged. Wells and springs dried up.

— During the period between 2 June and 25 October, a drought engulfed Shansi (now Shanxi province) in northern *China* at Kuang-ling.

— During the period between 8 August and 8 November, a drought engulfed Hopei (now Hebei province) in northern *China* at T'ang-shan and Chekiang province at Yüeh-ch'ing and P'ing-yang.

The year 1753 was a year of abundance in the vicinity of Shanghai, *China*. A *tau* of rice cost less than one hundred cash.<sup>166</sup>

**Winter of 1753 / 1754 A.D.** Just before the opening battles of the French and Indian War in December 1753, George Washington, then 21 years old, crossed the Allegheny River (*United States*). In their first attempt, Washington and a guide used a raft to cross the ice-choked river and this ended in disaster as Washington was knocked overboard in deep water and saved himself only by catching the raft as it swept by. The severe cold that night froze their clothes and the guide's fingers. The river also froze, however, allowing them to walk across on the ice the next morning. Soon they reached the safety of an English trader's settlement.<sup>11</sup>

The *Baltic Sea* froze.<sup>37</sup>

In 1754 in *Denmark* and *Poland*, the frost was very severe.<sup>93</sup>

During the winter of 1753-54, the *Baltic Sea* was completely covered with ice.<sup>68</sup>

The winter in *England* in 1754 was very severe.<sup>2</sup>

Frost in *England*.<sup>40, 41, 43</sup>

During the winter of 1753-54 [in *England*], the coldest day was on 6 February when the temperature fell to 15° F [-9° C].<sup>236</sup>

During the winter in *England* in 1754, the frost was very severe; especially at Bath in *Sommerset* and in the southwest of *England*.<sup>47, 93</sup>

The winter of 1753-54 was severe everywhere in *France*. The frost began in November and lasted until April. There were 52 frost days. The lowest temperature observed in Paris, *France* was 5° F (-15° C). The snow was very abundant. Many cattle perished. In *England*, the winter was also severe in London where the lowest observed temperature was 16° F (-8.9° C).<sup>62</sup>

On Thursday, 13 December 1753 at Manchester, in northwest *England*, all the rivers hereabout have been frozen over. A number of men and boys, a few days since, sliding on a milldam, between Wigan and Chorley, the ice broke, and every soul perished, as also 5 or 6 women in endeavoring to save their children.<sup>299</sup>

On 15 December 1753, Dublin, *Ireland* reported, “By the late frosts and snow and the heavy rains that have continued ever since, many rivers have overflowed their banks, and particularly the Liffey, by which great damage has been done to ships and boats, and several sailors were crushed to death amongst them, and many limbs broken.”<sup>299</sup>

On Monday, 17 December 1753 at Worcester in the West Midlands of *England*, “Upon going off of [melting] the snow, we had a great flood, which laid the lower part of the city under water, and the inhabitants were obligated to take to their upper rooms.”<sup>299</sup>

On 19 December 1753, the river Lecq [Lek] has risen considerably within these few days at Utrecht, *the Netherlands*. At Wyck, it rose 37 inches [0.9 meters], and at Schalwyck [Schalkwijk], it rose 46 inches [1.2 meters] above the high water mark, which makes us apprehensive that the dykes [dikes] will give way; the consequence of which would be the drowning of the neighboring country.<sup>299</sup>

On 22 December 1753, Flanders reported that at Liege [Liège, *Belgium*], “the rivers are so swell’d, within this fortnight, by the great rains, that most of them have overflowed and laid a great extent of the country under water.”<sup>300</sup>

On 28 December 1753, Francfort [Frankfort, *Germany*] reported, “Incredible damage has been done by the overflowing of the rivers Taubur [Tauber], Kocher, Jaxt [a tributary of the Neckar River] in Franconia, Fielde [Felde] and Unstrut [Saale-Unstrut?]. The latter broke through the dikes, and the inhabitants of Alten and Gotteren [Göttingen?] had scarce time to save themselves upon an eminence, before the town was overflowed; nay, the torrent following them, their neighbours were forced to relieve them, by floats of beams fastened together. In short, the whole face of that part of the country is ruined.”<sup>300</sup>

In *Scotland*, “The river Tay was locked up some weeks by the late frost, and on Dec. 28 [1753], the thaw caused such an inundation, that Perth, for two or three days was a peninsula. Whole ridges of fine land were torn away by the rapidity of the river, and bulwarks, built at great expense for the security of the town and adjacent places, destroyed.” “Also great damages have been done about Aberdeen, by the swelling and overflowing of the rivers Dee and Doveran [Deveron], from the great rains.”<sup>300</sup>

Clerkenwell [in central London] observed a temperature of 17° F [-8.3° C] at 9 a.m. on 11 December. On 30 December 1753 at 10 p.m., the temperature at Bath, *England* [in the open air] fell to 2° F [-16.7° C]. At this point, the thermometer was relocated inside. “I have no doubt, had I suffer’d it to remain without two or three hours longer, the mercury would have subsided to 0 deg.” “So intense a cold, in these southern parts of *England* has not, I believe, been known in any of the hard winters of this century, tho’ we have had some very severe ones.” On the night of 30 December the temperature near Hereford, *England* [16 miles from the border with *Wales*] fell to 4° F [-15.6° C] and by 9 o’clock the next morning it had not quite reached 6° F [-14.4° C]. The coldest temperature at Lydon in Rutland, *England* occurred at 8 a.m. on 31 December, when the temperature dropped to 18° F [-7.8° C].<sup>300</sup>

On 31 December 1753 it was reported, “The frost has been very severe in many parts this month, and the succeeding thaw, attended with heavy rains, caus’d great floods, which have done much mischief; and a great number of vessels have been wreck’d on the *English, Scotch, Irish, and Welch* coasts, in the late stormy weather.”<sup>299</sup>

In January 1754, *Russia* reported, “The season, since October [1753], has been excessively mild; so that we have had neither frost nor snow, whereby the method of travelling by sledges is render’d impracticable, and with any other carriages the road cannot be passed [probably due to excessive mud].”<sup>300</sup>

In January 1754, *Denmark* reported, “The snow this season has been excessive deep, and the frost is so severe, that 3 East India Men [ships] and 18 merchant ships are frozen up in the [sea] road of Copenhagen.”<sup>300</sup>

In January 1754, *Bohemia* [now within the *Czech Republic*] reported, “By as severe a frost as was ever known, the Moldau [River] has been so frozen, as to bear [the weight of] all sorts of carriages, and the vast quantities of snow have almost render’d the roads impassable.”<sup>300</sup>

A letter from R. Brooke, M.D. in Maryland in what would become the *United States* recorded temperature during the period September 1753 to August 1754. The lowest temperature of 10° F [-12° C] occurred on 12 February 1754. The highest temperature of 88° F [31° C] occurred on 25 August 1754. The thermometer was hung out of doors in a place where the sun never shone upon it. He remarked that this period did not produce a remarkable cold day last winter; nor hot day the succeeding summer. He remarked “the oldest people among us [observed], that the winter succeeding a hard winter in Europe is very severe here [in Maryland].” The summer of 1754 in Maryland was the wettest summer that is remembered by any man.<sup>301</sup>

On 1 January 1754, *Hamburgh* [Hamburg], *Germany* reported, “The neighbourhood of Bremen is all under water, by the overflowing of the Weser [River].”<sup>300</sup>

On 2 January 1754, *Ireland* reported, “Greater damages have been done by the late floods and storms, than has been remember’d; lands being overflowed, people, bridges, houses and trees carried away, and the rivers and roads rendered impassable.”<sup>300</sup>

On 2 January 1754, *Spain* reported, “the late tempests have done great damage on our coasts, where several vessels have been cast away, particularly a French ship of 24 guns.”<sup>300</sup>

In January 1754, *Holland* [*the Netherlands*] reported, “Two dikes in the neighbourhood of Deventer, in the province of Overyssetl [Overijssel], have given way by the late inundations, and threw the water of the Rhine [River] into the river Yssel [Ijssel], with so great rapidity, that most part of the lower town of Deventer was laid under water. The inundation was also great in the county of Twent [Twente], and the county of Zutphen; the environs [neighborhood] of the town of Zwooll [Zwolle] were overflowed [flooded] for about five leagues [15 miles, 24 kilometers], and a great number of cattle and people drowned. Half the city of Emmerick has been under water, and it would have been totally overflowed, but for a dike raised in haste in the middle of the old market, and the giving way of the dikes of Halem [Haarlem] and Leuven, by which means the districts of Limers [Lemmer], Latum, Doesburgh [Doesburg], &c. are entirely overflowed; and many thousand inhabitants ruined. At Leuven, the parsonage house was carried away, and the parson, and his sister, and a maid servant drowned.” Then on 15 January, *Hague* in *the Netherlands* reported, “The wind coming about to the southward, the waters in the several provinces have fallen so very considerably, that in some places the land that was overflowed is already dry.”<sup>300</sup>

In February 1754, *Poland* reported, “An odd accident lately happened in Posnania [Poznań]. A severe frost succeeding some days rain, fifteen bustardi [bustard], a bird next in size to the ostrich, having alighted in a field, had all their wings and feathers so strongly froze, that they could not fly; some were kill’d by the country people with blugeons [bludgeons], and others were taken with dogs; but they made so much resistance that a man was wounded and two dogs kill’d.”<sup>300</sup>

On 6 February 1754, “the river was so frozen above Kingstonbridge [over the River Thames in London, *England*], that people passed and repassed it [the frozen river] with safety.”<sup>300</sup>

On 8 February 1754, Paris, *France* reported, “It has, for two days past, froze so violently that, by observation, it is colder by a degree than it was in 1740; nor has so much snow fallen for 60 years, it being near two feet [0.6 meters] deep at Paris, and three [0.9 meters] in the country, and the Seine [River] is frozen over above Charenton. In the road leading to Beauvais, several holes, particularly upon the mountains, were filled with the snow [avalanches], and thereby several travelers perished.”<sup>300</sup>

On 9 February 1754, Copenhagen, *Denmark* reported, “The sea is now frozen over quite too the Swedish coast, so that people pass it on foot, and [army] deserters, on both sides, have taken advantage of it to change their service.”<sup>300</sup>

On 20 April 1754, Copenhagen, *Denmark* reported, “A great quantity of snow has cover’d the ground for some months past, and the last winter has been the longest that any person can remember.”<sup>300</sup>

In May 1754, *Sweden* reported, “The weather continues very severe in this country, the rocks are still covered with snow, and the earth frozen as in the middle of winter, an instance of which the oldest person cannot remember.”<sup>300</sup>

**1754 A.D.** In *England and Scotland*, there were great rainstorms in early spring.<sup>47, 92</sup>

In March 1754, *Spain* reported, “We have had violent storms for a fortnight past in which many ships of divers [diverse] nations have been lost on our coast.”<sup>300</sup>

In *Germany* and Holland [now *the Netherlands*], there were serious floods.<sup>47, 92</sup>

On 23 April 1754, Berlin, *Germany* reported, “A terrible storm of thunder and lightning happened lately at a village call’d Sonnenburgh [Sonnenberg], which set fire to Scharnow church, by which that building, and almost the whole town, was reduc’d to ashes.”<sup>300</sup>

In 1754, there was an inundation in Holland [now *the Netherlands*].<sup>43</sup>

On 13 May 1754, Exeter, New Hampshire in what would become the *United States* reported, “It is a melancholy time in regard to drought, and the terrible burnings there are in the woods. It is feared Nottingham will be almost destroyed. Several houses and barns are burnt already. The meeting house hardly escaped. 100,000 boards burnt at one mill; almost all the pine timber in the town destroyed; and the fire still raging. It seems unless providence should interpose, the country above us must be laid waste. We hear also that the fire has made great destruction of the woods at and about Chester, in the said province.” On 20 May 1754, Portsmouth, New Hampshire reported, “The woods have been on fire between Merrimack and Kennibek rivers, for thirty days past, which has done great damage to the fences, and the houses in several towns were with difficulty preserved.” [We are since informed, that the late plentiful rains have put a stop to the progress of the flames.].<sup>300</sup>

On 16 May 1754, “an inundation between Heilbron [Heilbronn] and Fouthenborough, *Germany*, has lately done great damage; before which a more terrible storm happened than the oldest man can remember; all the dykes [dikes] and causeways were broken down, and the fields and meadows ruined; houses, stables and cow-houses were overturned, and the cattle drowned. The damage done is computed at 100,000 flor. [florins]”<sup>300</sup>

On Friday, 14 June 1754 [Julian calendar], “In Monmouthshire and Gloucestershire [*Wales*] was the most violent storm of hail known in the memory of man, which did great damage to the corn [grain], fruit, and windows, some of the hail stones measuring 4 and 6 inches [10-15 centimeters]. Immediately after the hail, fell a prodigious shower of rain, which occasion’d such a flood, that many houses were filled four feet [1.2 meters] deep with water, and the rivers overflowed and cast out fish. At Coventry [*England*] the flood was so great, that for some time, waggons [wagons] and carriages were stopt [stopped] from passing through the town.”<sup>300</sup>

On 14 June 1754, there was a terrific hailstorm in Monmouthshire, *Wales* and Gloucestershire, *England*. Some of the hailstones measuring from 4 to 6 inches in circumference. Grain, windows, and fruit trees were severely injured. The storm was followed by prodigious quantities of rain, flooding the country seriously. At Coventry there was also a great hailstorm.<sup>93</sup>

On 15 June 1754 in *England*, there was a great hailstorm in Devonshire.<sup>93</sup>

On 18 June 1754, Dublin, *Ireland* reported, “Last Thursday [June 13<sup>th</sup> in the Julian calendar] and the two following days, the rains did great damages, and Rathfarnham bridge was thrown down, which was one arch of 100 feet [30 meters] wide. Many people and cattle were drown’d, and boats drove to sea.”<sup>300</sup>

On Thursday, 16 July 1754, *England* reported, “A violent rain began about Worcester, which held near 12 hours, without intermission. It beat down the grain and fruit, and made sad havock [havoc] in the country. The rivers Tame and Severn overflow’d their banks, and it being the midst of hay harvest, great crops of hay were carried off the meads [meadows] down the stream. The Severn never rose so high in the memory of man.”<sup>300</sup>

On Sunday, 28 July 1754 between 6 and 7 in the evening, Walton in Suffolk, *England* was struck by a violent storm of thunder, lightning, rain and hail. The hailstones were as large as pigeon’s eggs, which did great damage to the corn [grain] and other fruits of the earth, and scarce a whole quarry of glass [a pane of glass having a square or diamond shape.] is remaining in the windows of the town. The damage is supposed to amount to 500*l*. The hail fell about a mile [1.6 kilometers] in length and half a mile [0.8 kilometers] in breadth.<sup>300</sup>

On 28 July 1754 in *England*, there was a violent storm in Suffolk, with rain and hail. The hailstones were as large as pigeons’ eggs, and inflicted great damage upon the grain and fruit crops. The effect of the storm extended for about 1 mile in length, and half a mile in breadth.<sup>93</sup>

The year 1754 was very dry in Paris, *France*. This occurred mainly in the winter and the spring. The year produced only 14.7 inches (372 millimeters) of rainfall compared to typical yearly average of 20.9 inches (530 millimeters). The water level [on the Seine River] fell on October 7 to the zero water mark of 1719.<sup>79</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:  
January and February – generally moderate and pleasant. March 6<sup>th</sup> – the frost seems almost out of the ground. March 15<sup>th</sup> – cold, and froze hard. April 6<sup>th</sup> – this is the 13<sup>th</sup> day of fair, dry, and therefore pleasant weather. April 18<sup>th</sup> – this is the 25<sup>th</sup> day of pleasant weather. April 31<sup>st</sup> – cold, but dry. May 13<sup>th</sup> – cloudy and foggy; the grass



grows surprisingly well. May 23<sup>rd</sup> – a remarkable hot day. July 1<sup>st</sup> – I have no grass growing in my mowing ground, and there is no feed on the Neck [peninsula]; the reasons are, the open winter, three weeks early drought, and the grasshoppers. September 1<sup>st</sup> – we have no potatoes growing this year, because of grasshoppers. September 22<sup>nd</sup> – there was a melancholy drought. October 24<sup>th</sup> – a great storm; the earth is filled with water. November 5<sup>th</sup> – a smart storm with a deluge of rain and thunder and lightning in the night. There has been less thunder this summer than during many years past. November 23<sup>rd</sup> – unusually moderate and pleasant all this fall. December 13<sup>th</sup> – since the second day of this month, the weather has been pleasant, and the ground bare. December 27<sup>th</sup> – no sledding yet.<sup>78</sup>

In August 1754, *Poland* reported, “Great havock [havoc] has lately been made by the locusts, in the neighbourhood of Biala [Bielsko-Biala] in Posnania [Poznań], and in upper *Poland*. Much damage has been done by some late floods.”<sup>300</sup>

On Monday, 12 August 1754, Northampton in East Midlands region of *England* reported, “The floods have been so extraordinary since the great rains, that the cross roads, in many places, are impassable.”<sup>300</sup>

On 26 August 1754, Bonne [Bonn], *Germany* reported, “A serious storm of thunder, lightning, and hail, which happened in our neighbourhood last Thursday, has done very considerable damage to both sides of the Rhine [River]. The hail beat off the fruits of the trees, and the torrents of rain, which tore up and carried away the vines which the hail spared, has ruined whole vineyards for a long time to come.”<sup>300</sup>

On 13 September 1754, a violent hurricane struck the Leeward Islands, in which 25 vessels were run on shore at *Montserrat* and *Antigua*; and 5 at *St. Kitt's*, which had received great damage. Another account reports, “Twelve ships were drove ashore on the island of St. Domingo [now the *Dominican Republic* and *Haiti*] in the hurricane of last September, and on computation 1700 hogsheads of sugar were lost. Great damage was also sustained in the sugar and indigo plantations.”<sup>300</sup>

In September 1754, a hurricane did great damage in St. Domingo to the sugar and indigo plantations. Twelve ships were driven on shore and 1,700 hhd of sugar were lost.<sup>143</sup> [hhd is an abbreviation for hogshead – a large cask or barrel holding 63 gallons.] [Saint-Domingue (in French) or Santo Domingo (in Spanish) was a French colony on the Caribbean island of Hispaniola that in 1804 became the independent nation called *Haiti*.]

In 1754, seven feet three inches [87 inches or 2.21 meters] of rain fell in Barbados in the *Lesser Antilles* during the year.<sup>143</sup>

On 14 October 1754, a hard gale from the northeast caused great damage in North Carolina that would become part of the *United States*. The town of Portsmouth at Ocrick bar was overflowed, so that they went round it in boats.<sup>300</sup>

On Monday, 29 October 1754, York, *England* reported, by a sudden inundation of the river Rye, at Helmsley, *England*, two houses were washed away, and 13 persons drowned. Two other houses were greatly damaged, as also the stone bridge at the entrance of the town. Much damage was likewise done at Rivaulx [Rievaulx], where many cattle drowned, and haystacks washed away or driven down the river to a great distance.<sup>300</sup>

A letter from Maryland in what would become the *United States* dated 22 November 1754 reported, “At the time of the full moon in the latter end of last month, there fell such prodigious quantities of rain in our mountains, that the low grounds both in Maryland and Virginia, near Potowmack [Potomac] river, were under water, four people were drowned, many horses, cows, sheep, corn, tobacco, &c. were washed down with the current. These inundations frequently happen above the falls, but never do any damage below

navigable water. This year the flood rose 37 feet 9 inches [11.5 meters] perpendicularly, which is 4 feet 9 inches [1.4 meters] higher than it was ever known before.”<sup>301</sup>

On Tuesday, 5 November 1754, Gloucester, *England* [near the Welch border] reported, “The heavy rains which fell from Friday last to Sunday night, so much swelled the river Toway [Towy] in Carmarthenshire, *Wales* as to drown all the low lands between Landoverly [Llandoverly] and Carmarthenshire, and in the Vale the water was six feet [1.8 meters] high.”<sup>300</sup>

On Thursday, 7 November 1754, Glamorgan, *Wales* reported, “The rains in this county have been lately very heavy, and the floods have carried away an arch built over the river Tuaf [Taff], 144 feet [44 meters] wide, and supposed to be the largest in Europe.”<sup>300</sup>

On Saturday, 9 November 1754, Sherborne, *England* reported, “The rains have been so violent about Honiton in Devonshire, that the rivers have overflowed their banks, broke down several bridges, carried away some houses, and did other damage. The like accounts are received from several parts of Cornwall.”<sup>300</sup>

On 12 December 1754, Edinburgh reported, “The water of [River] Dee was so swelled last week by the break of the storm, that all the meadows were overflowed, and the cattle and sheep swept away; the poor found 55 dead sheep in different places, and many more are missing.”<sup>300</sup> [The River Dee flows through *Wales* and *England*.]

On Friday, 13 December 1754, “By a storm of wind, the glass-house at the Falcon stairs [in London, *England*] was blown down, boats on the river overset, barges, &c. damaged, and many chimneys blown down in different parts of the town.” On Monday 16 December, it was reported, “Several cellars, kitchins [kitchens], &c. in the low part of Westminster, were filled with water, and considerable damage done by the high tide, occasioned by the land floods, and late great wind.”<sup>300</sup>

On 14 December 1754, a thunderstorm struck Lorrain, *France*. “At 7 in the morning, a cloud of fire, followed by a most dreadful clap of thunder, covered the whole village of St. Aubin [Saint-Aubin-sur-Aire], situated in Lorrain [Lorraine], between Ligny and Void. The terror it occasioned was so great, that horses and other cattle broke their bridles and halters, and ran wildly about the streets and fields. The lightning fell upon the church, in which there were then two young women, who fell senseless to the ground; by the same flash the top of the confession-box, the steeple door, and the lower windows were beaten down, and the walls of the church shaken & crack’d. The lightning made its way thro’ the loft of the steeple, and broke down the timbers that supported the great bell, which fell upon the second bell, and broke that, together with the clock. The covering of the steeple was carried away, and the south and west angles beaten down. The materials were dispers’d with so prodigious a force, that stones weighing above eighty pounds [36 kilograms] were thrown upon the isle of the church above 22 yards [20 meters] from the steeple, and some upon adjacent houses, the roofs of which they broke thro’. The mayor of the village, who was then standing in his yard, at a good distance from the church, found himself suddenly surrounded with fire and smoke, and remained about a minute without either sight or senses. The same day they had terrible claps of thunder at Commercy, which is three leagues [9 miles, 14.5 kilometers] from St. Aubin, but no damage done.”<sup>301</sup>

On Friday, 20 December 1754, it was reported that there “was a terrible storm of wind and rain at Hollinburn [Hollingbourne] in Kent [*England*], which did great damage to the parish church, and the houses; a barn was blown down, and 30 large trees torn up by the roots.” Then on Tuesday 31 December, it was reported, “The late winds and tides have had such an effect on the banks at Romney-Marsh [in Kent], that the consequence is much apprehended.”<sup>300</sup>

On Tuesday, 31 December 1754, it was reported, “The weather has been very stormy for some time past in North and South Wales, attended with excessive heavy rains, and the floods were out so about Montgomery [*Wales*] as to render travelling difficult and dangerous.” “At Liverpool [*England*] they have also had exceeding stormy weather, and their shipping were in imminent danger.”<sup>300</sup>

In 1754, a severe drought of long duration engulfed Hupeh (now Hubei province) in central *China* at Ching-mên.<sup>153</sup>

The year 1754 was a year of abundance in the vicinity of Shanghai, *China*.<sup>166</sup>

In 1754 during the 8<sup>th</sup> moon, there were three tides in one day at Tsingpu, *China*.<sup>166</sup>

**Winter of 1754 / 1755 A.D.** In January 1755, *Sweden* reported, “There has fallen such a quantity of snow lately in the western provinces that it is near 6 feet [1.8 meters] deep, which renders the roads in many places impassable.”<sup>301</sup>

On 6 January 1755, *France* reported, “At 7 [o’clock] in the morning, a thermometer of Reaumur’s construction, placed at Versailles, in a window of the Archbp [Archbishop] of Lewis’s cabinet, was fallen to 11 one half [-11.5°Re, 6° F, -14.4° C], which is 2 degrees lower than in 1740. This thermometer is exposed to the W. [west] and sheltered from the North wind, by one of the stairs of the orangery, and, for these reasons, is always a degree higher than that in the king’s apartments, which is exposed to the N. [north] so that the cold on that day was two degrees lower than in 1740. The snow has very deep, even in the mild temperature of Marseilles.”<sup>301</sup>

The cold on January 6<sup>th</sup>, 1755 lead to much ice on the Seine River; on the 8<sup>th</sup> the ice surrounding the Isle Louvier in Paris, *France* was firm. The ice held until the 20<sup>th</sup> of January. The Seine River froze a second time beginning on the 26<sup>th</sup> but on the 29<sup>th</sup> it thawed again. On February 5<sup>th</sup> it froze again but on the 7<sup>th</sup> the river thawed for the third time. On January the 7<sup>th</sup>, the temperature on the Garonne River was (5° F, -15° C). The Garonne River was passable on foot.<sup>62</sup>

The winter of 1755 produced an excessive cold in the central and the southern *France*. This cold was less intense in the north. The Rhône River was frozen in Arles and Avignon to the thickness that carts pass over the frozen rivers safely. The river ceased to be navigable even in Lyon during the first half of January. Thermometers in the shade and exposed to the air in Lyon recorded -4° F (-20° C) and -5.8° F (-21° C) on the 17<sup>th</sup> of January. In Arles, another thermometer, if we believed the suspects reports, saw the largest temperature drop with a recording of -17.5° F (-27.5° C). The observations performed in Montpellier deserve more confidence. The cold struck in Montpellier suddenly on January 5, by a very violent northwest wind and the frost lasted until February 7, almost without interruption. This produced a total of 33 days of frost of which 25 days were a very heavy frost. The last fortnight fell so much snow that the snow level in the streets reached a height of 1.4 to 2.1 feet (438 to 649 millimeters). The coldest days at Montpellier were the 7 & 28 January and 1 & 5 February. The thermometer sank three times to 16.3° F (-8.7° C). The severity of this winter spread over Nimes and Toulouse. At Nimes, the cold reached 11.8° F (-11.2° C) on January 7. The coldest temperature in Toulouse was 10.6° F (-11.9° C). The north of *France* could not completely escape this harsh winter. In Paris the thermometer sank to 3.9° F (-15.6° C), but the cold was relatively less harsh and less durable than in the South.<sup>79</sup>

The winter of 1754-55 was severe in *France* and *Italy*. The Seine River in *France* froze twice. The lagoon at Venice, *Italy* froze twice and the ice bore the weight of people. The frost in Denainvilliers, *France* lasted from November to March, producing 51 frost days. The lowest temperatures observed were:

Geneva, *Switzerland* (-13.0° F, -25.0° C).

Frankfurt, *Germany* ( -5.8° F, -21.0° C)  
 Paris, *France* ( 3.9° F, -15.6° C) on 6 January  
 London, *England* ( 10.9° F, -11.7° C)

In southern *France* there was a lot of snow, and a number of olive trees froze in Languedoc.<sup>62</sup>

On 19 March 1755 in the neighborhood of Demonte, as in the upper valley of Stura, in the province of Cuneo in *Italy*, there was a great avalanche of snow from the mountain at Bergemoletto. Twenty-two people were buried in the avalanche under 60 feet of snow. Before the avalanche, there had been 3 days of continuous snowfall. Joseph Rochia tried to dig down to his house and barn to find his family. The month of April was very hot. On 25 April, he dug down to his barn and located his wife, sister and daughter within and still alive.<sup>237</sup>

In March 1755, three people were buried alive in an avalanche at Bergemoletto, *Italy* and survived over 5 weeks buried under 60 feet [18 meters] of snow.<sup>303</sup>

— “A small cluster of houses at a place called Bergemoletto near Demonte in the upper valley of Stura, was on the 19<sup>th</sup> of March 1755, entirely overwhelmed by two vast bodies of snow that tumbled down from a neighbouring mountain. All the inhabitants were then within doors, except one Joseph Rochia and his son, a lad of 15, who were on the roof of their house clearing away the snow which had fallen for 3 days incessantly. A priest going by to Mass, advised them to come down, having just before observed a body of snow tumbling from the mountain towards them. The man descended with great precipitation, and fled with his son, he knew not whither; but scarce had he gone 30 or 40 steps, before his son, who followed him, fell down; on which looking back, he saw his own and his neighbours houses in which were 22 persons in all, covered with a high mountain of snow. He lifted up his son, and reflecting that his wife, his sister, two children and all his effects were thus buried, he fainted away; but soon reviving got safe to a friend’s house at some distance.”

— “Five days after, Joseph being perfectly recovered, got upon the snow, with his son, and two of his wife’s brothers, to try if he could find the exact place where his house stood; but, after many openings made in the snow, they could not discover it. The month of April proving hot, and the snow beginning to soften, he again used his utmost endeavours, to recover his effects, and to bury as he thought, the remains of his family. He made new openings and threw in earth, to melt the snow, which on the 24<sup>th</sup> of April was greatly diminished. He broke through ice six English feet [1.8 meters] thick, with iron bars, thrust down a long pole & touched the ground, but evening coming on, he desisted.”

— “His wife’s brother, who lived at Demonte dreamed that night, that his sister was still alive, and begged him to help her; the man affected by his dream, rose early in the morning and went to Bergemoletto, where Joseph was; and after resting himself a little, went with him to work upon the snow, where they made another opening, which led them to the house they searched for; but finding no dead bodies in its ruins, they sought for the stable, which was about 240 English feet [73 meters] distant, which having found, they heard a cry of, *help, my dear brother*. Being greatly surprised as well as encouraged by these words, they laboured with all diligence till they had made a large opening, through which the brother who had the dream immediately went down, where the sister with an agonizing and feeble voice told him, *I have always trusted in God and you, that you would not forsake me*. The other brother and the husband then went down, and found still alive the wife about 45, the sister about 35, and a daughter about thirteen years old. These they raised on their shoulders to men above, who pulled them up as it was from the grave, and carried them to a neighbouring house. They were unable to walk, and so wasted, that they appeared like mere skeletons. They were immediately put to bed, and gruel of rye-flour and a little butter was given to recover them. Some days after, the Intendant came to see them, and found the wife still unable to rise from her bed, or use her feet, from the intense cold she had endured, and the uneasy posture she had been in. The sister, whose legs had been bathed with hot wine, could walk with some difficulty; and the daughter needed no further remedies.”

— “On the Intendant’s interrogating the women, they told him, that on the morning of the 19<sup>th</sup> of March they were in the stable, with a boy of 6 years old and a girl about 13. In the same stable were six goats,

one of which having brought forth two dead kids the night before, they went to carry her a small vessel of rye-flour gruel; there were also an ass, and five or six fowls. They were sheltering themselves in a warm corner of the stable till the church bell should ring, intending to attend the service. The wife related, that wanting to go out of the stable to kindle a fire in the house for her husband, who was clearing away the snow from the top of it, she perceived a mass of snow breaking down towards the east, upon which she went back into the stable, shut the door, and told her sister of it. In less than three minutes they heard the roof break over their heads, and also part of the ceiling. The sister advised to get into the rack and manger, which they did. The ass was tied to the manger, but got loose by kicking and struggling, and threw down the little vessel, which they found, and afterwards used to hold the melted snow which served them for drink.”

— “Very fortunately the manger was under the main prop of the stable, and so resisted the weight of the snow. Their first care was to know what they had to eat. The sister said she had 15 chesnuts [chestnuts] in her pocket; the children said they had breakfasted, and should want no more that day. They remembered there were 30 or 40 cakes in a place near the stable, and endeavoured to get at them, but were not able, for the snow. They called often for help, but were heard by none. The sister gave two chesnuts [chestnuts] to the wife, and eat [ate] two herself, and they drank some snow water. The ass was restless and the goats kept bleating for some days; after which they heard no more of them. Two of the goats, however, being left alive, and near the manger, they felt them, and found that one of them was big, and would kid, as they recollected, about the middle of April; the other gave milk, wherewith they preserved their lives. During all the time they saw not one ray of light, yet for about 20 days they had some notice of night and day from the crowing of the fowls, till they died.”

— “The second day, being very hungry, they eat all the chestnuts, and drank what milk the goat yielded, being near two pounds [0.9 kilograms] a day at first, but it soon decreased. The third day, they attempted again, but in vain, to get at the cakes. So resolved to take all possible care to feed the goats; for just above the manger was a hay-loft, whence through a hole the sister pulled down hay into the rack, and gave it to the goats as long as she could reach it, and then, when it was beyond her reach, the goats climbed upon her shoulders, and reached it themselves.”

— “On the sixth day the boy sickened, and six days after desired his mother, who all this time had held him in her lap, to lay him at his length in the manger. She did so, and taking him by the hand, felt it was very cold; she then put her hand to his mouth, and finding the cold likewise, she gave him a little milk; the boy cried, *Oh my father in the snow! Oh father, father!* and then expired.”

— “In the mean while the goats milk diminished daily, and the fowls soon after dying they could no more distinguish night and day; but according to their reckoning, the time was near when the other goat should kid, which at length they knew was come, by its cries. The sister helped it, and they killed the kid, to save the milk for their own subsistence. So they found that the middle of April was come. Whenever they called this goat, it would come and lick their faces and hands, and gave them every day two pounds [0.9 kilograms] of milk, on which account they still bear the poor creature a great affection.”

— “They said, that during all this time, hunger gave them but little uneasiness except for the first five or six days; that their greatest pain was from the extreme coldness of the melted snow-water, which fell on them, from the stench of the dead ass, goats, fowls &c. & [et cetera and] from lice; but more than all from the very uneasy posture they were confined to, the manger in which they sat squatting against the wall, being no more than 3 feet 4 inches [1 meter] broad.”

— “After the first two or three days they had no evacuation by stool. The melted snow-water and milk were discharged by urine. The mother said she had never slept, but the sister and daughter declared they slept as usual.”

In 1755, there was a severe winter in *Switzerland*.<sup>193</sup>

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**1755 A.D.** In the north of *England*, there were floods.<sup>40, 41, 43</sup>

Thunderstorms or rainstorms and an earthquake desolated *Provence, France* in 1755.<sup>79</sup>



On 17 May 1755 in *England*, there was a hailstorm in Huntingdonshire and Staffordshire.<sup>93</sup> [Huntingdonshire is a district of Cambridgeshire in eastern *England*. Staffordshire is a landlocked county in the West Midlands region of *England*.]

On Tuesday, 10 June 1755, “at Newmarket [in Suffolk, *England*] was such an inundation of water as was never known before, occasioned, it’s thought, by the breaking of a cloud between Chevely [Cheveley] and that town; for the torrent was so sudden that the inhabitants had no time to help themselves; and so rapid that it beat down two people in the street. It displaced grave stones in the church-yard, and removed pews in the church. The water was four feet [1.2 meters] deep in several houses; at the Star Inn, 28 hogsheads of beer and two pipes of wine were staved and lost. The damage is computed to be 1300*l*.”<sup>301</sup> [In present currency, that would be equivalent to £171,000 in damages based on the retail inflation price index.]

On Saturday, 5 July 1755, a terrible thunderstorm struck Bristol, *England*. The next day, thunder and lightning killed 12 sheep in the parish of Isterton near Devizes [in Wiltshire, *England*], and 6 more in the parish of Coat [Coate], two miles [3 kilometers] from that town. Then on Monday 7 July, “At Margate in Kent in the forenoon was a prodigious tempest of lightning and thunder, followed with heavy rain and hail, such as had not been known in the memory of man. At a place called Shallows, the water was near five feet [1.5 meters] deep in the houses. Between five and six in the evening, Capt. Morrison, in his ship, being about a league [3 miles, 4.8 kilometers] below the Nore Lands, saw two water spouts, one towards the Isle of Shepey [Sheppey], at about a mile [1.6 kilometers] off, which lasted about eight minutes; the other, a large one, toward the Essex coast, which lasted about 14 minutes. The sea was all in a break with them.”<sup>301</sup>

On 7 July 1755 in *England*, there was a hailstorm in Kent and Sussex, near Rye. "Hop grounds entirely stripped of all their leaves and branches, the bare poles only left standing; corn and mowing grass beat flat, as if trampled upon by a thousand horses; hedges and fruit trees bruised in such a manner as if purposely and with great force beaten to pieces; hailstones 6 or 7 inches round, and in such quantity as to reach near to the mid-leg; and which, by their continuing on the ground all night, and in many places for several days after, so chilled the earth as to render it very frigid and unkindly." Poultry was killed.<sup>93</sup>

On 13 July 1755, a dreadful storm of hail and thunder struck almost every part of the kingdom of *Denmark*. In Copenhagen, the lightning destroyed a chimney. In the duchies of Holstein and Sleswick [Schleswig] [now part of *Germany*], it reduced 13 houses to ashes. The corn [grain] was destroyed in several districts by the hail, which was as large as walnuts. Three days after they had another storm, which likewise did some damage to the fruits of the earth, but much less than the former.<sup>301</sup>

On 29 July 1755, a most terrible storm of thunder and lightning struck the Cape of Good Hope [now Godthåb or Nuuk] in West *Greenland*. “This being perfectly new, at least to the present inhabitants of that climate, terrified them to such a degree, that, after two or three repeated claps of thunder, they ran in the greatest confusion, and making the most terrible howlings, to their caves, from whence the most timorous could hardly be prevailed on to come out for some days, while other, more courageous, during the storm fired loaded muskets at the black clouds that hung over the entrance of their caves. The same accounts add, that on the 16<sup>th</sup> of August happened a like storm, and that the summer was so excessive hot, that the snow which some valleys had been accumulating for several years past, entirely dissolved; that the herbage arrived to great perfection, and the fruit to a degree of ripeness, which neither natives nor others remember to have seen before.”<sup>301</sup>

On Monday, 1 September 1755, Edinburgh, *Scotland* reported, “was the greatest fall of rain ever known in this country, which swelled all the rivers, and did a great deal of damage to the neighbouring fields; in particular the rivers of Spey and Findhorn rose upwards of 12 feet [3.7 meters] perpendicular more than



usual, and carried off a great deal of timber, grain, cattle, &c. A woman and a boy perished in the water of Dolnan in Strath Spey [Strathspey]; and a woman in the water of Lossie near Elgin. The small rivulets [very small streams] likewise rose to a great height, and several cattle pasturing on the banks of some of them were carried down, and perished.”<sup>301</sup>

On 29 September 1755 in *England*, there was a great hailstorm in Devonshire, and in Kent and Sussex.<sup>93</sup>

In October 1755, a sudden inundation produced great destruction in most of the valleys of Piedmont, *Italy*. The River Po overflowed. The disaster was preceded by horrible thunder. The inundation was due to the immense volume of water, which during the storm, suddenly issued through a new opening from underground in the mountains.<sup>205</sup>

The summer of 1755 in Denainvilliers, *France* was characterized by:

Hot days	57 days
Very hot days	5 days
Extremely hot day	2 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The maximum temperatures observed during the summer were:

Denainvilliers, <i>France</i>	( 97.3° F, 36.3° C) on 20 June
Paris, <i>France</i>	( 94.5° F, 34.7° C) on 6 July
Mulhouse, <i>France</i>	( 88.9° F, 31.6° C) on 21 June and 12 July

The summer was very hot in the region around Toulouse; and the year was rich in cereals except oats and corn. But the harvest was minimal. While in the lower Languedoc wine was abundance, but there was a grain shortage. In Burgundy, the grape harvest began on 16 September; the yield was of sufficient quantity, but mediocre quality. In the middle of *France* the corn harvest was weak; the grape harvest was about the size of half a normal crop; vegetables were abundance; fruits production poor.<sup>62</sup>

On 27 December 1755, it was reported, “The waters of the Rhone [Rhône River] in Normandy [*France*] swelled to a height never before known, by which a surface of more than 40 square leagues [305,000 acres, 1,235 square kilometers] comprehending the territory of Arles, has been totally laid under water, the summits of a few hills only excepted. The two branches of the river which surrounded the island of Camargue, united and made but one stream, by which more than 30,000 sheep were drowned, besides horses and mules. The city of Arles suffered much; the great causeway at Terascon was overflowed, and the country adjacent laid under water to the height of eight feet [2.4 meters]. Avignon has likewise been exposed to the like misfortune, and the whole country of Venaisien [Venaissin] as well as Provence, has sustained losses in cattle, corn, wine, and oil, to an incredible value.”<sup>302</sup>

In 1755, floods struck Shantung (now Shandong province) on the east coast of *China* at Chin-hsiang and Yü-t'ai; and Hupeh (now Hubei province) in central *China* at Ch'ien-chiang, Mien-yang, Ching-mên, Chiang-ling, Chien-li and Kuang-hua. During the period between 11 April and 10 May, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Chieh-yang. During the period between 10 June and 8 July, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu. During the period between 8 August and 5 September, a drought engulfed Shantung province at Huang. During the period between 3 December 1755 and 1 January 1756, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January – several snowfalls, and some sledding. January 21<sup>st</sup> – the ground almost bare. January 22<sup>nd</sup> – moderate; it hardly freezes a night. January 25<sup>th</sup> – the ground bare. February 11<sup>th</sup> – no snow this month yet. February 20<sup>th</sup> – some sledding, having had two or three inches (5 or 8 centimeters) of snow. February 30<sup>th</sup> – fine walking, and very

good sledding. March 20<sup>th</sup> – very good sledding. March 29<sup>th</sup> – it snowed all day. May 8<sup>th</sup> – we have done gardening. May 25<sup>th</sup> – the creatures were put on the Neck [peninsula]. June 14<sup>th</sup> – it rained abundantly. June 28<sup>th</sup> – very hot until the afternoon, when there arose a severe hurricane, with rain; Captain Bennett's frame [house] was blown down. July 18<sup>th</sup> – the Indian corn (by heat and alternate showers) grows finely. August 26<sup>th</sup> – no hot weather this summer (except eight days) until today. September 12<sup>th</sup> – a wonderful growing season. September 19<sup>th</sup> – there was a frost. October 6<sup>th</sup> – warm. October 14<sup>th</sup> – digging potatoes. October 26<sup>th</sup> – cold. December 6<sup>th</sup> – a true winter's day. December 15<sup>th</sup> – a fine summer's day.<sup>78</sup>

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**1756 A.D.** In *England* and *Europe*, there were great floods.<sup>47, 92</sup>

On Tuesday, 10 January 1756, “By the violence of the wind several barges were driven from their mooring below the bridge [in London, *England*] and running athwart [across] one another received great damage.” Worcester in the West Midlands reported, “By the high wind one of the pinnacles on the Malvern church was blown down, and other damage done to the noble antique building. At Kidderminster a very large tree, at the entrance of that town from Stowerbridge [Stourbridge], was blown up by the roots. And from other parts of the country we hear of great damage done to churches, dwelling-houses, and out-buildings; and that many trees were forced up by the roots, and carried to an incredible distance from the place where they grew. Some people affirm, they saw several flashes of lightning, that the sky seemed to separate, and that several lucid streams emitted from the opening. The hurricane caused a general consternation, and people’s fears naturally suggested to them the apprehensions of an earthquake or inundation.”<sup>302</sup>

On Friday, 13 January 1756, “At Stamford [in Lincolnshire, *England*] was a violent hurricane; two windmills broke loose, and were set on fire, and one of them burnt to the ground.” “At Liverpool [in Merseyside, *England*], about one in the morning began a most violent gale of wind at N.W. which lasted about four hours. Numbers of chimneys were blown down, houses stript [stripped] of their roofs, and two or three buildings levelled with the ground. In the height of the gale a fire broke out in a warehouse adjoining to the custom-house, but was happily extinguished without much damage.” “At Birmingham [in the West Midlands of *England*] considerable damage was done by the high wind. Several chimneys were blown down; some windows of the new church and chapel blown out; the roof of the church at Handsworth was stripped of its leaden covering, and several trees broke and thrown down.”<sup>302</sup>

A letter from Tuam, *Ireland* on 19 January 1756 reported, “We have here the most dreadful season your idea can form; nothing but lightening and thunder, hail, and rain, & such terrible storms, that the very houses crack and shake. Scarcely a week passes that we do not hear of some persons being drowned, the floods are risen to such a pitch. The Archbishop was five miles on his way to Dublin last Monday, but obliged to turn back, the roads being quite impassable.”<sup>302</sup>

From Echt, *Scotland* they write, that on the 26<sup>th</sup> of January [1756], many in the parish of Lumphanan and Kincarden [Kincardine] were surprised with thunder and lightning, which were more frightful than ever they had heard and seen, but especially the last. They imagined the loch of Auchlossen all on fire, as also some of the hills around them, and that it was either an earthquake or the day of judgement.<sup>302</sup>

In February 1756, *Scotland* reported, “Tempest, storms, hurricanes, thunder, lightning, and other terrifying phenomena have never been known so frequent throughout the kingdom as in the present winter.”<sup>302</sup>

On 11 February 1756, the most violent storm ever known struck Ross in *Ireland*.<sup>302</sup>

On Thursday, 18 March 1756, Saffron Walden in Essex, *England* reported a very unusual noise in the air. It was “attended by the descent of hailstones of an extraordinary size, some measuring three inches and a

half [9 centimeters] round, and in shape like a pear. The hailstorm went northward, the noise gradually decreasing for some minutes, and then entirely ceasing. As there was not the least breath of wind, every body apprehended an earthquake.”<sup>302</sup>

On Tuesday, 20 April 1756, “The heavy rains that fell this day rais’d the waters in the road at Edmonton [a borough in London, *England*] in some places 8 or 9 feet [2.4-2.7 meters] high. A bridge at Tuckey-Street near Enfield, was carried away. The Enfield, Cheshunt, and a great many other stage coaches and carriages were oblig’d to stop all night at Tottenham and Edmonton. The Hadham stagecoach was overset, and a woman passenger, the only one in the coach, was drowned.”<sup>302</sup>

In April 1756, it was reported that “At Romsdvalen [Romsdalen] in *Norway*, a torrent of water suddenly rushed out of a neighbouring mountain, by which not only the greatest part of the houses were destroyed, and all the cattle for about two miles [3 kilometers] round drowned, but many of the inhabitants were likewise born away by the stream. They do not attribute this strange event to an earthquake, as the nature of such phænomena are but little known in that remote country.”<sup>302</sup>

In April 1756 on the *Island of Minorca* in the Mediterranean Sea, a storm arose on the 13<sup>th</sup> that scattered transports and disordered a military convoy. In this storm, a merchantman and 14 tartans received so much damage that there was a necessity for sending them back, after taking out the troops and provisions they had on board. The roads became impassable and the weather so hot, that the cattle fainted under their labor. Then the heat grew intolerable.<sup>302</sup>

On 10 May 1756 in *England*, there was a hailstorm in Staffordshire.<sup>93</sup>

In 1756 [in *France*] there were early May frosts, which were strong enough to damage the [grape] vines. June was cold and damp. The month of July was so damp and cold that individuals dressed for winter and warmed themselves from time to time. August and September were still cold. In Denainvilliers, *France* the maximum summer temperature was 89.4° F (31.9° C) on 16 July. In Burgundy, *France*, the grape harvest began on 4 October. The harvest produced a normal yield; but because the grapes were rotten, the wine was mediocre. In the south of *France* the seasons fell into disorder. Rain and winds followed each other continuously. The year was unfavorable to agriculture. There were many floods, especially in November. In Berlin, *Germany*, it was very hot in June.<sup>62</sup>

On Thursday, 24 June 1756, a poor man and his child going to Wrestlington feast in Cambridgeshire, *England*, was killed by lightning. The next day a house at Mulner in Suffolk was set on fire by lightning. Then on 27 June, a most violent storm of lightning, thunder and rain struck London, and its neighborhood, in which a large tree, about 2 feet [0.6 meters] in diameter, that stood in a public yard in Petticoat Lane, was snapped into two.<sup>302</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January – moderate and pleasant month, generally. January 28<sup>th</sup> – the season seems so altered that the fish were struck in, as in May. February – much delightful weather. March – some blustering weather, but unlike March. March 19<sup>th</sup> – rainy and warm, like May. April 12<sup>th</sup> – the robin visited us several springs past. May 11<sup>th</sup> – our heart cherry trees and pear plums are blossoming. May 19<sup>th</sup> – they are all in the bloom. Hot and rainy. June 2<sup>nd</sup> – things were never so forward; plenty of rain this month. June 27<sup>th</sup> – a hot Sabbath. July 12<sup>th</sup> to 15<sup>th</sup> – foggy. July 20<sup>th</sup> – a fine growing season. July 22<sup>nd</sup> – we are visited with worms, as we were thirteen years ago, which have destroyed whole fields of English and Indian corn in divers [diverse] places. July 30<sup>th</sup> – a wet summer this! August 10<sup>th</sup> – I never saw such grass, so tall and thick. August 26<sup>th</sup> – very hot. September 11<sup>th</sup> – extremely hot, but come on very cold. September 24<sup>th</sup> – the frost has killed the brakes and leaves of Indian corn. November 12<sup>th</sup> – fine weather.<sup>78</sup>

In 1756, the climate of *Syria* is described as: “The seasons in general are regular, particularly at Aleppo, where the air is usually very healthy, and so pure and free from damps [damp weather], that the

inhabitants of all ranks not only sup [eat supper] but sleep in their court yards, or on the tops of their houses, exposed to the open air, from the end of May to the beginning of September. The severity of winter is reckoned to last but 40 days from the 12 of Dec. [December] to the 20<sup>th</sup> of Jan. [January]. The air during this time is found to be very piercing, even by strangers that come from a cold climate; and yet the ice is very rarely hard enough to bear [the weight of] a man. The snow seldom lies above a day, and when the sun shines out, and there is no wind, the weather is not only temperate, but almost hot, in the depth even of this winter, during which narcissus's are in flower, and hyacinths and violets begin to blow [blossom] before it is over. The fields are covered with a new verdure in Feb. [February] and the trees in March; but the beauty of this early spring quickly fades, and before the end of May the whole face of the country is so parched, that it looks like a barren heath, incapable of producing any but the few robust plants, which the excessive heat of a *Syrian* summer cannot kill. From this time till the middle of Sept. [September] no shower refreshes the thirsty ground, and no intervening cloud shades it for an hour from the burning sky. About the autumnal equinox the air is cooled by the first showers, and if they are plentiful, tho' [though] they continue only a few hours, the whole country assumes a new aspect. After this there is generally an interval of about 30 days before the second rains, and during this season the weather is temperate, serene, and extremely delightful. After the second rains the weather becomes variable, and winter sensibly approaches, tho' by so gentle a pace, that the trees retain their leaves till the middle of November, and till the end of this month the most tender and delicate constitutions feel no want of fire; some indeed pass the whole winter without it." <sup>302</sup>

On 1 July 1756, Jamaica on Long Island, New York in what would become the *United States* reported, "We had here the most violent hurricane [tornado] that perhaps ever happened in this part of North America. It began on the north side, and run in a straight course across the island to the south, being about 15 miles [24 kilometers] in length, and not exceeding 80 rods [1/4 mile, 0.4 kilometers] in breadth, making incredible havock [havoc], destroying almost every thing in its way. The largest oak and hickory trees were not able to withstand its violence, but were torn up by the roots, split into innumerable pieces, and many large limbs of several hundred weight carried into open fields near half a mile's distance from the woods. Several houses are damaged, six barns destroyed, upwards of 800 bearing apple-trees blown down near 8[0] acres of excellent timber entirely ruined, and several lengths of fence blown down and broken. A grind-stone of upwards of 150 lb. [68 kilograms] weight, was removed by the force of the wind, with the frame it was fixed on, 12 or 15 feet [3.7-4.6 meters], an iron chimney back several feet; a barn shattered into innumerable pieces, and the iron hinges of the doors weighing several pounds, were found a quarter of a mile [400 meters] from the place where [where] the barn had stood. Two apple trees were removed whole with a great quantity of earth sticking to their roots upwards of 30 rood [rod, 495 feet, 151 meters]." <sup>302</sup>

A letter dated 30 July 1756 stated; "The thunder has broke upon a rock at Langleford [in Northumberland, in northeast *England*], near Cheviot [highest summit in the Cheviot Hills], split it to pieces, and killed 40 sheep." <sup>302</sup>

On Tuesday, 17 August 1756, "The most terrible hurricane [tornado?] happened at Padua [in northern *Italy*] that was ever heard of in Europe. About noon it grew dark all on a sudden, and lightned [lightninged] and thundered to that degree, that a general dessionation [desolation] seem'd to be at hand. Several houses were thrown down, and many more had their roofs carried away by the violence of the wind. The town house, which was admired by all foreigners as a fine building, was blown down, and its fall occasioned that of the neighbouring buildings. The effects of the storm were not less dreadful in the country, where several of the inhabitants who fled to the churches for refuge, were crushed under the ruins." <sup>302</sup>

A storm struck Martinico (*Dominican Republic*) on September 12, 1756 and did great damage.<sup>40, 41</sup> [Martinico (Dominican Republic) is a nation on the island of La Hispaniola, part of the Greater Antilles archipelago in the Caribbean region. The western third of the island is occupied by the nation of Haiti.]

On 6 October 1756, a most violent hurricane struck Wigton in Cumberland, *England*. The damage done was deplorable. Stacks of hay and corn [grain] were entirely swept away; houses unroofed, and in several places driven down by its fury; trees without number torn up by the roots; others snapped off in the middle, and their fragments scattered over the adjoining fields. Some of the trees were twisted almost round, or split down to the very ground. After the storm, every herb, every plant, and every flower had its leaves withered, shriveled up, and turned black. In order to ascertain the cause, the dew and rain on the windows were analyzed by taste and found to be brackish as any seawater.<sup>237</sup>

On 6 October 1756, a most violent hurricane struck Wigton in Cumbria, *England*, “such a one perhaps as has not happened in these parts, in the memory of man. It lasted full 4 hours from about 11 till 3. The damage it has done over the whole county is very deplorable. The corn [grain] has suffered prodigiously. Houses were not only unroofed, but in several places overturned by its fury. Stacks of hay and corn were entirely swept away. Trees without number torn up by the roots, others snapt [snapped] off in the middle, and scattered in fragments over the neighbouring fields. Some were twisted almost round; bent, or split to the roots, and left in so shatter’d a condition as cannot be describ’d.” “I immediately examined the dew or rain which had been left on the grass, windows, &c. in hopes of being enabled, by its taste, to form some better judgment of the particles; with which the air had been impregnated, and I found it as salt as any seawater.” The wind was westerly, and consequently in its passage swept the Irish Sea.<sup>302</sup>

On Wednesday, 6 October 1756, “This day about one in the morning a dreadful hurricane happened, the effects of which were very extraordinary and extensive. Fifteen passengers, and twelve horses were lost in the Old Passage cross the [River] Severn from *Wales*. At Bath [in Somerset in southwest *England*], a tree that stood in Dr. Harrington’s garden was broken short off in the middle. At Penrith in Cumberland [*England*], it blew down the N.W. [northwest] battlement of the church, and the battlements of Mrs. Gaitsgarth’s tower, which fell upon the roof of the Tower house, and broke thro’ it into a room where two young ladies, Miss Molly Bolton, and Miss Dawson of Blencoe were in bed. Miss Bolton was unfortunately killed, and Miss Dawson buried in the ruins, but afterwards taken out unhurt. Almost every house in the town was damaged, and almost all the trees in the neighbouring country shivered to pieces, or blown up by the roots. The corn [grain] was all laid flat and damaged to the amount of a thousand pounds. A gentleman near this place observed that the barometer fell two degrees and a half in less than 3 quarters of an hour [45 minutes]. At Sunderland [in Tyne and Wear in northeast *England*] above 40 keels are missing, and several ships damaged, and driven to sea; the bodies of 12 men were taken up the next morning, and there is therefore much reason to fear that some of the vessels that were driven to sea are lost. At Newcastle [Newcastle-upon-Tyne in northeast *England*] many houses were blown down, others unroofed, and scarce a chimney left standing; above 40 keels, and several vessels from London were either sunk or driven to sea, and many men on board perish’d. A Danish vessel loaded with iron was sunk. The *Bussing*, of Whitby, was overset, and four boys drowned. At Aldstone Moor [Addlestone Moor in Surrey, *England*] the people imagined the earth shook, and therefore ran out for safety, but were driven by the wind against banks and hedges, where they suffered much by the breaking of trees, and the falling of stones. Gibside Wood [now a National Trust Wood in *England*], a place much visited by persons of taste, has suffered great damage; great numbers of the stately trees are either torn up, or shiver’d to pieces, large branches of others were twisted off, and scattered on the neighbouring hills, walks, lawns, and roads. Great part of the south front and roof of the elegant banquetting [banqueting] house is ruined, tho’ a column near 140 foot high, surrounded with scaffolding almost to the top, suffered no damage, nor was one rafter removed. At Greenock and Port Glasgow [in *Scotland*], the shipping both in the [sea] road and harbour broke from their moorings, and ran foul of one another, by which they lost their heads, boltsprits and masts. At Greenock, 500 trees are blown up by the roots, and two women who



went out to look after their friends on ship board, were blown into the water and perished. At Dumfries [Scotland], both the churches and many houses have suffered, and some thousand pounds worth of timber has been destroyed. In the midst of the storm, a vessel drove away with only the master and one boy on board, but happily put on shore at the English side without damage, but several other vessels were lost with all their hands. At Senwick [Fenwick], near Kircudbright [Kirkcudbright, Scotland], the storm was felt with great violence, and besides the common effects it divided two very large hay-stacks in the middle, and carried the upper part to a very considerable distance, several corn stacks were intirely [entirely] carried away, and all the thatched houses uncovered. At Belfast, in Ireland, several vessels were driven on the Giant's causway [causeway], several houses blown down, and many persons killed. The storm was also very violent all along the coast of Holland [now *the Netherlands*]. In the district of Warmund [Warmond, *the Netherlands*] and Leidendorp [Leiderdorp, *the Netherlands*], a whirlwind took up several stacks of hay, the remains of which were no where to be found; ten cows that were grazing in the same meadow were blown into the water, and several carts and waggons [wagons] that were going along the road were blown down and rolled over and over with their drivers and horses into the water, which was taken up in great sheets and scattered over the land to a considerable distance. Above sixty ships on the coast were stranded and lost. On the day after this hurricane, it was observed that the tide at Long Drax [Drax, North Yorkshire, England] did not flow above 5 or 6 inches [13-15 centimeters], tho' it flowed above 6 or 7 feet [1.8-2.1 meters] perpendicular the night before; there have been former instances of the tide being stopped by the wind, but none equal to this."<sup>302</sup>

On 20 October 1756, black dust fell all over the country in the island of Zetland [Shetland, Scotland]. It had the appearance of lamp-black, but smelled strongly of sulfur. People in the fields had their faces, hands, and linen, blackened by it. It was followed by rain.<sup>237</sup>

In 1756 during the period 2-30 January, floods struck Hupeh (now Hubei province) in central *China* at Ch'ien-chiang and Kuang-hua; Anhwei (now Anhui province) in eastern *China* at Shou and Fêng-yang; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Ch'ao-an. At Ch'ien-chiang, the dikes were damaged. During the period between 5 February and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua. During the period between 29 May and 26 June, a drought engulfed Chekiang province at T'ung-hsiang and Hupeh (now Hubei province) in central *China* at T'ien-mên.<sup>153</sup>

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**Winter of 1756 / 1757 A.D.** The winter of 1756-57 started early and ended late with a few interruptions due to milder weather. The frost in Denainvilliers, *France* lasted from November to March, producing 64 days of frost. The lowest temperature observed in Paris, *France* was 9.5° F (-12.5° C) on 8 January. The Seine River was frozen over from 9 until 20 January 1757.<sup>62</sup>

On the first of January 1757, drifting ice began to appear on the Seine River in *France*. On the 6<sup>th</sup> of January, the river was completely frozen. On the morning of the 9<sup>th</sup>, individuals traveled on the ice between Pont Neuf and Pont Royal in Paris, along with many other locations. On the 20<sup>th</sup> the ice conditions ended.<sup>62</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1756 on November 30<sup>th</sup> – it snowed very fast. December 7<sup>th</sup> – severe cold. December 10<sup>th</sup> – a thaw. December 23<sup>rd</sup> – a severe snowstorm. December 29<sup>th</sup> – fine warm weather for three days past. In 1757 on January 4<sup>th</sup> – cold. A fall of snow three-inches (8 centimeters). January 14<sup>th</sup> – it can't be better sledding. January 18<sup>th</sup> – the harbor frozen over. January 31<sup>st</sup> – it rained all last night. February 6<sup>th</sup> – deep snow. (The snow was so deep in drifts that there was no possibility of getting to the meetinghouse.) The rest of the month partly cold and blustering, partly rainy, and partly pleasant. March – begins pleasant but windy. March 5<sup>th</sup> – the snow is five-feet (1.5 meters) deep in the woods. March 22<sup>nd</sup> – a severe snowstorm. March 26<sup>th</sup> – more snow. March 29<sup>th</sup> – pleasant and warm. April 3<sup>rd</sup> – more snow.<sup>78</sup>



In Philadelphia, Pennsylvania in the *United States* the winter of 1756 was very mild; the first snowstorm occurred on 18 March.<sup>1</sup>

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**1757 A.D.** In February 1757, it was reported, “a sudden change of weather has spread unspeakable distress over many of the most fertile provinces of *France*. The fatal effects of the melting of the snow had been apprehended long before the thaw happened, yet the calamities that have followed have exceeded all that were foreseen. The province of Artois [in northern *France*] in particular has suffered severely. The rivers everywhere swelled with such incredible rapidity, that men, women, and children were carried away by the violence of the torrent. All the valleys were immediately overflowed. Causeways, houses, churches, bridges, mills, all were born down and mingled in one promiscuous ruin. Nothing was able to resist the fury of the water. In the country, vast numbers of cattle of all kinds have perished, and the corn [grain] fields have been torn up and ruin’d in a most astonishing manner. In short, there is no expressing the miserable condition of this most fertile province.”<sup>303</sup>

On Sunday, 6 February 1757, “The river Clyde swelled to such an amazing height by the melting of the snow on the mountains, that the lower part of the city of Glasgow [*Scotland*] was overflow’d to the height of 5 feet [1.5 meters].”<sup>303</sup>

On 11 February 1757 about 10 o’clock at night, “the stream of the Elve [Elbe River], that rises in the mountains of Bohemia [now western *Czech Republic*], came down with such rapidity, that it broke up the ice, and threw very large pieces of it upon the land at a surprizing [surprising] distance. The noise it made was unspeakable. Next morning the ice meeting with some obstruction between Dresden and Miessen [in eastern *Germany*], the current rose so high, that it came up to the iron rails of the bridge. This lasted about an hour, when it began to separate and go off with the stream. His Prussian majesty, and the princes his brothers, went into the garden of the palace, in order to look at so strange and extraordinary a sight.”<sup>303</sup>

On Sunday, 3 March 1757 it was reported, “The squadron at Port l’Orient and Brest put to sea with a fair wind. It has since been reported that the Brest [in northwest *France*] squadron was presently dispersed, and almost wholly dismantled by a violent storm, and obligated to return to port to refit.” On the 9<sup>th</sup>, the Brest squadron consisting of 16 ships of the line, with 12 frigates, fireships and transports were ready to return to sea.<sup>303</sup>

On Tuesday, 6 March 1757 arose the greatest storm of wind on the western coast of this island [*England*] that was ever known.<sup>303</sup>

— At Liverpool it began about 9 [o’clock], preceded by a dreadful roaring of the sea. At 10 it blew a hurricane, and about 11 veered to the W.N.W. [west northwest] and was attended with such heavy squalls of wind, that the oldest person here don’t remember the like. The sloop *Duke*, [Captain] Thomas Deaz, for Drogheda; a river sloop [Captain] Tarlton, for Preston; and brigantine *Quester*, [Captain] Potter, for Africa, sunk. Brigantine *Drogheda Merchant*, [Captain] James Heys, for Drogheda; and the brigantine *Manchester*, [Captain] Randle McDonald, for Londonderry, overset, sunk, and were stranded all of them opposite to the town.

— The snow *Monmouth*, [Captain] Twentyman; ship *Johnson*, [Captain] Gawith; and snow *Swale*, [Captain] Pollard, for Virginia; ship *Trafford*, [Captain] Clarke, for Philadelphia; snow *Hopewell*, [Captain] Langford, for Barbadoes [Barbados]; snow *Mears*, [Captain] Barrel, for Africa; and a sloop, [Captain] Williams, from Holyhead, all riding at anchor at the Black Rock, parted their cables, and were put ashore in Bottle Bay. The *Marlborough*, [Captain] Ward, for Virginia; *Rainbow*, [Captain] Harrison, for Africa; and *St Andrew*, [Captain] Burton, for New York, were the only vessels that rode it out there. The ship *Great Britain*, [Captain] Hicks, from Riga, and the brig *John*, [Captain] Clifton, for Yarmouth, were put on shore near Knott’s Hole. The *Liverpool Exchange*, [Captain] Urmson; the *Smithson*,

[Captain] Salisbury, from London; and *Barnevest*, [Captain] Howard, for London, were forced on shore near Highlake; a Dutch vessel, name unknown and all her crew perished. A pilot-boat, William Cerlett, late owner and master, met with the same fate. *Duke of Argyl*, [Captain] Hardy, for Virginia; *Carolina*, [Captain] Erskine, for Barbadoes, with many others, parted their cables. Ship *Alice*, [Captain] Brigs, from London, cut away her masts, and the *Ince* boat, with several others were bulged and stranded.

— The damage in the town was very considerable, numbers of chimneys, some houses, and many walls, were levell'd [leveled] with the earth. Roofs unstripped, and showers of broken [roof] slates, bricks, &c. rendered the streets impassable. About 42 feet [12.8 meters] of the lofty spire of St Thomas's church, (which was esteemed one of the most beautiful in Europe) fell upon the body of the church, broke through the roof, and has tore down the west galleries.

— In the different parts of the adjacent country, barns, houses, and other buildings were stripped, and many levelled with the ground. Considerable damage is done at Knowsley-hall, the seat of the Earl of Derby. Croshie, Sephton, Woolfall, Spellow, and several other mills are blown down, ricks of hay entirely destroyed and carried away. Happily for the sea coast the tides were at the lowest, or in all probability there would have been considerably more damage done; for though it was ebb tide in course, yet the flood returned, or rather did not go out of the river. The gale abated and backed to N.N.W. [north northwest] and N. about one o'clock in the afternoon.

— At Chester above 100 chimnies [chimneys] were blown down, most of the houses stripped of their slating [slate roofs]; the chimnies at the minster, and all the windows on one side are blown to pieces; and all along the adjacent road the houses and barns were stripped, and hundreds of large trees torn up by the roots. At a little town called Acton, within a mile of Nantwich [in Cheshire, *England*], the top of the church steeple beat in the roof of the church, and damag'd it to the amount of 2000*l*. [In present currency, that would be equivalent to £227,000 in damages based on the retail inflation price index.] At Nantwich the church is much shattered, and the houses mostly stripped.

— At Worcester the wind blew down a stack of chimnies at the Town-hall, which beat thro' [through] the roof, and thence through the ceiling over the nisi prius bar [all legal actions tried before judges of the King's Bench Division], while the court of assize [criminal court] was sitting. Mr. Justice Wilmot was on that bench, but his lordship happily received no hurt, and there happened to be only five of the counselors present, four of whom were hurt, but not dangerously, *viz.* Mr. Moreton, Mr. Aston, Mr. Nares, and Mr. Ashurst; Mr. Aston prevented further damage to himself by instantly slipping under the council table; but Mr. Moreton was presently jammed in by the rubbish, and remained so some time. The six following persons lost their lives on this occasion, *viz.* Mr. Lawes, the cryer of the court; Mr. Chambers, an attorney of Kidderminster; Mr. Freme, an ironmonger; Hr. Hurtle, of Hartlebury; and Mr. Shaw, of Ombersley; all of whom were taken out dead from amongst the rubbish, and most dismal spectacles they were, as was likewise Mr. Wainwright of Bromsgrove, who did not die till some time after he was carried out of the hall. Divers [diverse] other people were greatly hurt. It is not to be conceived what confusion the court was presently in, or what mischief ensued from the people's hurrying out of the hall, and in going down the hall steps, whereby several were thrown down and trampled upon a considerable time; nor is it easily to be described the anxiety of such people who happened to be at home, while some of the family were out and supposed to be gone to the hall. Mr. Baron Adams, who sat at the crown-bar, at the other end of the hall, had adjourned the court, and was gone to his lodgings but a few minutes before this melancholy accident happened, which put an entire stop to the business of the assizes.

In March 1757, due to the defect of last year's crop in *England* and *Ireland*, bread had become so excessively scarce, that the nation was in dread of a famine.<sup>304</sup>

On Friday, 1 April 1757, "A most violent hurricane arose in *France*, which threw down chimneys at Paris, tore up trees by the roots in the adjacent country, and at Havre de Grace [Le Havre] the play-house was blown down while the opera of Sampson was performing, and above 100 persons perished in the ruins, &c. The candles setting fire to the timber, the whole was reduced to ashes."<sup>303</sup>

The summer of 1757 was unusual in Paris, *France* because of a series of intensely hot days. The following temperatures were observed in Paris: on 10 July (95.0° F, 35.0° C); on 11 July (95.5° F, 35.3° C); on 12 July (95.5° F, 35.3° C); on 13 July (95.5° F, 35.3° C); and on 14 July (99.9° F, 37.7° C). On 20 July at the Observatory of the College of France, the following temperature was observed: 101.8° F (38.8° C).<sup>62</sup>

The summer of 1757 in Denainvilliers, *France* was characterized by:

Hot days	29 days
Very hot days	13 days
Extremely hot day	4 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The following temperatures were observed in Denainvilliers: on 11 July (97.3° F, 36.3° C); on 12 July (93.9° F, 34.4° C); on 13 July (97.3° F, 36.3° C); on 14 July (95.0° F, 35.0° C); on 17 July (88.3° F, 31.3° C); and on 20 July (95.5° F, 35.3° C).<sup>62</sup>

The maximum summer temperatures this year were:<sup>62</sup>

Paris, <i>France</i>	( 99.9° F, 37.7° C) on 14 July
Denainvilliers, <i>France</i>	( 97.3° F, 36.3° C) on 11 & 13 July
Mulhouse, <i>France</i>	( 92.8° F, 33.8° C) on 14 July

Similar high temperatures were observed in *Germany* in July but that means temperature in July in Berlin rose to 75.7° F (24.3° C). The drought in northern *France* was very strong. The Seine River was down to 0.13 meters (5.1 inches) deep. In Burgundy, the grape harvest began on 26 September. The grape harvest was of common quality and pretty good quantity.<sup>62</sup>

In the area around Orleans, *France*, the heat began in late June and lasted through July and into August. The air was refreshed by frequent rains. Wheat and rye produced a good harvest; but barley and oats were less productive. The wine produced only one third of a normal harvest, and the quality was very mediocre. Fruits were available in abundance.<sup>62</sup>

In July 1757 at Plymouth, [*England*], the weather was extremely hot. “From the beginning of June last we have had a very dry season, generally very warm, and sometimes excessively hot. From the 7<sup>th</sup> to the 14<sup>th</sup> of this month [July] the heat was violent; greater indeed than has been known here in the memory of man. I have talked with several persons, who have lived a considerable time in Jamaica, Gibraltar, and Minorca; and they severally [individually] assert, that they never felt such intense heat in any of these places. On the 11<sup>th</sup>, 12<sup>th</sup>, and 13<sup>th</sup> of this month, Fahrenheit’s thermometer, in the shade, about 3 o’clock in the afternoon, was at 87[° F, 30.6° C]; nay, on the 12<sup>th</sup> it was even above 88[° F, 31.1° C]. Abundance of people have suffered very severely from these excessive heats: putrid, bilious, petechial [rash], nervous fevers, are exceedingly common everywhere. Dysenteries, haemorrhages [hemorrhages], most profuse sweats, affect not only those in fevers, but a vast many others. The days and nights were so intolerably hot, that little or no sleep was to be gotten. The wind we had, like, the Campsin, actually blew hot, though strong.” At Edystone, which is 16 miles from Plymouth, the temperature during this time period was mild. London also experienced hot temperatures during this period. The highest was on 14 July when the temperature reached 85° F [29.4° C]. But another heat wave struck London between 8-10 August when the temperature reached 85° F [29.4° C]. On the 9<sup>th</sup>, it was near 86° F [30° C].<sup>237</sup>

On Wednesday, 13 July 1757, a violent rainstorm struck London, *England*. It so suddenly filled the shores, that five men employed in cleaning the main shore at Fleet-Ditch, were forced down by the rush of the water, one of who perished, notwithstanding the utmost efforts were made to save him.<sup>303</sup>

On Monday, 15 August 1757, “Great part of Lady Peters’s house near Brentwood, in Essex [*England*] was burnt down by lightning. This tempest was so terrible at Lewis [Lewes] in Sussex, that a whole farm belonging to Mr. Venn, in that neighbourhood, was in a manner destroyed by it.” “A ball of fire [lightning] was seen between five and six in the evening to fall on a house near Woodbury Hill, Dorsetshire, which broke thro’ the roof and the chamber floor, and burst by the woman of the house on the bricks of the under floor. It appeared to her as if the room was in a flame, which soon set fire to the inside of the house, & in less than 2 hours consum’d [consumed] it.”<sup>303</sup>

Hurricane at *Malta* on October 29, 1757.<sup>43</sup>

On Thursday, 3 November 1757, “about 3 in the afternoon, a storm of thunder and lightning arose in Dublin [*Ireland*], that astonished the inhabitants; one of the pinnacles on the north square of Christ-Church steeple was thrown down by it, and the great ball and iron work about the weathercock, lately gilded were turned quite black by the force of the lightning. This storm was attended by a great fall of hail-stones of a very large circumference.”<sup>303</sup>

In 1757 during the period between 20 January and 17 February, floods struck Anhwei (now Anhui province) in eastern *China* at Wu-ho; and Shantung (now Shandong province) on the east coast of *China* at Tê, Chin-hsiang, Yü-t’ai, Shou-chang and Liao-ch’êng. During the period between 5 February and 6 May, a severe drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lung-ch’uan. During the period between 5 February and 8 November, a drought engulfed Kwangtung province at Hui-lai. During the period between 6 May and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at T’ung-hsiang and Ch’ung-tê; and Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts’ang-wu.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: April 12<sup>th</sup> – rain. April 15<sup>th</sup> – more rain. April 25<sup>th</sup> – rainy. May 10<sup>th</sup> and 11<sup>th</sup> – the spring is very backward. April 25<sup>th</sup> – raw, cold. June 1<sup>st</sup> – a very dry time producing a severe drought. June 19<sup>th</sup> – though there were two or three small showers, the drought awfully increases. June 28<sup>th</sup> – it rained most of last night and this morning. The grain and grass are much cut short [limited growth]. August 16<sup>th</sup> – we have refreshing rains, and it is now a growing season. August 30<sup>th</sup> – it was constantly hot, and became dry again. September 17<sup>th</sup> – a refreshing rain. October – much fine weather this month. October 31<sup>st</sup> – cloudy and cold.<sup>78</sup>

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**Winter of 1757 / 1758 A.D.** During the winter of 1757-58, fairly abundant snow fell, which drove the development of ice floes on the Seine River from 21 to 26 January. In *Italy* and in *Spain*, there was severe cold. The following were the minimum temperatures observed during the winter:<sup>62</sup>

Leipzig, <i>Germany</i>	(-4.0° F, -20.0° C)
Hague, <i>the Netherlands</i>	( 3.2° F, -16.0° C)
Paris, <i>France</i>	( 7.3° F, -13.7° C) on 22 January

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: November and December 1757 – common winter months. In 1758 on January 29<sup>th</sup> – the snow is 3½ feet (1.1 meters) upon a level. February – some pleasant weather, but in general a cold month. March – alternately cold and pleasant. March 26<sup>th</sup> – horses and sleighs go everywhere over the snow, which is as high as the fences. April – a cold month. April 30<sup>th</sup> – a very cold spring thus far. May – generally raw and cold.<sup>78</sup>

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**1758 A.D.** In July 1758, over 5 inches [13 centimeters] of rain fell in London, *England*, a quantity surpassing any in the same month perhaps in the memory of man. The mean annual depth of rainfall in *England* is 23.5 inches [60 centimeters], of which the largest proportion usually falls in the winter months.<sup>304</sup>

On 4 July 1758, Williamsburg, Virginia in what would become the *United States* reported, “Last Sunday, about four in the afternoon, we had a gust of wind [tornado?], which tore up large trees by the root, and blew down several old houses, chimnies [chimneys], &c. It was accompanied with the most violent shower of hail ever known here, which destroyed everything in its way; not a house in the town whose windows are not broke to pieces, our gardens entirely leveled, our fruit-trees, Indian corn, tobacco and indigo, totally ruined wherever it reached; several of the hailstones were as large as hens eggs. Its direction was from N.W. to S.E. but we do not find it extended itself fat.”<sup>304</sup>

On 9 July 1758 about 4 o'clock in the afternoon, a hailstorm struck Williamsburg [Williamsburg, Virginia in what would become the *United States*] to the southeast after some thunder and lightning passed over. The hailstones were of an oblong square form, an inch and a half long, and the sides were three quarters of an inch wide. From one of the sides there proceeded sharp spikes that protruded at least a half an inch. The governor cooled his wine and froze cream with some of them the next day. And they were not quite dissolved when he went to bed the next night. They broke every pane of glass on the north side of his house, and destroyed all his garden entirely.<sup>305</sup>

On 9 July 1758 in the Colony of Virginia [now the *United States*] there was a hailstorm, which arose about 4 P.M., proceeded from a cloud not more than a mile in length, which (after a storm of thunder and lightning) passed over the town of Williamsburg to the southeast. The hailstones were of an oblong square form, 1½ inches long, and the sides were ¾ inches wide, so that each would have made two cubes ¾ inch square; from one of the sides sharp spikes protruded at least half an inch. The Governor cooled his wine, and froze cream with some of them the next day, and they were not quite dissolved when he went to bed the next night.<sup>93</sup>

On July 17, a storm damaged Williamsburg, Virginia in the *United States*.<sup>41</sup>

In 1758 in Savannah, Georgia in the *United States*, the Governor of Georgia writes: “One cannot here sit down to any thing that requires much application but with extreme reluctance; for such is the debilitating quality of our violent heats at this season (July), that an inexpressible languor enervates every faculty, and renders even the thought of exercising them painful. It is now about 3 o'clock; the sun bears nearly S.W., and I am writing in a piazza, open at each end, on the N.E. side of my house, perfectly in the shade: a small breeze at S.E. blows freely through it; no buildings are nearer to reflect the heat than 60 yards: yet in a thermometer hanging by me, made by Mr. Bird, and compared by the late Mr. George Graham with an approved one of his own, the mercury stands at 102° F [38.9° C]. Twice it has risen this summer to the same height; viz. on the 28<sup>th</sup> of June, and the 11<sup>th</sup> of July. Several times it has been at 100° F [37.8° C], and for many days successively at 98° F [36.7° C]; and did not in the nights sink below 89° F [31.7° C]. It is highly probable that the inhabitants of this town breathe a hotter air than any other people on the face of the earth. The greatest heat we had last year was 92° F [33.3° C], and that but once. . . In my cellar the thermometer stands at 81° F [27.2° C], in the next story at 102° F [38.9° C], and in the upper one at 105° F [40.6° C]. . . Yet but few people die here out of the ordinary course; though indeed one can scarcely call it living, merely to breathe, and trail about a vigorless body, yet such is generally our condition from the middle of June to the middle of September.”<sup>237</sup>

On 17 July 1758, the Governor of Georgia, Henry Ellis Esq., gave the following account of the hot weather he encountered in Savannah, Georgia in what would become the *United States*.<sup>305</sup>

— It is now about three o'clock; the sun bears nearly southwest and I am writing in a piazza, open at each end, on the northeast side of my house, perfectly in the shade. A small breeze at southeast blows freely through it. No buildings are nearer, to reflect the heat, than 60 yards [55 meters]; yet Fahrenheit's thermometer stands at 102° F [38.9° C]. Twice it has risen this summer to the same height; viz on the 28<sup>th</sup> of June, and the 11<sup>th</sup> of July. Several times it has been at 100° F [37.8° C], and for many days successively at 98° F [36.7° C]; and did not in the nights sink below 89° F [31.7° C]. I think it highly



probable, that the inhabitants of this town breathe a hotter air than any other people on the face of the earth. The greatest heat we had last year was but 92° F [33.3° C], and that but once; from 84° to 90° F [28.9° to 32.2° C] were the usual variations; but this is reckoned an extraordinary hot summer. The weather-wise of this country say it forebodes a hurricane; for it has always been remarked, that these tempests have been preceded by continual and uncommon heats [hot weather]. I must acquaint you, however, that the heats we are subject to here are more intense than in any other parts of the province. The town of Savannah being situated upon a sandy eminence, and sheltered all round with high woods. But it is very sufficient, that the people breath so hot an air as I describe, and no less remarkable, that this very spot, from its height and dryness, is reckoned equally healthy with any other in the province.

— I have frequently walked a hundred yards under an umbrella, with a thermometer suspended from it by a thread to the height of my nostrils, when the mercury has risen to 105° F [40.6° C]; which is prodigious. At the same time I have confined this instrument close to the hottest part of my body, and have been astonished to observe, that it has subsided several degrees. Indeed, I never could raise the mercury above 97° F [36.1° C] with the heat of my body.

— This same thermometer I have had thrice in the equatorial parts of Africa, as often at Jamaica, and the West India Islands [West Indies]; and, by my journals, I do not find, that the quicksilver ever rose in those parts above the 87<sup>th</sup> degree [30.6° C], and to that but seldom. Its general station was between 79° and 86° F [26.1° and 30° C]; and yet I think I have felt those degrees, with a moist air, more disagreeable than what I now feel.

— In my cellar the thermometer stands at 81° F [27.2° C], in the next story at 102° F [38.9° C], and in the upper one at 105° F [40.6° C]. And yet these heats, violent as they are, would be tolerable, but for the sudden changes that succeed them. On the 10<sup>th</sup> of December last [1757], the mercury was at 86° F [30° C]. Then on the 11<sup>th</sup> it was so low as 38° F [3.3° C] of the same instrument. What havoc must this make with a European constitution? Nevertheless, but few people die here out of the ordinary course.

On 7 August 1758, Boston, Massachusetts in what would become the *United States* reported, “Last Monday about noon, a violent hurricane, or whirl-wind [tornado] passed thro’ [through] part of Chelsea (or Ramney-Marsh) which arose and came off the water from the S.W. bending its course about N.E. supposed to extend in width but about four or five rod [66-83 feet, 20-25 meters], and seemed to carry all before it, tearing up by the roots a great number of stately oaks, and elms above 60 feet [18 meters] in height, as also a great many apple-trees in several orchards; particularly in one orchard only, 63 fine trees were torn up leaving the ground about the roots open 20 or 30 feet [6-9 meters] over. With great fury it came against some of their stone-fences and threw them down, in some places hardly leaving one stone upon another. A cart standing in the midst of a barn loaded with hay was forced a considerable way out; and some of the posts or rafters of the barn broke off. In one place, the gust seem to rise so that the limbs and branches of lofty trees were broke off as if cut with an axe. It passed by one corner of a dwelling house, and shook it so violently, that the people expecting it would be turned over, ran out to save their lives. So violent a hurricane was scarcely ever known in these parts.”<sup>304</sup>

During August [1758] in Virginia in the *United States*, the heat was greater than usual during the summer. On 9 August, the temperature reached 97° F [36.1° C] and on other days it was 94° and 95° F [34.4° and 35° C].<sup>237</sup>

On August 23, a violent storm struck the island of Barbados, in the Lesser Antilles in the *West Indies*.<sup>40, 41, 56</sup>

On Sunday, 8 October 1758, “It blew a perfect hurricane in the channel [*English Channel*], by which several of our [British] ships of war and merchantmen suffered much. The *Edystone* storeship, in particular, was driven from her moorings near the rock when the light-house was within three working days of being habitable.”<sup>304</sup>



On Tuesday, 31 October 1758, it was remarked that “In a garden at the Abbey-Hill, near Edenbourg [Abbeyhill near Edinburgh, *Scotland*], there is at this time an apple-tree with the second crop of fruit quite formed, and also several roses in full bloom; an uncommon instance of the mildness of the season in that northern climate.”<sup>304</sup>

In 1758, a hurricane struck St. Marks, Florida in the *United States* causing 40 deaths.<sup>141</sup>

Before 10 November 1758, a hurricane struck St. Kitts in the *West Indies* causing 200 deaths.<sup>141</sup>

In southern *France* during the year 1758, it was wet, cold and variable.<sup>79</sup>

During the whole summer of 1758, heavy rains fell in *Switzerland*.<sup>193</sup>

In 1758, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Ch’ing-p’u; Shantung (now Shandong province) on the east coast of *China* at Chin-hsiang, Yü-t’ai and Chi-ning; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at P’u-ning. During the period between 8 April and 6 May, a drought engulfed Shantung province at Tung-p’ing. During the period between 5 July and 3 August, a drought engulfed Kansu (now Gansu province) in northwest *China* at Ch’ing-yang.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 31<sup>st</sup> - people everywhere planting. June – some pleasant days, but mostly raw and cold. July – little or really no hot weather this month. Very wet. August 19<sup>th</sup> – fine weather, but not hot. August 31<sup>st</sup> – very cold all this week. September 28<sup>th</sup> – the greater part of the Indian corn in this town is spoiled, it was planted so late; it has been such a wet summer. October – mostly cold and unpleasant. November – some pleasant, but mostly cold weather.<sup>78</sup>

**Winter of 1758 / 1759 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1758 on December 25<sup>th</sup> – the harbor froze over to the Islands. In 1759 on January 20<sup>th</sup> – incomparable sleighing. January 31<sup>st</sup> – a severe cold winter thus far. February – some comfortable pleasant weather this month. March – same; but there were snowstorms the 22<sup>nd</sup> and 26<sup>th</sup>.<sup>78</sup>

In February 1759, it was reported, “The city of Petersbourg [St. Petersburg, *Russia*], has suffered prodigiously from the mildness of the winter; the sledges [sleighs] that usually supplied the inhabitants with all the necessaries [necessities] of life from immense distances, have been rendered useless for want of frost and snow to level the roads; provisions have therefore risen to the most extravagant prices, and the poor citizens have felt all the calamities of a famine, notwithstanding the abundance with which the people of the country are everywhere supplied.”<sup>305</sup>

**1759 A.D.** On Saturday, 10 March 1759, “A violent storm did incredible damage to the shipping, as well as to the houses and churches all along the western coast, more particularly at Falmouth [in Cornwall, *England*], where many vessels drove from their anchors, and suffered considerably. Some lost their masts, others went upon the sand, and one or two filled with water. In this storm 19 persons in a passageboat from Pool [Poole] to Wareham, were forced upon the beach, 13 of whom perished in endeavouring to recover the shore. Nothing could be more dismal than to see the poor souls half-buried in the mud, with the sea beating over them, without being able to afford them any relief, and their piercing cries were terrible.”<sup>305</sup>

On Wednesday, 11 April 1759, “The steeple of Great Billing church in Northamptonshire [in East Midlands region of *England*] was demolished by lightning, and some stones of a very large size driven to a great distance with astonishing force. The pews in the church were likewise very much shivered. The

minister by a special providence, found himself impelled to quicken the reading of the service on that day, by which the lives of many of the parishioners were preserved.”<sup>305</sup>

On Monday, 7 May 1759, lightning struck the steeple of Reverend Haven’s meetinghouse at Portsmouth in New Hampshire in what would become the *United States*. The lightning strike caused extensive damage to the meetinghouse and also killed 3 cows and a hog in a stable 60 feet [18 meters] from the steeple. The meetinghouse is situated on a small elevation and this is the 2<sup>nd</sup> or 3<sup>rd</sup> time it was struck by lightning.<sup>305</sup>

The summer of 1759 in Denainvilliers, *France* was characterized by:

Hot days	36 days
Very hot days	15 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The heat was intense in July. The maximum temperatures observed during the summer were:<sup>62</sup>

Denainvilliers, <i>France</i>	( 92.8° F, 33.8° C) on 9 and 24 July
Neuenbürg, <i>Germany</i>	( 92.1° F, 33.4° C)
Neuchâtel, <i>Switzerland</i>	( 92.1° F, 33.4° C)
Mulhouse, <i>France</i>	( 90.3° F, 32.4° C) on 25 July

On Sunday, 1 July 1759, “A violent tempest happened in *Denmark*, the effects of which were felt even in the bowels of the earth. The combustible matters in the territory of Ladegard took fire; a high wind drove the flames and smoke into the town of Ripen, which would have been intirely [entirely] destroyed, had not the wind suddenly shifted.”<sup>305</sup>

On Monday, 9 July 1759, a dreadful storm of thunder and lightning broke forth in the neighborhood of Kirk?dy [Kirkcaldy, *Scotland*], which lasted without intermission, from [five?] in the morning till five in the afternoon; during which space, two women who attended a bleaching ground [a stretch of grass where off-white linen was set on the ground to bleach in the sun], were struck dead by the lightning. One of them was sitting on a [tilted] ground, with a child sucking at her breast, by her fall the little infant was tumbled down the hill, but received no manner of hurt.<sup>305</sup>

On Sunday, 15 July 1759, “A most dreadful storm of thunder and lightning began in the evening in the neighbourhood of Bristol [in southwest *England*], by which a man was struck blind in Hallier’s lane. The lightning was the most terrifying, and the claps that succeeded the loudest that has been heard in those parts many years.” The next day on the 16<sup>th</sup>, “The chimnies [chimneys] of the house of Mr. Whitfield, lord of the manor of Rickmansworth [in southwest *England*], were beaten down by the thunder and lightning, and the windows on one side broken. As a lady was combing her hair at the window, the comb in her hand was shivered to pieces, and the bed in her room split and rent in a surprising manner, yet she did not receive the least hurt. Some of the bricks of the chimnies were carried 100 yards [91 meters] from the house.”<sup>305</sup>

In Burgundy, *France*, the grape harvest began on 24 September. The harvest amounted to almost nothing because of the hailstorm that struck on 1 & 21 June. The hail was about 6 decimeters (23.6 inches) deep in Dijon after the hailstorm.<sup>62</sup>

In the area around Orleans, *France*, the wheat harvest was abundant and the grains were of a very good quality. The wine harvest was of an average annual yield, and the fruit harvest was good. The summer was very hot in the Languedoc. Very little wheat, corn, wine, vegetables and fruit were harvested.<sup>62</sup>

In 1759, a tornado struck Leicester, Massachusetts in what was to become the *United States*.<sup>199</sup>

In September 1759, a great hurricane struck the Florida Keys in the United States. "In the month of September, of the year 1759, a heavy gale of wind from the N.E. so greatly impeded the current of the Gulf stream, that the water, forced at the same time into the Gulf of Mexico by the trade-winds, rose to such a height, that not only the Tortugas [cluster of seven islands making up the Dry Tortugas] and other islands disappeared, but the highest trees were covered on the peninsula of Larga [Key Largo]; and at this time (William Gerard de Brahm, Esq. surveyor-general of the southern district of North America, states), the *Litbury* snow, John Lorrain, master, being caught in the gale, came to an anchor, as the master supposed, in Hawke Channel [in the Florida Keys]; but, to his great surprise, found his vessel, the next day, high and dry on Elliot's Island [Elliot Key], and his anchor suspended in the boughs of a tree." <sup>143</sup> [A snow is a sailing ship that is generally used as a merchant ship but were also capable of being used as warships.]

On 9 November 1759, Halifax in Nova Scotia, *Canada* reported, "Last Saturday night and Sunday morning we had here the most violent gale of wind that has been known. It has done vast damage to the wharfs in this town and suburbs. Great quantities of salt and sugars which were in the cellars near the beach, are almost wholly ruined and two schooners were driven ashore, some thousands of trees in the woods were blown down, and in some places the roads rendered impassable. The damage sustain'd at the wharfs &c. is computed at several thousand pounds. As the storm happened at the height of the spring tide, and the wind in the southern board, it drove the tide in to that degree, that 'tis suppos'd the water rose near six feet [1.8 meters] perpendicular above its ordinary flowing." <sup>306</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 4<sup>th</sup> – the robin visited us today. The spring birds have been here singing several days. The month has been generally fair and pleasant, but cold and dry. May 11<sup>th</sup> – a warm day; the first this spring. May 16<sup>th</sup> – the cherry trees are blooming. May 19<sup>th</sup> – the grass is forward. May 24<sup>th</sup> – a delightful warm day. May 31<sup>st</sup> – cold weather. There has been but one warm, and one hot day, all this spring. June 5<sup>th</sup> – charming hot. June 7<sup>th</sup> – May storm. June 14<sup>th</sup> – raw, cool. June 25<sup>th</sup> – a happy growing season. July 2<sup>nd</sup> – a frost. July 18<sup>th</sup> – a deluge of rain. Cherries begin to be ripe. July 31<sup>st</sup> – it was so wet a season we are in no haste to cut our grass. August – a fruitful summer, especially in pasturing and hay. September 1<sup>st</sup> – abundance of pigeons. September 18<sup>th</sup> – gale of wind that blew down the apples, etc. September 26<sup>th</sup> – wonder of a hot day. September 30<sup>th</sup> – no frost yet. October 18<sup>th</sup> – no frost yet. October 22<sup>nd</sup> – charming day. October 30<sup>th</sup> – cold weather. November – generally moderate this month. December – snows and cold weather, but not more than common for the season. <sup>78</sup>

In 1759, there was a famine in Bombay in *India* and Scinde (now Sindh, *Pakistan*). <sup>156</sup>

In 1759, droughts engulfed several regions of *China* including: <sup>153</sup>

— During the period between 5 February and 8 August, a severe drought engulfed Shansi (now Shanxi province) in northern *China* at P'ing-ting, Hsi-yang and Yü.

— During the period between 25 June and 23 July, a drought engulfed Shansi province at Taiyuan; Hupeh (now Hubei province) in central *China* at Chih-chiang; and Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-yu.

— During the period between 25 June and 23 July, a drought engulfed Shansi province at Tai, I-ch'êng, Chung-yang, An-i, Chiang, Yüan-ch'ü, Ch'ang-ch'ih, Ho-ching, Ying, Tatung, Huai-jên, Shan-yin and Ling-ch'iu; Kansu (now Gansu province) in northwest *China* at Ning [uncertain name]; Suiyuan province (now part of *Inner Mongolia*) at Fêng-chên; Shensi (now Shaanxi province) in central *China* at Kan-ch'üan; and Hopei (now Hebei province) in northern *China* at Hsin-yüeh.

In 1759 during the period between 21 September and 20 October, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at T'ai; Shantung (now Shandong province) on the east coast of *China* at Lin-ch'ing; and Anhwei (now Anhui province) in eastern *China* at T'ai-hu and Ch'ien-shan. A typhoon hit T'ai and resulted in crop damage. <sup>153</sup>

In 1759 during the summer, there was a flood in the vicinity of Shanghai, *China*.<sup>166</sup>

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**Winter of 1760 / 1761 A.D.** On 14 December 1759, there was a great frost at Petersburg [Saint Petersburg, *Russia*]. De Lisle's thermometer stood at 205 [-34° F, -36.7° C].<sup>237</sup>

At Bareith [Bayreuth, *Germany*?] in the night between 16 and 17 December 1759, the cold was insupportable. Reaumer's thermometer was at [-]15 [-15° Re, -1.8° F, -18.8° C], which is precisely the same degree it was at in 1709. Many birds dropped down dead as they were flying in the air. At Leipsic [Leipzig, *Germany*] it was still more severe, insomuch that [10?] sentinels were frozen to death. The severity of the cold is equally felt at Dresden [*Germany*] for want of firing. The Austrian troops have cut down all the fine trees, without exception, that adorned the garden of Zinzendorff [Zinzendorf] without the Pirna gate of Dresden.<sup>306</sup>

On 27 January 1760, between 3 and 4 in the afternoon, one of the dikes of the Rhine River about a league [3 miles, 4.8 kilometers] distant from Cleves [Kleve, *Germany*], was broken down by the ice, and in less than a quarter of an hour all the neighboring countryside to the west of that city was overflowed, quite from Calcar [Kalkar, *Germany*] to Nimeguen [Nijmegen, *the Netherlands*]. A great number of country people were left destitute both of houses and provisions, and reduced to a state of the most deplorable poverty and distress.<sup>306</sup>

In February 1760, it was reported that 4,000 Prussians soldiers died by the cold [in *Eastern Europe*] in a space of 15 or 16 days.<sup>306</sup>

During the winter, the River Thames in *England* was frozen below Gravesend.<sup>1</sup>

The winter in *Germany* in 1760 was very severe.<sup>2, 40, 41, 43, 47, 93</sup>

On 25 May 1760, Honorable James Murry, governor of Quebec, *Canada* wrote that within the walls of the city under siege during the winter, that due to "the excessive coldness of the climate, and constant living upon salt provisions, without any vegetables, introduced the scurvey [scurvy] among the troops, which, getting the better of every precaution of the officer, and every remedy of the surgeon, became as universal as it was invertebrate, in so much, that before the end of April, 1000 [soldiers] were dead, and above 2000 of what remained, unfit for service." Even by the 26<sup>th</sup> of April, the earth was still covered with snow in many places and everywhere the ground was impregnably bound up by frost.<sup>306</sup>

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**1760 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: January and February – no weather unusual in winter months. March 13<sup>th</sup> – pleasant. March 17<sup>th</sup> – cold and windy. March 23<sup>rd</sup> – snow. March 30<sup>th</sup> – the robin and spring birds came a week or ten days sooner than usual, so much forwarder is the spring than common. April – several cold days. April 27<sup>th</sup> – severe thunder and lightning. May 1<sup>st</sup> – the trees shoot out their leaves. The heart-cherry trees begin to blossom (earlier than last year, and then earlier than usual.) May 31<sup>st</sup> – no hot weather this spring. Indian corn looks poorly. June 26<sup>th</sup> – there has been but 24 hours of hot weather this year. July 12<sup>th</sup> – hot weather for a week past. August 12<sup>th</sup> – hot and peerless growing season. September 1<sup>st</sup> – multitudes of grasshoppers. September 16<sup>th</sup> – extremely hot. September 17<sup>th</sup> – extremely cold. November 8<sup>th</sup> – a gay morning and a warm day.<sup>78</sup>

On Friday, 15 February 1760, a hurricane struck London, *England* by which much damage was done both on land and in the river.<sup>306</sup>

— A stack of chimneys that fell in at Newcastle court near Grosvenor Square, demolished the bed and furniture of two rooms. The lead was blown off the house of Earl Cowper, in Great George Street into the street. A house in Hanover Street had the gable end blown off. One of the pinnacles of a building adjoining to the House of Commons was blown down, which broke through the roof of the room over the

Speaker's chamber. The Mall in St. James's Park was covered with branches of trees. Upwards of twenty-seven feet [8.2 meters] of lead on the Admiralty roof was rolled up like a scroll by the force of the wind. A great number of chimneys, fences, etc. were blown down in Westminster.

— Many ships in the river were driven from their anchors; some lost their rudders, and received considerable damage by running foul of one another. The *Mary*, [Captain] Whitson, was driven ashore below Limehouse, but by taking out her guns, etc. they are in hopes of getting her off with little damage.

— The [news]paper from the country are filled with the terrible effects of this storm. In many places it was attended with thunder, lightning, hail, and rain. It untiled the roofs of houses and blew trees down by the roots. It swept away ricks of corn [grain], hay, and cottages.

— At sea it did incredible damage to the shipping. In almost every harbor some persons perished in boats and in ships. But the loss most regrettable was the unfortunate *Ramillies*, Captain Tayler, with 734 men. Being embayed [enveloped] within the Bolt-head (which they had mistaken for the Ram-head, and imagined they were going into Plymouth Sound) and close upon the rocks, they let go their anchors, and cut away all their masts, and rode safe till five in the evening, when the gale increased so much it was impossible to describe. They parted, and only one midshipman and twenty-five men out of the whole, jumped off the stern on the rocks and were saved.

On Monday, 27 February 1760, it was reported, "During the late hard gales of wind, most of the springs in and about Chatham [in southeast *England*], were dried up; a phenomenon not easy to be accounted for."<sup>306</sup>

On 26 April, a thunderbolt ignited the famous Abbey of Royaumont in *France* and the Church of Our Lady in Hamburg, *Germany* during a lightning storms.<sup>62</sup> [The Abbey of Royaumont is 30 kilometers from Paris.]

On 22 May 1760, a corp of British infantry (six regiments) arrived safe in the Weser [River], off Gurtendorff [Gutendorf, Thüringen, *Germany*], fortunately escaping a violent storm, which came soon after.<sup>306</sup>

On 28 June 1760 in *England* there was a great hailstorm in Cambridgeshire.<sup>93</sup>

On 20 July 1760 in southwestern *France* in the neighborhood of Auseli and Comminges, hailstones 5 inches in diameter fell. Men and cattle were killed.<sup>93</sup>

On 20 July 1760 a hailstorm struck Comminges, *France* with 5-inch (13 centimeter) hailstones. Men and sheep were killed.<sup>28</sup>

[At the Observatory of the College of *France*], several days of unusual heat were observed during the summer: (99.9° F, 37.7° C) on 18 July; (99.9° F, 37.7° C) on 19 July; (93.6° F, 34.2° C) on 20 July; and (84.9° F, 29.4° C) on 21 July. The maximum temperatures observed during the summer were:<sup>62</sup>

Beijing (Peking), <i>China</i>	(109.6° F, 43.1° C) on 5 June
Mulhouse, <i>France</i>	( 92.8° F, 33.8° C) on 19 July

In Burgundy, *France*, the grape harvest took place between 15 and 22 September. The harvest was ordinary but the wine was of a very good quality. In the south of *France* this year the harvest was bad for all crops.<sup>62</sup>

On 19 September 1760, a waterspout [large deluge] struck Brackenthwaite in Cumberland [now Cumbria], *England*. To the east was a ridge of lofty mountains. Three small brooks, Lizza, Hopebeck and Hubcorton were all affected simultaneously by the inundation. In a field of 10-12 acres [4-5 hectares], the flood produced a sandbank of such thickness as never to be removed. The old channel



which did not exceed five or six feet [1.5-1.8 meters] in breadth, and one [0.3 meters] in depth, became at least 18 or 20 yards [16.5-18.3 meters] in breadth and one and half [1.4 meters] deep. The water remained the next morning at a widow's cottage, twelve feet [3.7 meters] perpendicular above the ordinary surface of the water; 30 yards [27 meters] from the brook.<sup>306</sup>

In October 1760 during the war, there were heavy rains in Westphalia, *Germany*, which cause the Rhine and the [Lippe?] rivers to overflow their banks and rendered the roads impracticable. The excessive rains, and the scarcity of provisions caused the French to abandon Landgraviate of Hesse Cassel [Hesse-Kassel, now part of the German state of Hesse].<sup>306</sup>

On 25 October 1760, a hurricane struck the *Caribbean* island of Barbuda causing 50 deaths.<sup>141</sup>

In Holland [*the Netherlands*] from Michaelmas [29 September] 1760 until 1 January 1761, the number of vessels lost by storms amounted to upwards of 300.<sup>243</sup>

On Friday, 5 December 1760, a storm struck the coast of *England*. "By the violence of the wind this morning at N.N.E. north-northeast] great mischief was done at sea, the *Prince of Orange* man of war at Spithead parted from her cables, and drove down to St. Helens, but without farther damage. The expedition fleet rode it out safe. Two ships were driven on shore on Deal beach, and eight in Hearn Bay. Several others in the Downs cut and parted [their cables]." <sup>306</sup>

On the 30th of December 1760, during the siege of Pondicherry, *India*, a tremendous cyclone drove on shore and wrecked three British ships belonging to the besieging squadron. The crews were saved.<sup>191</sup>

In 1760 during the period between 13 June and 11 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ing-yüan; Shensi (now Shaanxi province) in central *China* at Hsün-yang; and Hopei (now Hebei province) in northern *China* at Pai-hsiang. During the period between 8 August and 8 November, floods struck Szechwan (now Sichuan province) in southwest *China* at P'ing-shan.<sup>153</sup>

**Winter of 1760 / 1761 A.D.** In Philadelphia, Pennsylvania in the *United States* the winter of 1760 was alternately very cold and very mild. In the month of March there was the heaviest fall of snow ever remembered so late in the season.<sup>1</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1760 on November 14<sup>th</sup> – snow. November 19<sup>th</sup> – exceeding cold. November 23<sup>rd</sup> – moderate weather. December 7<sup>th</sup> – pretty cold. December 20<sup>th</sup> – much colder. December 26<sup>th</sup> – calm mornings all this week and moderate through the days. In 1761 on January 11<sup>th</sup> – the harbor froze over yesterday and today. January 26<sup>th</sup> – a fine level [not drifted] snow, and enough of it. February – wonder of a month. The snow went away on the 7<sup>th</sup>. March – unusually moderate weather this month.<sup>78</sup>

On Christmas day [25 December] 1760 at Eshgill near Alston in Cumberland in northwest *England*, a gentleman there had marigolds, and ten other different kinds of flowers, in full bloom (the same as in the months of May or June) and all the trees in his garden in bud, owing to the mildness of the season: a circumstance never known before in the memory of man, so far north.<sup>243</sup>

On 1 January 1761, the wind blew a perfect hurricane at Leeds in Yorkshire, *England*. A great number of chimneys, corn and haystacks, were blown down, and [roof] slates torn off houses. But the greatest damage was done to straw thatched buildings. A poor man at Holbeck in this parish, finding his house ready to fall, immediately stepped out of bed, and setting his shoulder to the beam that solely supported the roof, held up the house till his wife and children crept out between his legs (having no other way) and he had but just time to get off himself before the whole fabric fell to the ground.<sup>243</sup>



The season is so forward [early], that on the 14<sup>th</sup> instant [January 1761], there was in Comb-Wood, between Wimbledon and Streatham in Surry [Surrey], *England*, a thrush's nest with four eggs in it, some of which were laid ten days before, and the hen thrush sitting very close upon them. Primroses and daisies have appeared in great plenty, and at a place near Ryegate [Reigate], a plate of strawberries was produced a few days since at a gentleman's table. And from Swansea [Swansea, Wales] to South Wales, we have the following letter dated the 23<sup>rd</sup>. "Last week several flocks of swallows, and other summer birds, were seen here, occasioned by the mildness of the season; but 'tis thought the present frost (which came pretty sudden and severe) must have destroyed the greatest part of them, as many have been since found frozen to death. A few days since there was a pear tree in full blossom, in a gentleman's garden not far from this town; and a gooseberry bush, which stood under a wall, and was fenced from the north wind, had gooseberries as large as cherry stones; and 'twas thought, had the mild weather continued, several sorts of summer fruit would have been ripe before Easter."<sup>243</sup>

As of 19 January 1761 at Boston, *England*, the winter was extremely cold. For 2 or 3 days, the harbor was filled with ice.<sup>243</sup>

On 20 January 1761, a frost set in at Ratisbon [now Regensburg in Bavaria, *Germany*] that was very excessive and sudden. The River Danube froze over within 24 hours, which was hardly ever known before, the swiftness of the current of that river being very great.<sup>243</sup>

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**1761 A.D.** In *England*, there were great rain and floods.<sup>47, 92</sup>

In *Ireland*, there were great floods; especially in Cork and Dublin.<sup>47, 92</sup>

There were great rains and floods in *Southern Europe*.<sup>47, 92</sup>

At Thessalonica [Thessaloniki, *Greece*] "Yesterday [March 1761?] we were terribly alarmed by a prodigious ball of fire, which rose from the earth in the southeast part of the city, and directed its course horizontally towards the west, where entering a dark black cloud, it burst with a prodigious loud noise, attended with thunder and flashes of fire; so that it seemed as if heaven and earth had been coming together. This was followed by so violent a shower of rain, that it threatened a second [Great] deluge. God preserve us, my dear friend, amidst this complication of troubles!" On 31 March 1761, many events happened almost simultaneously. At Fort Augustus, *Scotland* on 31 March, Loch Ness [an unusually deep lake] suddenly rose about 2 feet in height. The King's galley broke from her mooring. Several boats were cast very high on dry land. On 31 March, an earthquake struck Cork, *Ireland*. On 31 March, an earthquake struck Madrid and the coast of *Spain*. On 31 March, an earthquake struck at Corunna [A Coruña, *Spain*]. On 31 March, an earthquake was felt at Bayonne, *France*. On 1 April, an earthquake was felt at Bourdeaux, *France*. On 31 March, an earthquake was felt at Amsterdam, *the Netherlands*. On 31 March, on his Majesty's ship Gosport located about 80 leagues [240 miles, 386 kilometers] east-southeast of Lisbon, Portugal, felt the shock of an earthquake. On 31 March, an earthquake struck at Lisbon, *Portugal*. On 31 March and 9 April, earthquakes struck [Fort] Santa Cruz in South Barbary [in *Algeria*]. On the island of Barbadoes [*Barbados* in the Lesser Antilles] on 31 March, there were fluxes and refluxes of the sea. At Barbadoes, the same fluxes and refluxes of the sea were noted for the Lisbon earthquake of 1755. On 31 March, an earthquake struck *Madeiras* in the Canary Islands. The island of *Terceira*, one of the Azores, seems to have been the center of all these violent shocks, as they ended there in a dreadful eruption [of a Stratovolcano on 17 April 1761]. At *Terceira* on 31 March, the sea rose to a great height; on 14 April, there were 4 small earthquakes; on 15 April, there was a very violent shock in the morning followed by continuous trembling until the 17<sup>th</sup>.<sup>243</sup>

A missionary at Salonica [now Thessaloniki], the capital of Macedon [Macedonia] in *Greece*, described the wretched situation of that country during the last two years [prior to 1761]. He said that a plague carried off at least 200,000 souls; and seven successive earthquakes have overthrown most of the cities in that province. The capital is reduced to a heap of rubbish. The plains, once so famous, are now a desert. The inhabitants have abandoned their dwellings; nor will any return to bury his friend or relation. On 8 April 1761, the miserable people were terrified beyond description, at the rising of an extraordinary phenomenon. The heavens after sunset appeared as if all on fire. They discovered trains of fire, and left a suffocating smell of brimstone and bitumen, which they thought portended the general conflagration. But about midnight, the whole vanished in the most dreadful claps of thunder.<sup>243</sup>

The hurricane of 8 April 1761 in the south of *France* was very deadly. It tore up one six thousand olive trees, and eighteen hundred feet of fruit trees.<sup>79</sup>

A violent storm struck Charleston, South Carolina in the *United States* on May 4, 1761. The storm caused the loss of ships worth 20,000l.<sup>40, 41, 56</sup>

In May 1761, a whirlwind [tornado], the most violent and dreadful that ever had been known, was experienced near Charlestown [Charleston], South Carolina, in the *United States*. The tornado passed down the Ashley River, ploughing the waters to the bottom and laying bare the channel. The town was in imminent danger of being destroyed, but the danger passed and the town escaped. A fleet of forty sail of loaded ships lay at anchor in Rebellion Road about four miles from town. The whirlwind passed in an oblique direction and only struck part of this fleet, sinking five vessels in an instant and dismasting eleven ships.<sup>174</sup>

On 2 May 1761, a tornado struck Charleston, South Carolina in the *United States* at 2 o'clock in the afternoon. "The tornado crossed the Ashley River, and swooped down upon the shipping at Rebellion Wharf, with such fury as to threaten the destruction of the entire fleet. From the city it was seen coming [coming] at first rapidly toward Wappo Creek [Wappoo Creek], like a column of smoke, with a very irregular and tumultuous movement. The quantity of [water] vapor that composed this column, and its prodigious velocity produced so intense a commotion that it agitated Ashley River to its depths, and left the channel bare. The ebb and flow made the shipping float off to a great distance. When it struck the river, it made a noise like continuous thunder; its diameter, at that moment, was estimated at fifteen hundred feet [457 meters], and its height, as seen from Charleston, at twenty-five degrees. It was met, at White Point, by another whirlwind, which descended Cooper River, but was not equal to the first. When they came together, the commotion in the air was much greater still; the foam and the vapor seemed to be thrown to the height of forty degrees, while the clouds, that hurried from all directions toward that point, seemed to rush thither and whirl about, at one and the same time, with incredible velocity. The meteor [tornado] that darted upon the shipping in the roadstead, and reached them in three minutes; although the distance was nearly six miles [10 kilometers]. Out of forty-five vessels, five were sunk on the spot; The State ship *Dolphin* and eleven others were dismasted. The damage, estimated at more than £200,000, was done in a moment, and even the vessels that sank were swallowed up so rapidly that the people who were below had scarcely time to scramble up on deck. The whirlwind of Cooper River changed the course of the one that came from Wappo Creek [Wappoo Creek], which, had it not been for that, would, proceeding in the same direction, have swept away the city of Charleston before it like so much straw." "This terrible column was first perceived about noon, at more than fifty miles [80 kilometers] west-southwest of the roads [roadstead]. It destroyed every thing in its way, making a complete avenue when it passed through the woods. The loss of the five ships was so sudden that it is not known whether it was the weight of the column of wind, or the mass of the water driven upon them, that made them go down."<sup>205</sup>

A letter from Boston in New England described the tornado that struck South Carolina [in the *United States*] in May 1761. "We have advice from Charlestown in South Carolina, that on the 4<sup>th</sup> of last month

[4 May 1761] at half past two p.m. a most violent whirlwind, of that kind commonly known by the name of typhoons [typhoons] passed down Ashley river, and fell upon the shipping in Rebellion road with such fury and violence, as to threaten the destruction of the whole fleet. This terrible phenomenon was first seen from the town, coming down Wappo creek, resembling a column of smoke and vapour [vapor], whose motion was very irregular and tumultuous, and came with great swiftness. The quantity of vapour which composed this impetuous column, and its prodigious velocity, gave such a surprising momentum, as to plough Ashley river to the bottom, and laid the channel bare; this occasioned such a sudden flux and reflux, as to float many boats, pettiaugers [periauger], and even sloops and schooners, which were before lying dry at some distance from the tide. When it was coming down Ashley river, it made a noise like constant thunder; its diameter at the time, was judged to be about 300 fathoms, and its height about 35 degrees. It was met at White Point by another gust [tornado], which came down Cooper's River, but was not equal to the other; but upon their meeting together, the tumultuous agitation of the air was much greater, insomuch that the froth and vapour seemed to be thrown up to the height of 40 degrees, while the clouds that were driving in all directions to this place, seemed to be precipitated, and whirled round at the same time, with incredible velocity. Just after this it fell upon the shipping in the road, and was scarce three minutes in its passage, though the distance was near two leagues [6 miles, 10 kilometers]; there were forty five sails [sailing ships] in the road, five of which were sunk outright, and his majesty's ship Dolphin, with eleven others, lost their masts, etc. The damage done to the shipping, which is valued at 20,000 l. sterling, was done almost instantaneously, and some of those that were sunk, were buried in the water so suddenly, as scarcely to give time to those that were below to get upon deck; and it is remarkable, that but four lives were lost in them. The strong gust which came down Cooper's river, checked the progress of that pillar of destruction from Wappo creek, which had it kept its then direction, must have driven the town of Charlestown before it like chaff. This tremendous column [tornado] was first seen about noon, upwards of fifty miles W. by S. from Charlestown, and has destroyed, in its course, several houses, negro huts, etc. on the plantations, and many, both white people and negroes, were killed and hurt; besides many cattle have also been found dead in the fields. In several parts of its course it left an avenue of a great width, from which every tree and shrub was torn up: great quantities of branches and limbs of trees were furiously driven about, and agitated in the body of the column as it passed along. The fleet lying in the road, ready to sail for Europe, was the largest and richest that ever cleared out from Charlestown. About four o'clock the wind was quite fallen, the sky clear and serene, so that it was scarce credible that such a dreadful scene had been so recently exhibited, were not the sinking and dismasted vessels so many shocking and melancholy proofs of it. The sinking of the five ships in the road was so sudden, that it was a doubt whether it was done by the immense weight of this column pressing them instantaneously into the deep, or whether it was done by the water being forced suddenly from under them, and thereby letting them sink so low, as to be immediately covered and ingulphed [engulfed] by the lateral mass of the water. Most of the disabled ships were towed up to the town the next day, and captain Scot, of the Scarborough, is appointed to convoy those that are able to put to sea, in the room of the Dolphin." <sup>243</sup>

On 21 June 1761 in *England*, there was a hailstorm in Surrey.<sup>93</sup>

On 25 June 1761, great damage was done near Kingston in Surry, *England* by a storm of thunder, lightning, and rain. The country around Harrow [now in Greater London] in Middlesex was laid underwater. Six deers were struck dead by lightning in Bushy Park. At Bourn in Lincolnshire, hailstones fell as big as pigeons' eggs, and very great damage was done, as well as in many other parts of the kingdom.<sup>243</sup>

[On 25 June 1761], a violent storm struck the neighborhood of Durham, *England*. It leveled and stripped most of the trees in a nearby woods.<sup>243</sup>

On 27 June 1761 in *England*, at Bourne (Lincolnshire), about 5 P.M., it having been very black and

cloudy for some two hours, rain began to fall in large drops, succeeded by large hailstones, mixed with pieces of ice of irregular shape, some of which measured 8 inches in circumference; the windows were broken, fruit trees damaged, and grain crops destroyed in a line of about 3 miles in width. The thunder was very severe; and some sheep were killed. The storm extended into Cambridgeshire.<sup>93, 243</sup>

On 5 August 1761 in *England*, there was a violent hailstorm at Benfield (Northamptonshire) damaged and destroyed the grain crops. Many of the pieces of ice weighed a pound each.<sup>93</sup>

On 5 August 1761, a most violent storm of thunder and lightning attended with hail did incredible damage to the corn [grain] in the neighborhood of Benfield in Northamptonshire, *England*. Many of the hailstones or rather pieces of ice weighed a pound each, and broke the windows wherever they fell.<sup>243</sup>

On 14 August 1761 in *Scotland* at Cumbernauld, there was a great hailstorm, which killed more than 1,000 crows, the bones of which were found broken, and the flesh black.<sup>93, 243</sup>

On 4 September 1761, a hurricane struck South Carolina in the *United States*. The prodigious influx of the sea created a new channel 18 feet deep at high water and nearly half a mile over. As a result, navigation of Cape Fear River, from being the most difficult, has changed to the easiest and safest on that part of the continent. This was a massive hurricane and threatened destruction to the whole country.<sup>243</sup>

On 25 September 1761 in *England*, there was a hailstorm on Enfield Marsh, lasting about 3 minutes. The hail did great damage to trees, fruit, etc., killing birds and poultry. Some of the stones measured 5 inches in circumference.<sup>93, 243</sup> [Enfield Marsh is now the Tottenham Marshes in Greater London.]

The summer of 1761 in Denainvilliers, *France* was characterized by:

Hot days	38 days
Very hot days	6 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The maximum temperatures observed during the summer were:<sup>62</sup>

Denainvilliers, <i>France</i>	( 92.8° F, 33.8° C ) on 24 June and 8 September
Mulhouse, <i>France</i>	( 88.3° F, 31.3° C ) on 25 June

In the area around Orleans, the majority of the harvest is very poor in quantity and quality. The grape harvest began in Burgundy on 14 September; the yield was quite abundant, but of medium quality. In the south of *France* a terrible hurricane took place on 8 April. This year was very productive in those lands not exposed to the southwest winds.<sup>62</sup>

On 4 October 1761, a storm struck the coast of New England in the *United States* causing incredible damage.<sup>243</sup>

On Wednesday last [14 October 1761] at Great Malvern in Worcestershire, *England*, “we had the most violent thunder ever known in the memory of man. At a quarter past four in the afternoon, I was surprised with a most shocking and dismal noise; a hundred forges (the nearest resemblance I can think of) were they all at work at once, could scarce equal it; I ran to the fore-door, and casting my eyes upon the side of the hill about 100 yards to the south west of my house, there appeared a prodigious smoke, attended by the same violent noise [tornado]. I ran back into the house, and cried out a volcano (for so I thought) had burst out of the hill; but I had no sooner got back again, that I found it had descended, and was passing on within about a hundred yards of the south end of my house; it seemed to rise again in the meadow just below it, and continued its progress to the east, rising in the same manner four different times, attended with the same dismal noise as at first; the air was filled with a nauseous, sulphureous [sulfurous] smell. I saw it gradually decrease till quite extinguished, in a turnep [turnip] field about a

quarter of a mile below my house. The turnep leaves, with leaves of trees, dirt, sticks, etc. filled the air, and flew higher than any of these hills. The thunder ceased before this happened, and the air soon afterwards became calm and serene. The surprise and astonishment of all ranks of people, during the appearance of this strange phenomenon, is scarcely to be expressed.” The vast column of smoke, mentioned in the above letter, was so large, that a physician of eminence at Worcester, saw it in its progress down the hill, about a mile from Feckenham, which is about twenty miles from Malvern.<sup>243</sup>

On the 20 October 1761, the British fleet, then lying in Madras Roads [now near Chennai, *India*], encountered a violent cyclone. The men of war put to sea, and were thus providentially saved; but all the vessels, which still lay at anchor were lost, and scarcely a soul on board saved.<sup>191</sup>

On 23 October 1761, a most violent storm of wind and rain did great damage to the houses, stores, wharves, and merchandise, and to the shipping in Boston harbor in the *United States*.<sup>174</sup>

On 20 November 1761, by a sudden hurricane of wind, several merchant ships below bridge [London Bridge in *England*?] were driven from their anchors, and received great damage. Several of the small craft were stove in pieces [completely destroyed], a corn lighter was sunk off East Lane stairs.<sup>243</sup>

On 2 December 1761, the fog was so thick in and about London, *England*, that even the chairmen lost their way in the streets, and carriages ran against carriages, by which much mischief [damage] was done.<sup>243</sup>

A drought in the summer of 1761 and 1762 was so great in the northern American colonies [*United States*], as to cut short the crops, and render supplies from abroad absolutely necessary. During the drought of 1761, a fire raged in the woods, in the towns of Barrington and Rochester, in New Hampshire, and passed over into the county of York, burning several weeks with irresistible fury. A plentiful rain, falling in August, extinguished it. An immense quantity of the most valuable timber was destroyed by this conflagration.<sup>174</sup>

In 1761, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 3 June and 1 July, floods struck Hupeh (now Hubei province) in central *China* at Ch’ien-chiang and Mien-yang.

— During the period 2-30 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Hsia-chiang; Kiangsu (now Jiangsu province) on the east coast of *China* at Sung-chiang; Hopei (now Hebei province) in northern *China* at Nan-kung, Yung-ch’ing, Ning-ho, Wên-an, Wang-tu, Jung-ch’êng, Ku-an and Lu-lung; Shantung (now Shandong province) on the east coast of *China* at Yüeh-ling, Yü-t’ai, Chin-hsiang, Ning-yang, Wên-shang and Shou-chang; and Hupeh province at Chiang-ling and Yün-mêng. At Yün-mêng, all the houses and fields were damaged by the floodwaters and innumerable people drowned.

— During the period between 30 August and 27 September, floods struck Shantung province at Liao-ch’êng.

The year 1761 was a year of abundance in the vicinity of Shanghai, *China*.<sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 1<sup>st</sup> – the season is uncommonly forward, warm and pleasant. April 22<sup>nd</sup> – fine weather continually. April 30<sup>th</sup> – cold. June 25<sup>th</sup> – it is as melancholy dry a time as ever I saw. July 5<sup>th</sup> – as great a drought as in 1749. July 11<sup>th</sup> – gentle showers. July 17<sup>th</sup> – plenty of peas. July 20<sup>th</sup> – raspberries. August 1<sup>st</sup> – the drought awfully continues. August 12<sup>th</sup> – no feed on the Neck [peninsula] a great while. August 16<sup>th</sup> – the drought increases. August 19<sup>th</sup> – a great storm of rain. August 31<sup>st</sup> – marvellous growing time; surprising change on the face of the earth. September 25<sup>th</sup> – the earth has a most beautiful green face. October 6<sup>th</sup> – the grass is better set than in the spring.<sup>78</sup>



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**Winter of 1761 / 1762 A.D.** In *England*, a London newspaper of 29 January 1762 read, “The Thames had been frozen so firmly since Christmas, that horses and carriages were driven thereon. Also, that booths were erected, and fairs held thereon.”<sup>1</sup>

In *England*, it snowed for 11 days in 1762.<sup>40, 41, 43, 56</sup>

On 11 December 1761, the frost at Hamburgh [Hamburg], *Germany* was so severe, that they began to compare it with the frost of 1740. The Elbe River was frozen over for several days. The magistrates have doubled the guards because of the French and Hanoverian deserters who flocked there. It was feared that if the frost should continue, soon there would be 10,000 deserters of different nations.<sup>243</sup>

During the winter in 1761 at Solikamsky in Siberia, *Russia*, the cold was extreme. The temperature using de L’Isle’s thermometer sunk down to 280 [-124° F, -86.7° C]. “This extreme, and almost incredible degree of cold appeared to me astonishing indeed, as the thermometer on which it was observed was exposed on a wall to the north, in an open yard, so that I did not conceive it was possible a man could live in the degree of cold he must necessarily be exposed to. In crossing the yard to take the observation, my breath froze to my lips, and made an icicle of my beard. Sometimes the cold is so excessive as to strike both men and horses dead, who happen to be at too great a distance from any house to shelter themselves from it. The extreme condensation of air prevents the smoke of chimnies [chimneys] from rising; sparrows and magpies drop dead on the ground; nor can either skins or dung defend the huts of the natives. A man, who only walked about eighty steps from his own door, had his nose and his hands so frozen, that both would have mortified, had not the greatest care been taken. Though thus attacked by the weather, he was covered with few, and his hands were wrapped in a fur hood.”<sup>249</sup>

The winter of 1762 was remarkably mild in *Switzerland*. Severe cold came from the northeast as far as Lake Geneva but did not enter it. A constant fog suspended its operation or rather prevented it from passing mount Jura. Nine or ten inches of snow fell in the valley surrounding Geneva and this snow lay five or six weeks on the ground. At that time there was scarcely any snow on the mountains and very little in *Switzerland*.<sup>193</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1761 on December 31<sup>st</sup> – we never had such a December; it began with snow, and the snow is now two-feet (0.6 meters) upon a level. It gives fine sledding. Marblehead, Massachusetts reported that on February 8, 1762 the snow was more than 5 feet (1.5 meters) deep. On February 11<sup>th</sup> the snow is so deep that it is impossible to pass from the windmill to the meetinghouse. February 28<sup>th</sup> – the snow at Portland began falling as early as the 3<sup>rd</sup> of December; since which it kept snowing continually. Entries for March frequently mention the difficulty of travelling on account of the depth of the snow. April 4<sup>th</sup> – there is no riding on horseback, nor in a sleigh or chaise, but only on narrow bad footpaths [due to the depth of the snow]. April 12<sup>th</sup> – the robin and spring birds visited us. April 28<sup>th</sup> – the last of the huge mountain of snow behind the garrison disappeared.<sup>78</sup>

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**1762 A.D.** In *England*, there was a great flood in the Thames Valley, and other parts of *England*.<sup>47, 92</sup>

On 22 February 1762 in northern *France* at Valenciennes near the border with Belgium, there was a great storm of hail, snow, and rain, accompanied with thunder. The lightning set fire to St. Gray's church.<sup>93</sup>

In Lisbon, *Portugal*, there was great destruction from a flood.<sup>47</sup>

In northern *Spain*, floods caused 3,000,000 livres damage at Bilboa, in April 1762.<sup>40, 41, 43</sup>

On 28 April 1762 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>



In *France* in May, floods caused great damage.<sup>40, 41, 43</sup>

In May 1762 in *Switzerland*, there were no dews, which normally fall plentifully in that month. Instead there was a northeasterly wind, which held for twenty-two days.<sup>193</sup>

On 21 July 1762 in *England*, there was a hailstorm in Yorkshire.<sup>93</sup>

A drought struck eastern Massachusetts in what was to become the *United States* in 1762. There was scarcely any rain from 9 April to 18 August. At Danvers, the rains didn't come until 22 September. Wells went dry, the grass dried up and numerous fires prevailed. When rains finally came, farmers were forced to slaughter their cattle because of a lack of hay. Many people became destitute and suffered for want of food.<sup>199</sup>

In Dublin, *Ireland* on the 21<sup>st</sup> of October, there was a serious flood and much damage.<sup>47, 92</sup>

The summer of 1762 was very nice and very hot in July and most of the autumn. The summer in Denainvilliers, *France* was characterized by:

Hot days	54 days
Very hot days	5 days
Extremely hot day	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

A maximum temperature of 96.1° F (35.6° C) was observed in Denainvilliers on 2 August. In Burgundy, the grape harvest began on 15 September; 7 days earlier than average. The harvest was very plentiful and the wine of very good quality. The grain was of excellent quality and the year was very productive in terms of food.<sup>62</sup>

In 1762 in Burhanpoor (Burhanpur in north-central *India*), the River Taptee (Tapti) was greatly swollen in consequence of heavy rains, and one-fourth of the city inundated and one-tenth of the houses destroyed.<sup>47, 92</sup>

On 19 October 1762 in Detroit, Michigan in the *United States* there was a period of remarkable darkness. During most of the day, Detroit was under almost total darkness. "The darkness continued until 9 o'clock [a.m.], when it cleared up a little. We then for the space of about a quarter of an hour saw the body of the sun, which appeared as red as blood, and more than 3 times as large as usual. The air all this time, which was very dense, was of a dirty yellowish green colour [color]. We were obligated to light candles to see to dine, at one o'clock [p.m.], though the table was placed close by two large windows. About 3 [p.m.] the darkness became more horrible, which augmented till half past 3 [3:30 p.m.], when the wind breezed up from the S.W., and brought on some drops of rain, or rather sulphur [sulfur] and dirt, for it appeared more like the latter than the former, both in smell and quality. Mr. S. took a leaf of clean paper, and held it out in the rain, which rendered it black whenever the drops fell upon it; but when held near the fire turned to a yellow colour; and when burned it fizzed on the paper like wet [gun] powder. During the shower the air was almost suffocating with a strong sulphureous smell; it cleared up a little after the rain."<sup>237</sup> [There were several volcanic eruptions in 1762. These included the Pavlof Sister stratovolcano eruption in Alaska and the Kliuchevskoi stratovolcano eruption in Russia, the Epomeo eruption on the Isle of Ischia in Italy and the Planchón-Peteroa volcano eruptions in Chili/Argentina.]

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:  
June 5<sup>th</sup> – melancholy dry time. All are now looking for an absolute famine. June 23<sup>rd</sup> – a dark day. July 5<sup>th</sup> – [The dry conditions may have led to fires.] The woods are all afire; six houses, two saw mills, several barns and cattle were burnt at Dunston. Six families burnt out at North Yarmouth, and a vast deal of damage done in fences burnt,

and fields and pasture laid open. On August 13<sup>th</sup>, 16<sup>th</sup>, 18<sup>th</sup>, and 21<sup>st</sup>, there were showers. The earth is now wonderfully soaked and refreshed, and the grass begins to look green. October – it was a very cold day, but no frost yet. November – the last 11 days have been moderate and comfortable. December – several delightful days this month.<sup>78</sup>

In the *United States*, the severest drought ever experienced in the American northeast was in the summer of 1762. Scarcely a sprinkle of rain fell for nearly four months, May-September. Vegetables of every description perished.<sup>1</sup>

A drought struck New England in the *United States* in 1762. There was scarcely any rain from April 9 to August 18, and in some places, as at Danvers, Massachusetts until September 22. The month of April was cold. There was a slight drizzling rain at Boston, Massachusetts on May 7 and June 3 and showers on June 18. On July 7, a fast was held at Falmouth, Maine, and at Milton, Massachusetts. On July 28, being fearful that a famine would ensue, a public fast was proclaimed in a number of cities. Refreshing showers occurred near Falmouth, but not elsewhere until August 18, when abundant rain descended throughout New England. Crops were, of course, very light and cattle were generally slaughtered because of the difficulty of keeping them through the winter.<sup>138</sup>

On 9 December 1762, a storm from the southwest struck Carthagena, *Colombia*, which was followed by an earthquake, destroyed great part of the walls of the town, and many houses. The floods from the mountains came down with a rapidity never before seen, and vast quantities of mud choked up the entrance of Boca Chica [Bocachica]. Two Spanish men-of-war were driven on shore, and the castle of Santa Maria was entirely destroyed.<sup>143</sup>

In 1762 during the period between 24 April and 23 May, floods struck Hopei (now Hebei province) in northern *China* at Ch'ing-yün, Tsao-ch'iang, Hsü-shui and Wang-tu. Then during the period between 19 August and 17 September, floods struck several regions of *China* including:<sup>153</sup>

- Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng, P'u-t'ai [possible misprint, "T'ai-p'u"], Ch'iu, Tê-p'ing and Huang. At Ch'iu, the crops were damaged by the floodwaters.
- Chekiang (now Zhejiang province) on the east coast of *China* at Hai-yen, Hangchow, I-wu, Hai-ning, Yü-hang and P'ing-hu. At Hai-ning and Yü-hang, there was a great storm and the crops were damaged. At Hai-yen, houses were damaged by the floodwaters.
- Kiangsu (now Jiangsu province) on the east coast of *China* at Ch'ing-p'u.

In 1762 during the 6<sup>th</sup> moon, there was a flood in the vicinity of Shanghai, *China*.<sup>166</sup>

In 1762 during the period between 6 May and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Kansu (now Gansu province) in northwest *China* at Hui-ning.<sup>153</sup>

**Winter of 1762 / 1763 A.D.** During the winter, the River Thames in *England* was frozen below Gravesend. The winter was recorded as being intensely cold throughout *Europe*.<sup>1</sup>

The frost in *Britain* lasted 94 days.<sup>41, 43</sup>

In *England*, the frost lasted ninety-four days, and produced terrible effects. The frost set in on Saturday, 25 December 1762: "A most intense frost with easterly wind, which has since continued, with very little intermission, until the end of January. Some experiments have been tried during the course of it . . . On Friday, 31 December, a glass of water placed upon a table in the open air, in six minutes froze so hard as to bear 5 shillings upon it; a glass of red port wine placed upon the same table froze in two hours; and a

glass of brandy in six, both with hard ice. In *Cornwall, Wales, and Ireland* this frost was felt but slightly.”<sup>47, 93</sup>

The winter of 1762-63 was mild in Cornwall, *England*. This is in sharp contrast with the cold weather experienced at London. The coldest days at Cornwall were on 14 and 15 December and on 9 January. But the temperature did not fall below 38° F [3.3° C]. As a result, the myrtles are in perfect health; the mignonettes in flower; the cluster rose and white violet in bloom at Christmas; and the scarlet double ranunculus in full bloom; the double hyacinths have formed their bells, and some are now ready to unfold.<sup>237</sup>

In *Germany*, the frost seems to have set in sooner. On the 18<sup>th</sup> of December at eight in the morning, the cold was -2° F (-19° C) – the same as in 1740; the next day a half degree more, “which answers exactly the same degree of cold at Paris (*France*) in 1739”.<sup>47, 93</sup>

The winter of 1762-63 produced intense cold in Berlin, *Germany* and throughout the whole country. On 27 December 1762, the temperature dropped down to -4° F [-20° C].<sup>237</sup>

In *France*, the olives and vines suffered much; the Seine and Rhône Rivers being frozen over, the navigation was stopped, and provisions rose in Paris to famine prices.<sup>47, 93</sup>

In *France* the Seine River froze on 29 December 1762. On 1 & 2 January 1763 it was frozen at the first gate of the Louvre in Paris. The river thawed on the first of February. The river was frozen for 35 days. The lowest recorded temperature was 10° F (-12.5° C).<sup>62</sup>

The winter of 1762-63 was remarkable for its early onset and its long duration. [In *France*] the frost began in November 1762 and lasted to the end of January 1763. In Paris, *France*, the Seine River was frozen 25 continuous days. On 29 December 1762, the temperature read (14.7° F, -9.6° C). The Loire River was frozen near its mouth. In the south of *France* the temperature remained very mild. In Brussels, *Belgium*, the lowest observed temperature was (7° F, -13.9° C); the Canal in the city was frozen so solid that horse-drawn carriages, two wheel cabriolets and wagons drove across the ice safely. In London, *England*, the Thames River was so frozen that wagons could cross it on the ice. Two sentries were found frozen to death in January 1763. From north *Holland* individuals on sleighs safely crossed over the sea to Friesland on the ice. In *the Netherlands* at Utrecht on 27 December the low temperature was (8.4° F, -13.1° C); in Leyden (11.8° F, -11.2° C); in Amsterdam (14° F, -10° C); and in Vienna, *Austria* (-4° F, -20° C). In Rome, *Italy*, the cold was so strong that all the wells in the city froze.<sup>62</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1762 on December 26<sup>th</sup> – the Fore River froze over. December 31<sup>st</sup> – winter sets in. In 1763 on January 12<sup>th</sup> – incomparable sledding. January 26<sup>th</sup> – the harbor froze over all this week. January 31<sup>st</sup> – the harbor broke up. February 4<sup>th</sup> – the harbor is frozen over. February 6<sup>th</sup> – our people generally spent yesterday shovelling snow to the meetinghouse and elsewhere. February 9<sup>th</sup> – We are everywhere shut up [indoors]; people are discouraged making paths. They say there is now five-feet (1.5 meters) of snow upon a level but on clear ground, it has drifted to the size of mountains. It is a melancholy time, near a famine for bread. February 12<sup>th</sup> – the harbor is frozen over. February 26<sup>th</sup> – the harbor is frozen over. February 28<sup>th</sup> – there is no path anywhere through the country further than Stroudwater and up to Windham. Mr. Marston was obligated to leave his horse at Hampton and come home with snowshoes. Thus ends February, as it did last year, a severe winter as any we have had. March – a cold, blustering month. March 1<sup>st</sup> – today in God’s gracious providence we were relieved by the coming in of Mayhew’s schooner from Connecticut with 1,000 bushels of Indian corn. People were reduced to the last and extremist distress; scarce a bushel in the whole eastern country. March 8<sup>th</sup> – yesterday and today we had the coldest and longest storm this winter; there fell 19 inches (48 centimeters) [of snow], about as much as has been consumed. On 10 March, Rev. Smith married Samuel Green and Jane Gustin; they came on snowshoes across the Cove from Captain Ilsley’s to his house. March 28<sup>th</sup> – it has been a cold, tedious winter. April 15<sup>th</sup> – there has been no rain this spring. The snow

goes away kindly. April 12<sup>th</sup> – the robin and spring birds begin to tune up. April 30<sup>th</sup> – the roads and ground as dry as summer. May 1<sup>st</sup> to May 18<sup>th</sup> – fine weather. May 20<sup>th</sup> – cold, which prevents the cherry trees from blossoming. May 24<sup>th</sup> – the freshets [floods waters caused by spring thaw] are raised higher than ever known.<sup>78</sup>

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**1763 A.D.** In *England*, there were great rains and floods.<sup>92</sup> “A remarkable year for floods and high waters.”<sup>47</sup>

In southeastern *Ireland*, there were floods. “Above 200 persons perished on the River Nore.”<sup>47, 92</sup>

In the *Gentleman’s Magazine* there are melancholy accounts of the damage resulting from the thaw, after the six weeks’ frost, and by the rains which followed in *England* in January: “Rivers have overflowed their banks, and laid vast tracts of land under water, cattle in many places have perished, and in some are deprived of food; people have been forced to leave their dwellings and take refuge in the neighbouring towns; in short, such a scene of calamity and distress as is to be seen in the counties of Lincoln and Cambridge has never been known in this island by the oldest man [in] it. The vast extent of meadow from the source of the Thames to the river’s mouth is almost covered in water. The great bank between Peterborough and Wisbeach in Cambridgeshire has been broken down, and near 400,000 acres of land overflowed. The river Welling in Lincolnshire has likewise broke its banks, and overflowed Porsend and Crowland fens. . . . The River Severn has likewise risen to an uncommon height, and laid the meadows on each side its banks under water to an immense extent. About Birmingham the floods are inconceivable. In short such general floods were never known.”<sup>47</sup>

On 26 February 1763 in *England*, there was a violent hurricane at Broadway in Worcestershire from southwest to northeast, tearing up trees by the roots, and beating down a house. The hail devastation extended about  $\frac{3}{4}$  of a mile in length and 25 yards in width.<sup>93</sup>

On 1 March 1763 in *England* at Harrow [now part of London], there was hail and rain, accompanied with lightning and thunder, doing great damage.<sup>93</sup>

On 23 June 1763 in *England*, there was a great hailstorm in Essex.<sup>93</sup>

On 26 June 1763 in *France*, a hailstorm struck in the province of Macconnois [now the Mâconnais district in Burgundy, *France*], from the frontiers of Beaujolais to the frontiers of Burgundy. The fruit and grain of 36 villages was destroyed and the vines were permanently broken.<sup>93</sup>

On 15 July 1763 in eastern *France* at Bensaçon, the whole country in some 200 communes laid waste by a hailstorm. There were hailstones as large as fowls’ eggs. Trees were torn up, and people killed and wounded.<sup>93</sup>

On 19 August 1763 in *England*, there was a great hailstorm in the neighborhood of London, Essex, Hertfordshire, Middlesex, and Kent. Great darkness followed by storm of hail, wind, and rain, driving in the direction of Kent. Poultry and sheep were killed, and crops destroyed. Damage was estimated at £50,000. *A Kentish Garland* provided the following detailed account of the devastation of this storm: On Friday, August 19, 1763, a storm arose at sea, off the Sussex coast. The moraine was still, with scarcely a breeze of air; and so excessively hot, that it was suffocating. About ten o’clock in the forenoon, a black cloud arose towards the west; soon after which the wind blew in like a hurricane; the clouds came on with amazing velocity, throwing out in their course dreadful flashes of lightning; and the thunder was almost one continued roar. About half-past eleven, the rain poured in torrents, and in a few minutes was intermixed with some detached hailstones, which were very large, as an introductory of what were to follow: the hail, wind, lightning and thunder, soon came on so furiously, that all was one dreadful scene of horror. The boughs, branches, and leaves of trees, broken and stripped off, flying in the wind, still

more darkened the air; the tiles and windows rattling, and dashing to pieces; trees torn up, and falling, struck all with a terror not easily to be expressed; some running distractedly about, wringing their hands, while others stood like inanimate beings. The storm lasted about half an hour. What a scene ensued! A universal desolation everywhere presented itself; some houses filled with water; others, with their barns, blown down; roofs and walls shattered; the windows quite destroyed: the waters roaring in torrents down the streets, plowing up the stones in their course, and leaving deep chasms; the surface of the earth covered with prodigious hailstones and water; corn, fruit, and hops destroyed; the fields and hop-gardens everywhere disfigured; trenches formed by the rushing water; the roots of the hops bared, and the poles thrown down in all directions; heaps of stone and sand driven through the hedges; boughs and branches scattered; the fruit-trees stripped of their bark. The smaller animals, such as hares, pheasants, and other game, lay dead in the fields; and a large hog was killed by the hail upon Banning Heath. The larger quadrupeds, endowed with superior instinct, saw their danger; horses, bullocks, and sheep ran, and sheltered themselves from the coming storm. In Maidstone, on one side of the High Street, not only the glass, but also the lead and frames, of the windows, were forced in and destroyed, particularly by the hail. It was like fragments of ice, and of very irregular shapes; at Banning, one piece was taken up formed like an oyster; Sir Philip Boteler measured, and found it nine inches round at the extremity: and even ten days after, some hailstones were taken up four inches and a half in circumference. One of the largest struck the stile of a horizontal post-dial of brass, and bent it near thirty degrees towards the east. Posts, bars, and gates had deep impressions from them. They were of different shapes; some flat, irregular, and very much jagged; others an assemblage of pieces of ice; whilst a few were globular, with a small cavity in the center; and if they were held together, they immediately froze, and were not easily separated. The storm commenced in this county at Tunbridge Wells, whilst the people were at prayers in the chapel, and passed quite across to Sheerness, a distance of forty miles, its breadth not exceeding four miles: the direction of it was from southwest by west, to northeast by east; and it was severely felt in the parishes of Tunbridge, Speld-Hurst, Penshurst, Tudely, Capel, Pcmbury, part of Hadlow, Yalding, Hunton, Brenchley, Mereworth, East and West Peckham, Wateringbury, Nettledsted, East Malling, Teston, East and West Farleigh, Barming, Loose, Maidstone, Boxley, and Detling; after which its violence was spent, and only little injury was occasioned. Numbers [of people] came from all parts to witness the melancholy scene. The inhabitants of the vicinity humanely raised £3000 in a few months, which in some measure relieved the unhappy sufferers: but the cruel effects long remained; most of the hop-hills died; the filbert and apple trees swelled in knots where they had been bruised; and some were so injured, that the branches and shoots long after continued to die: the cherry-trees bore it the best, owing perhaps to the strength of their outward bark.<sup>93</sup>

In August 1763 in *Ireland*, there was a great hailstorm in Kinnegad.<sup>93</sup>

In *Europe*, there were great floods.<sup>47, 92</sup>

The summer [in *France*] of 1763 had unusual high temperatures in August but the heat wave only lasted a short period of time. This season exhibited a severe drought, especially in the south. The summer in Denainvilliers, *France* was characterized by:

Hot days	22 days
Very hot days	3 days
Extremely hot day	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

Up until August, there had only been 10 hot days. The high temperatures observed during the summer were:

Paris, <i>France</i>	( 94.5° F, 34.7° C ) on 18 August
<i>Ibid.</i>	(102.2° F, 39.0° C ) on 19 August
Denainvilliers, <i>France</i>	( 95.5° F, 35.3° C ) on 19 August
Mulhouse, <i>France</i>	( 90.1° F, 32.3° C ) on 10 August



Brussels, *Belgium* ( 81.0° F, 27.2° C) on 19 August

In Burgundy, the grape harvest began on 5 October. The yield was fairly plentiful, but the wine was of a very poor quality. In the area around Orleans, the grapes did not even ripen. The grain harvest was excellent in northern and central *France*; but in the south the harvest was poor.<sup>62</sup>

There was an excessive drought in 1763 in southern *France*.<sup>79</sup>

In 1763, a drought engulfed Hupeh (now Hubei province) in central *China* at Ao-ch'êng. During the period between 11 June and 10 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Kao-an and Szechwan (now Sichuan province) in southwest *China* at Shih-yang.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 27<sup>th</sup> – warm weather is much wanted. July 1<sup>st</sup> – there is no summer yet. July 14<sup>th</sup> – not a hot night this summer; indeed, no hot weather at all, but constantly wet. July 21<sup>st</sup> – cold northeast storm. There has not been for two months past, 48 hours of fair weather at one time. August 9<sup>th</sup> – the weather continues foggy and wet. August 26<sup>th</sup> – fair weather; a great favor and rarity. August 27<sup>th</sup> – by reason of the wet weather, my books and clothes have become mouldy, and we were not able to shut our inner doors, being swelled so through the whole summer. September 10<sup>th</sup> – a frost last night. September 18<sup>th</sup> – plenty of rain, after a fortnight of dry seasonable weather. September 28<sup>th</sup> – we began to dig our potatoes. November 10<sup>th</sup> – a long storm.<sup>78</sup>

**Winter of 1763 / 1764 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1763 on November 14<sup>th</sup> – very cold. November 18<sup>th</sup> – a great northeast snowstorm. November 26<sup>th</sup> – there was a week of moderate, pleasant weather. December 2<sup>nd</sup> – moderate weather. December 8<sup>th</sup> – raw. December 13<sup>th</sup> – pleasant. December 18<sup>th</sup> – blustering. In 1764 on January 11<sup>th</sup> – harbor froze over. January 26<sup>th</sup> – there fell just as much snow as was wanted and desired. Much business done this month.<sup>78</sup>

**1764 A.D.** In *Ireland* in January, there were great floods in Dublin, Cork, and other parts.<sup>47, 92</sup>

On 23 June 1764 in *England*, there was a great storm of hail, rain, lightning and thunder, in Middlesex, Berkshire, Wilts, Oxford, Buckinghamshire, Worcestershire, Hampshire, Essex, Durham, and Yorkshire. The hail caused immense damage to fruit and grain crops; also to buildings and livestock. In Berkshire alone damage was estimated at £20,000.<sup>93</sup>

On 25 June 1764 in *England*, there was a hailstorm in Northamptonshire.<sup>93</sup>

On 25 June 1764 in northern *France* at Douay [now Douai], there was a hailstorm. The hailstones were as big as fowls' eggs.<sup>93</sup>

On 25 June 1764 in southwest *Germany* at Heidelberg, there was a dreadful hailstorm. The Electoral Palace caught fire by lightning, and was in a great part consumed.<sup>93</sup>

The summer of 1764 in Denainvilliers, *France* was characterized by:

Hot days	42 days
Very hot days	7 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The highest temperatures occurred in June. The high temperatures observed during the summer were:

Paris, <i>France</i>	( 99.5 ° F, 37.5° C) on 22 June
Lausanne, <i>Switzerland</i>	( 95.0 ° F, 35.0° C)
Denainvilliers, <i>France</i>	( 92.8 ° F, 33.8° C) on 19 June
Mulhouse, <i>France</i>	( 88.9 ° F, 31.6° C) on 19 June
Brussels, <i>Belgium</i>	( 79.0 ° F, 26.1° C) on 13 July



In Burgundy, the grape harvest began on 12 September. The yield was fairly plentiful, and the wine was of a very good quality. The grain would have produced a good harvest; except in a good many places, hailstorms destroyed the crop. In the area around Orleans, the harvest produced little fruits and vegetables.<sup>62</sup>

In France there was a flood. On 15 November 1764, the Seine River in Paris, *France*, at the bridge “Pont de la Tournelle” reached a height of 7.0 meters (23.0 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

During 1764-1766, there was a famine on the coast of *India* between 16 degrees and 18 degrees Latitude.<sup>182</sup>

In 1764, floods struck many regions of *China* including:<sup>153</sup>

— During the period 3-31 March, floods struck Hupeh (now Hubei province) in central *China* at Hanyang, Han-ch’uan, Ao-ch’êng and Wuchang; and Kiangsi (now Jiangxi province) in southern *China* at Nan-ch’ang, Chi-an and Kiukiang.

— During the period 1-30 May, floods struck Hupeh province at Huang-an, Huang-kang, Ch’i-shui, Kuang-chi and Shih-shou; and at Tung-t’ing Lake in Hunan province in south-central *China*. At Tung-t’ing Lake, innumerable houses were damaged.

— During the period between 31 May and 28 June, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hsüan-p’ing and Szechwan (now Sichuan province) in southwest *China* at Ta.

In 1764 during the period between 6 May and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Ning-ching and Tung-kuang.<sup>153</sup>

In 1764 during the 11<sup>th</sup> moon on the 11<sup>th</sup> day in the vicinity of Shanghai, *China*, there was a storm with hail. But as harvest was already gathered so it did no damage.<sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

February – generally moderate weather this month. March 12<sup>th</sup> – cold and windy. March 15<sup>th</sup> – warm. March 25<sup>th</sup> – uncomfortable. March 28<sup>th</sup> – charming pleasant. April 14<sup>th</sup> – the spring is marvellously forward. April 26<sup>th</sup> – pleasant day. May – generally a pleasant month. May 25<sup>th</sup> – the cherry trees are in full bloom. June 14<sup>th</sup> – the earth is sufficiently soaked. June 18<sup>th</sup> – the earth has a most beautiful green face. June 30<sup>th</sup> – the fruits of the earth are promising. August 18<sup>th</sup> – a very dry time seems to be coming on. August 31<sup>st</sup> – a very dry time indeed. September 7<sup>th</sup> – there has been a great deal of very cold weather. September 18<sup>th</sup> – cold still. September 19<sup>th</sup> – a hot day. September 26<sup>th</sup> – very cold. September 30<sup>th</sup> – delightful Sabbath. October 3<sup>rd</sup> – fine weather. October 13<sup>th</sup> – pleasant. October 22<sup>nd</sup> – very warm. October 24<sup>th</sup> – cold and windy. October 26<sup>th</sup> – a great storm, wind southeast. November 1<sup>st</sup> – pleasant. November 5<sup>th</sup> – dry travelling. November 16<sup>th</sup> – very cold. November 27<sup>th</sup> – a fine day.<sup>78</sup>

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**Winter of 1764 / 1765 A.D.** On 31 December 1764, the Delaware River near Philadelphia, Pennsylvania in the *United States* was frozen completely over in one night, and the weather continued cold until the 28<sup>th</sup> of March with snow two and a half feet (0.8 meters) deep. The winter was intensely cold. The Delaware River was so frozen solid that on 19 February, a whole ox was roasted on the Delaware.<sup>1</sup>

The winter of 1764-1765 was very cold and snowy in the *United States*. A holiday snowstorm hit Philadelphia on 25-26 December 1764, another heavy snowfall struck on 5-6 January 1765. The snow in Germantown was 2 feet (0.6 meters) deep at that time. During the last week in January, the weather turned intensely cold. The Delaware River was closed to navigation due to ice from 24 December 1764 to 24 February 1765. On 7 February, “an ox was roasted whole on the river Delaware, which, from the novelty of the thing drew together a great number of people.” A great snowstorm buried Philadelphia on 24 March. Snow was “said to be between 2 and 2½ feet (0.6-0.8 meters) on the level”. After this late

March storm, surveyors Charles Mason and Jeremiah Dixon measured the depth of snow at the Maryland-Pennsylvania border and found it to be near 3 feet (0.9 meters) deep.<sup>27</sup>

During the winter of 1764-65, the Hudson River between New York and Powles' Hook [now called Paulus Hook, Jersey City, New Jersey] in the *United States* was frozen and was crossed on the ice. [Manhattan, New York is located 1 mile across the Hudson River from Powles' Hook. "Crossed on the ice" generally means the ice was sufficiently thick to allow foot and wagon traffic.] [This is only one of four winters when the Hudson River was completely frozen over during the century from 1740-1840. The other winters were 1740-41, 1779-80, and 1820-21.]<sup>202</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1764 on December 17<sup>th</sup> – about 15 inches (38 centimeters) of snow upon the ground. December 27<sup>th</sup> – there is between 2 and 3 feet (61 and 91 centimeters) [of snow]. December 31<sup>st</sup> – it has thus far been a severe winter; nothing like it since 1747 and 1748, then it was more so. January 1765 – the bay is skimmed over. January 14<sup>th</sup> – pleasant. January 22<sup>nd</sup> – the heart of the winter seems broken; incomparable sledding. January 23<sup>rd</sup> – a charming day. January 26<sup>th</sup> – very cold. January 31<sup>st</sup> – a great storm. February 5<sup>th</sup> – tempestuous and cold. February 12<sup>th</sup> – the ice lies over the harbor still. February 14<sup>th</sup> – a thaw. February 18<sup>th</sup> – fine, warm weather. February 25<sup>th</sup> – there has been no snow all this month. March 2<sup>nd</sup> – winter returns upon us. March 13<sup>th</sup> – a charming day. March 22<sup>nd</sup> – raw; cold. March 24<sup>th</sup> – dismal snowstorm.<sup>78</sup>

The winter in 1765 [in *Europe*] was moderate and in *Italy* of extraordinary gentleness.<sup>62</sup>

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**1765 A.D.** In *England* and *Europe*, there were general rainstorms and floods.<sup>47, 92</sup>

In *Ireland*, there were great floods throughout the south.<sup>47, 92</sup>

In *Ireland* in 1765, there was great scarcity. Distilling and exportation of corn [grain] prohibited by Act of Parliament.<sup>57, 91</sup>

On 10 June 1765 in *England* at Lower Brails (Warwickshire), there was hail, rain, and thunder. Some of the stones measured 7½ inches in circumference; and lay 14 inches deep upon the ground, destroying crops, fruit, poultry, and vegetation generally.<sup>93</sup>

In July 1765, a hurricane visited the *Caribbean* island of St. Eustatius [Statia]. The storm reached the *Caribbean* island of Martinico [Martinique], where thirty-three ships were lost. At Guadeloupe in the *Lesser Antilles*, six ships and ten small vessels were lost.<sup>143</sup>

On 2 August 1765 in *England*, there was a great hailstorm in Kent. Hail and ice lying 3 feet deep in some places. Crops were destroyed. The hailstorm also struck in Cambridgeshire and Suffolk.<sup>93</sup>

The summer of 1765 in Denainvilliers, *France* was characterized by:

Hot days	41 days
Very hot days	2 days
Extremely hot days	3 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The hottest days occurred in August. The high temperatures observed during the summer were:

Paris, <i>France</i>	( 96.8° F, 36.0° C) on 24 August
<i>Ibed.</i>	( 99.9° F, 37.7° C) on 25 August
<i>Ibed.</i>	(104.0° F, 40.0° C) on 26 August
Denainvilliers, <i>France</i>	( 95.0° F, 35.0° C) on 24 August
Mulhouse, <i>France</i>	( 85.8° F, 29.9° C) on 16 June
Brussels, <i>Belgium</i>	( 84.9° F, 29.4° C) on 26 August

In Burgundy, the grape harvest began on 23 September. But the wine was bad because on 1 September the area was hit with a hailstorm. In the area of Orleans, the grape harvest produced good vintage wine, because of the hot days at the end of August and early September. The harvest in the south because of heavy rains were plagued with a lot of weed in the sheaves; and as a result, the yield of wheat was bad and a mediocre crop of corn was produced.<sup>62</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 31<sup>st</sup> – hot and pleasant, though it has been raw and cold for some time past. April 9<sup>th</sup> – the robin this morning first made his appearance. April 10<sup>th</sup> – the spring bird, with the robin, gave us a serenade. April 11<sup>th</sup> – the wind blew fresh and cold. April 19<sup>th</sup> – warm. April 22<sup>nd</sup> – raw; cold. April 30<sup>th</sup> – the dry time continues and increases. May 1<sup>st</sup> – plentiful rain. May 12<sup>th</sup> – the spring is uncommonly forward. May 14<sup>th</sup> – the cherry [trees] blows [blossom]. May 25<sup>th</sup> – cold for 9 days past. May 27<sup>th</sup> – an extremely hot day. May 29<sup>th</sup> – a growing season. June – a growing season. June 30<sup>th</sup> – a great prospect of rain and grass, though the Indian corn very much wants heat. July – alternately warm and cold. August – the pastures are dried up. September 2<sup>nd</sup> – plentiful rains: the earth has a new [green] face. September 15<sup>th</sup> – very cold. September 24<sup>th</sup> – a delightful day.<sup>78</sup>

In 1765, there was a famine in Bombay in *India* and Scinde (now Sindh, *Pakistan*).<sup>156</sup>

In 1765 during the period between 20 April and 19 May, floods struck Shantung (now Shandong province) on the east coast of *China* at Ch'ang-ch'ing and Hui-min. During the period between 6 May and 8 August, a drought engulfed Shensi (now Shaanxi province) in central *China* at Lo-ch'uan. During the period between 16 August and 14 September, floods struck Shensi province at Fu-ku and Hopei (now Hebei province) in northern *China* at Chi. At Chi, houses were damaged by the floodwaters. [Chi is located at longitude 117.24° East and latitude 40.03° North.]<sup>153</sup>

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**Winter of 1765 / 1766 A.D.** At Ratisbon (*Bavaria*) the frost was so severe that birds fell down dead with cold. On 13 January, Reaumur's thermometer was 2° lower than in the severe weather in 1709.<sup>47, 93</sup>

At Lisbon, *Portugal*, Reaumur's thermometer was 3½° below freezing point (-4° C, 24° F).<sup>47, 93</sup>

At Naples, *Italy* also the weather was so excessively severe that the snow laid knee deep in the streets; Mount Vesuvius was also covered with snow, at the same time throwing up fire and black smoke, which made a most astonishing appearance.<sup>47, 93</sup>

On 30 January 1766 in *Gibraltar*, there was a dreadful hailstorm, which commenced about 4 P.M. Hailstones were of immense size. The hailstorm terminated in a rainstorm, which flooded the town and caused the loss of many lives.<sup>93</sup> [Gibraltar is a British overseas territory located on the southern end of the Iberian Peninsula at the entrance of the Mediterranean Sea.]

*Gibraltar* nearly destroyed by a storm on February 3, 1766.<sup>40, 41</sup>

In 1766, the frost was most terrible from 25 December to 16 January and from 18 to 22 January.<sup>90</sup>

In *England* on 15 February, a great snowstorm hit Nottinghamshire, which lasted fifty hours. In other parts of *England* rain storms [freezing rain], which froze upon the trees, and caused great destruction of timber; the immense weight breaking off the largest arms and branches.<sup>47, 57</sup>

In *England* on February 14<sup>th</sup> and 15<sup>th</sup>, there was a great rainstorm in the south and southwest of *England*, which, by reason of a northeast wind, became frozen as it fell, and thus weighing down large timber trees, produced terrible destruction. In the northern part of *England* there was snow, accompanied by severe frost.<sup>47, 93</sup>

The Seine River in *France* was entirely frozen over.<sup>38</sup>

During the winter of 1765-66, the rivers froze in the southern *France*, even the River Gave, despite his speed. The Seine froze on 1 January 1766, at a temperature of 16° F (-9° C) between the Pont Neuf and the Pont Royal in Paris. The next day the sky was completely clear.<sup>62</sup>

In *France* on the 20<sup>th</sup> of April 1766, the frost was so severe in the province of Dauphiny, that it destroyed the vines, and cut off the blossoms of the early fruit trees.<sup>47</sup> [Dauphiny is a former province in southeastern *France* which extended up to what is now the center of Lyon.]

The winter of 1765-66 was severe in *France*. The frost in Denainvilliers, *France* lasted from 20 December 1765 to 25 January 1766, producing 36 days of frost in succession. The coldest day was 10 January with a measured temperature of 8.4° F (-13.1° C). The lowest temperature observed in Paris was 9.5° F (-12.5° C). The Seine River froze on 1 January 1766. The River Gave and the other rivers in southern *France* were covered with ice. The Rhône River at the Heiligen-Geist Bridge froze so solid that carriages traveled across the ice. In Languedoc, *France*, many olive trees were damaged. In Madrid, *Spain* people were ice-skating outdoors, and snow fell in Cadiz.<sup>62</sup>

The winter of 1766 produced harsh frosts in January and February. These froze the Seine River in Paris, *France* by a cold 9.5° F (-12.5° C). There were thirty-two days of frost at Viviers, and thirty-seven days of frost at Montpellier. The cold reached 11.8° F (-11.2° C) in Viviers and 14° F (-10° C) at Montpellier. A constant drought reigned during the course of these frosts.<sup>79</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1765 on December 16<sup>th</sup> – snow. December 31<sup>st</sup> – last night was as cold as (perhaps) it ever was, in this country, and continues so. In 1766 on January 6<sup>th</sup> – the harbor remains shut up [due to the ice]. January 9<sup>th</sup> – fine weather. January 17<sup>th</sup> – severely cold. January 21<sup>st</sup> – rain. January 30<sup>th</sup> – incomparably pleasant. February 4<sup>th</sup> – fine sledding. February 9<sup>th</sup> – this is the 14th day since there has been any falling weather. February 19<sup>th</sup> – pleasant day. February 26<sup>th</sup> – fair and pleasant. February 28<sup>th</sup> – very cold. March 14<sup>th</sup> – a great northeast snowstorm as ever was known, perhaps greater.<sup>78</sup>

In Philadelphia, Pennsylvania in the *United States* the winter of 1765 was intensely cold. On the 19<sup>th</sup> of February, a whole ox was roasted on the frozen Delaware River.<sup>1</sup>

Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>

The earliest authentic record we have of severe cold weather in Florida in the *United States* is in the year 1766, just after the transfer of the Florida to England. The night of January 2, 1766, John Bartram, the botanist, says, "was the fatal night that destroyed the lime, citron, and banana trees in St. Augustine, many curious evergreens up the river that were nearly twenty years old and in a flourishing state, the young green shoots of the maple, elm, and pavia [red buckeye or firecracker plant], with many flowering plants and shrubs never before hurt." Bartram, who was then camping on the St. Johns River above Volusia, says: "The morning of the 3d was a clear, cold morning; thermometer, 26° F; wind, northwest. The ground was frozen an inch thick on the banks." Bernard Romans, in his *Natural History of Florida* (1775), says: "On January 3, 1766, a frost destroyed all the tropical productions in the country, except the oranges. The Spaniards called this a judgment on the place for having become the property of heretics, as they never had experienced the like."<sup>115</sup>

*The Modern Part of an Universal History from the Earliest Account of Time* published in 1766 describes the climate of *North America* during that period of time. This is of interests because it is shortly after the end of the last Little Ice Age, which corresponded to the reduced period of solar activity known as the Maunder Minimum (1645-1715 A.D.) The following was observed:<sup>290</sup>

— Severe cold is commonly known in the winter months as low as 34 or 35 degrees North latitude. Vast shoals of ice are seen floating, and the sea frequently is frozen to a small distance from the shore, in the latitude of 44 or 45 degrees North.

— Virginia has winters that are fine clear air and dry, which renders it very pleasant. Their frosts are short, but sometimes so very sharp, that it will freeze the rivers over three miles [5 kilometers] broad. Snow falls sometimes in pretty great quantities, but rarely continues above a day or two. Their spring is about a month earlier than in England. In April, they have frequent rains. May and June the heat increases. The summer is much like in England, being mitigated with gentle breezes that rise about nine o'clock, and decrease and increase as the sun rises and falls. July and August, those breezes cease, and the air becomes stagnant. In September, the weather usually breaks suddenly, and heavy rains fall, when many people fall sick. This becomes the time of the fluxes, scorbutic dropsies, gripes, or the like.

— In Maryland, the air is excessively hot some part of the summer, and equally cold in winter, when the northwest wind blows. Their winters are not of more than three or four month's duration, and in these they seldom have one month of bad weather. All the rest they are happy in a clear air, and bright sun, and are scarce ever troubled with fogs.

— New England (the colonies of Massachusetts, New Hampshire, Connecticut, Rhode Island and Providence Plantation) have north and northwest winds blowing over a long tract of frozen country, are excessive cold, which makes the winters there much severer and longer than in Old England. The ground is also covered with snow and the shipping on the coast frozen up several months. But then the weather is more constant, and not variable as in Old England, and the short summer much hotter.

— The country called New Britain or Eskimaux and British Canada borders the Hudson Bay. There are high mountains to the north which being perpetually covered with snow. The winds blow from the north three fourths of the year. It is an area of excessive cold. The soil in the countryside around Fort Nelson is frozen six feet [1.8 meters] deep even in the summer. In lakes and standing waters, which are not ten feet [3 meters] deep, the water is frozen to the bottom in the winter and the fish killed. But in waters of greater depth, and rivers near the sea, the fish are caught all winter, by cutting holes in the ice to which they come up for air. As soon as they are taken out of the water, they are immediately frozen stiff and are thawed out again by being immersed in cold water.

— Canada proper (bordered by Terra de Labrador, Hudson Bay and New Britain; on the east by the River Saguenay; and on the south by the great province of Louisiana and the Iroquois and Etechemins) greatest hardship is the winter cold, which is there so excessive from December to April, that the greatest rivers freeze over, and the snow lies commonly two or three feet [0.6-0.9 meters] deep on the ground.

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**1766 A.D.** On 10 July 1766 in *England*, there was a great hailstorm in Greenwich [now a suburb of London]. The hailstones were very large.<sup>93</sup>

On 13 July 1766 in *England*, there was a hailstorm in Yorkshire.<sup>93</sup>

On 17 July 1766 in *England*, there was a hailstorm in Suffolk.<sup>93</sup>

On 21 July 1766 in southern *France*, there was a hailstorm at Verdun-sur-Garonne. Hail, accompanied by torrents of rain, fell, and destroyed and carried away all the crops not previously gathered. The water courses were thus choked, and a great flood ensued, placing more than 100 houses under water. Trees were uprooted by the force of the hurricane; and the church at Pilleport was blown down and 12 persons killed.<sup>93</sup>



The summer of 1766 was remarkable for an extremely high temperature. In July at the Observatory of the College of *France*, a temperature of 100.0° F (37.8° C) was recorded. However, in Paris there were only 24 hot days and one very hot day. And in Denainvilliers, *France* only 40 hot days were observed. The grape harvest began in Burgundy on 27 September. The yield of wine was ordinary and the quality pretty good. This summer was excessively rainy in southern *France*. In the countryside around Orleans in September, many vines froze to death.<sup>62</sup>

The rains of 1766 were epoch-making in the southern *France*. They occurred during the autumn over much of these lands. They ravaged Alby [now Albi], Montauban, Cette [now Sète], Montpellier, Provence and Roussillon. These rainstorms broke out in October. In Montpellier on the 13<sup>th</sup>, it rained for eight consecutive hours. Thereafter, all its rivers overflowed and swamped fields, vineyards and whole herds. These early rains were still very mild compared with November. A furious storm broke out on November 14, about ten o'clock in the evening. The storm was violence during all the next day and continued almost without interruption until 22<sup>nd</sup>. At Montpellier, they measured 32 inches (812 millimeters) of rainfall in the months of October and November. This broke down to 6.4 inches (163 millimeters) in October and 25.6 inches (649 millimeters) in November. This was 1.9 inches (47 millimeters) above the average for these two months. November 14 alone produced at least 15.4 inches (392 millimeters) of rainfall. The period of November 14<sup>th</sup> to the 17<sup>th</sup> produced a total of 21.3 inches (541 millimeters).<sup>79</sup>

Lightning and tempest storms of 1766 sowed grief and terror. They began in October and were repeated with increasing violence in the month of November. The storm of 14 November surpassed all others. No feature was missing from this terrible scene. There were fierce winds, heavy shots of thunder, hail and torrents of rain. These storms struck mainly the southern provinces of *France*.<sup>79</sup>

In *Scotland* in 1766, "The magistrates of Edinburgh and Glasgow have put an stop to the exportation of grain, tallow, and butter, in their respective jurisdictions; a power which the magistrates of London do not seem to possess."<sup>57</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April – generally pleasant. April 27<sup>th</sup> – the spring comes on finely. May 5<sup>th</sup> – a long spell of raw, cold weather. May 16<sup>th</sup> – our cherry trees begin to blossom. May 26<sup>th</sup> – the cherry trees are in full blow [bloom]. May 31<sup>st</sup> – the spring it uncommonly forward, the Indian corn, in many places, has come up. June 14<sup>th</sup> – an uncommon growing season. July 30<sup>th</sup> – rain every day; never such a season but the old grass [covered] grounds have but poor burdens, owing to the last winter's frost, which killed the grass. August 18<sup>th</sup> – such a growing season through the whole summer never was known. September 1<sup>st</sup> – cabbages are beginning to head. September 10<sup>th</sup> – Michaelmas storms. September 30<sup>th</sup> – the earth has a most beautiful face; the English grass is now set, and grows more than at any time this year, and there has been no frost yet. October – pleasant weather most of the month. October 31<sup>st</sup> – a surprising warm summer's day. November 1<sup>st</sup> and 2<sup>nd</sup> – two more similar days. November 9<sup>th</sup> and 13<sup>th</sup> – cold. November 14<sup>th</sup> – moderate again.<sup>78</sup>

On 13-14 August 1766, a hurricane struck the *Caribbean Islands* of Martinique. [Various accounts give differing fatality figures of 440, 400, 100, and 90.]<sup>141</sup>

On 13 August 1766 a dreadful hurricane struck the *Caribbean* island of Martinico [Martinique]. The hurricane began at ten in the evening with a gale from the northwest. At midnight, the shock of an earthquake added to the horrors of the increased hurricane. At three in the morning, the gale abated, and at daylight the streets of St. Pierre's appeared covered with ruins. The roads were blocked up with trees blown up by the roots. The rivers had brought down stones of an enormous size; and the shore was covered with wrecks and dead bodies. At five a.m., a waterspout burst upon Mount Peleus, and overwhelmed the neighboring plains. At six it was quite calm, and the sea smooth. Twenty-eight French and seven English vessels were wrecked, besides twelve passage canoes. Ninety persons were said to



have perished, many under the ruins of their own houses, and twice that number were wounded. The writer says, "The above is a genuine recital of what has happened at St. Peter. In going over the island, we shall find nearly the same calamities, and in some places still worse."<sup>143</sup>

On 4 September 1766, a hurricane struck Texas in the *United States* and the *Gulf of Mexico*. During the hurricane, 5 ships were wrecked on Galveston Island, Texas and a majority of the treasure and persons from these ships were saved. In the *Gulf of Mexico*, it is believed that one merchantman vessel from the Spanish Fleet was lost in the storm. But the date of the loss of the merchantman vessel varies by the account. One ascribes the date as the 1<sup>st</sup>-4<sup>th</sup>, or in the middle of September.<sup>141</sup>

[Due to a hurricane] On 13-15 September 1766, all the vessels at Montserrat [located in the Leeward Islands, part of the chain of islands called the Lesser Antilles in the *West Indies*], and thirteen vessels at St. Kitts in the *West Indies*, were driven on shore and lost. At Montserrat, half the town was destroyed and upwards of two hundred persons reduced to distress, by the torrents from the mountains.<sup>143</sup>

On 21 September 1766, the provision grounds and sugar cane plantations at *Caribbean* island of St. Eustatius [Statia] were destroyed by a violent hurricane. Several vessels were lost. The salt works at Tortuga were also destroyed by a hurricane, and three French and five Newfoundland, Canada vessels driven on shore there.<sup>143</sup>

On 6 October 1766, a hurricane struck Guadeloupe in the *Leeward Islands*. Twelve inbound slave ships from Africa traveling to the Isle de Saints were totally lost during the storm.<sup>141</sup> [Îles des Saintes is a small archipelago of French Antilles located to the south of Guadeloupe island.]

On 6 October 1766, five vessels were driven on shore at Dominica in the *Lesser Antilles* in a gale of wind, and upwards of fifty sail [sailing ships] at Guadeloupe in the *Leeward Islands*.<sup>143</sup>

On 22-23 October 1766, a violent hurricane did considerable damage in the harbor of Pensacola, Florida in the *United States*. The Spanish fleet from Vera Cruz [Veracruz, Mexico] bound for Havana, Cuba and then Spain, consisting of five large register ships richly laden, was driven ashore in the bay of St. Barnard [where the Mississippi River enters the Gulf of Mexico].<sup>143</sup>

On 23 October 1766, a hurricane struck northwest Florida in the *United States*. All the crew drowned except for three in the brig *Wetherill* during the most terrible hurricane.<sup>141</sup>

In 1766 during the period between 8 August and 8 November, floods struck Shantung (now Shandong province) on the east coast of *China* at Liao-ch'êng, Tsinan, Yü-ch'êng, Hui-min, Shang-ho, Li-ching, Chin-hsiang and Yü-t'ai. During the same period of time, a drought engulfed Shantung province at Wên'têng and Jung-ch'êng.<sup>153</sup>

**Winter of 1766 / 1767 A.D.** The Seine River in *France* was entirely frozen over.<sup>38</sup>

In *Denmark* at Copenhagen in January 1767, the cold was reported to be as intense as it had been in 1740. The Sound was frozen over, and there was communication with *Sweden* on the ice.<sup>47, 93</sup>

In *Russia* in January 1767, the cold was unusually intense; many, both rich and poor, perished; while many more were devoured by wolves in the forests.<sup>47</sup>

In *Prussia* (now *Germany*) at Berlin in January 1767, the cold was more severe than it was in 1740. The Rhine River was frozen near Coblenz – a circumstance which the annals of that city record as a

memorable event. The artificers [artistic craftsman] again followed their several trades upon the ice [ice fair on the Rhine].<sup>47, 93</sup>

In *Italy* in January 1767, the cold was so severe as to drive the poor from their habitations in the country; and some were said to have perished.<sup>47</sup>

In *England*, “The snow was so deep throughout the whole kingdom that the like has not been remembered by the oldest man living; many people perished, cattle and horses have been buried and dug out; the stage wagons have been delayed; the post boys have been bewildered, and some frozen to death; in short the severity of the season is universally felt; and the distresses of the poor in many places are inexpressible.”<sup>47, 57</sup>

In 1767, there was a severe frost [in *Great Britain*].<sup>128</sup>

In 1767, the Rhine River in *Germany* was driven by wagons. The Seine River in *France* was very low, and froze at a very moderate cold. On the Seine, the frost began on 4 January, a thaw came on 22 January, the ice conditions ended on the 26th. The thickness of the ice was 19 centimeters (7.5 inches).<sup>62</sup>

The cold during the winter of 1766-67 during the month of January was especially severe. Many vines and plants were frozen to death. But the cornfields were protected by the large amount of snow that fell during the winter. The following are lowest temperatures observed during the winter:

Warsaw, <i>Poland</i>	(-22.0° F, -30.0° C)
Utrecht, <i>the Netherlands</i>	( -4.0° F, -20.0° C)
Frankfurt, <i>Germany</i>	( -2.9° F, -19.4° C)
Cologne, <i>Germany</i>	( -1.7° F, -18.7° C)
Derby, <i>England</i>	( -1.5° F, -18.6° C)
Brussels, <i>Belgium</i>	( 0.0° F, -17.8° C) on 7 January
Dijon, <i>France</i>	( 0.5° F, -17.5° C)
Denainvilliers, <i>France</i>	( 1.6° F, -16.9° C) on 12 January
Vienna, <i>Austria</i>	( 1.6° F, -16.9° C)
Paris, <i>France</i>	( 4.5° F, -15.3° C)
London, <i>England</i>	( 15.4° F, -9.2° C)

The Rhine River in *Germany* was frozen so hard that loaded wagons passed between Cologne and Deutz on the ice. Also Lombardy, *Italy* was very cold.<sup>62</sup>

In *France* on 20 April 1767, the frost was so severe in the province of Dauphiny that it destroyed the vines, and cut off the blossoms of the early fruit trees.<sup>93</sup>

On 2 January 1767, the temperature at New Haven, Connecticut in the *United States* fell to -26.5° F [-32.5° C].<sup>207</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1766 on November 17<sup>th</sup> – a great snowstorm. November 29<sup>th</sup> – geese and chickens plentiful at 2s. a pound; turkeys 2s. 6d. Cold weather. December 5<sup>th</sup> – butter 5s. a pound. A moderate month for December. In 1767 on January 6<sup>th</sup> – a deluge of rain carried away most of the snow. January 11<sup>th</sup> – snow. January 13<sup>th</sup> – more rain. The last snow entirely carried away. January 17<sup>th</sup> – more snow. January 21<sup>st</sup> – the roads are all ice again. January 26<sup>th</sup> – more snow. January 30<sup>th</sup> – incomparable sledding. February – a cold month.<sup>78</sup>

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**1767 A.D.** In *England* in January 1767, there was an apparent irruption of the sea. The tide rose so high in the Thames that the damage occasioned was estimated at 50,000*l.* On the seaboard of Essex several islands were submerged. At Aldborough (Suffolk) the sea flowed in at the windows of several houses, bore down a few, and damaged many. The inhabitants were driven to the greatest distress. Much damage

done near Ipswich. Ayrmouth, *Scotland*, the sea breached over many of the houses, the high street was like a sea, and the consternation of the inhabitants' inexpressible.<sup>47</sup>

In *England* in February 1767, "The floods are every where out; but the most melancholy effects of these inundations are almost always felt in the fen counties, where a breach in the banks generally lays whole districts under water. By a breach in Deeping Bank, several thousand acres are now under water; and by the north bank of the River Glen giving way, the north fens are overflowed, by which the inhabitants of the villages between Peterborough and Lincoln are reduced to the most deplorable circumstances: their cattle carried away, and their houses three or four feet under water. Many other places have shared the same fate; and in short their consternation and distress is such as none can conceive but those who have been in the like situation."<sup>47</sup> [Deeping Bank is now Deeping Fen, a low-lying area in Lincolnshire in the east of *England*.]

In *Wales*, "No man living ever saw such floods."<sup>47</sup>

In *Scotland* in February, the inundations on the breaking up of the snow did incredible damage. At Lochinabar the waters of the River Annan came down with such rapidity as to take houses, cattle, corn, and everything along with them.<sup>47</sup> [Lochinabar is now Lochinvar, a loch in southwestern *Scotland* that is a reservoir.]

In *Ireland*, the waters of the River Liffey overflowed, doing great damage.<sup>47</sup>

In 1767, riots [in *Great Britain*] ensued on account of the high price of bread, at 7¼ *d*. In 1768, a quarter of a loaf of bread cost 7¼ *d*. In 1769, a quarter of a loaf of bread, at 6½ *d*.<sup>128</sup>

In *France* on the 8<sup>th</sup> of April, there was a dreadful storm of thunder and lightning, which did considerable damage at Provence. The lightning set fire to the Royal Abbey of St. James, by which one of the main beams in the steeple was burnt, so as to give way in the angle. Two other churches were set on fire in the neighborhood; the bells of one melted, and the other was entirely consumed.<sup>57</sup>

On 4 May 1767, at Hitchin in Hertfordshire, *England* after a violent thunderstorm, a black cloud suddenly arose in the southwest and was almost instantly followed by a shower of hail. Several of the hailstones, which fell measured from seven to fourteen inches in diameter. The extremity of the storm fell near Offley, where a young man was killed, and one of his eyes was beaten out of his head, his body being in every part covered with bruises. Another person, nearer to Offley, escaped with his life, but was extremely bruised. At a nobleman's seat in the vicinity, seven thousand squares of glass were broken, and great damage was done to all the neighboring houses. The large hailstones fell in such immense quantities, that they tore up the ground, and split many large oaks and other trees, cutting down extensive fields of rye, and destroying several hundred acres of wheat, barley. Their hailstones had various shapes, some being oval, others round, others pointed, and others flat.<sup>191</sup>

In 1767, Potsdam, *Germany* was devastated by hailstones that were the size of ordinary gourds.<sup>190</sup>

On 20 July 1767 in *France*, there was a terrible hailstorm at Valenciennes. This storm did great damage to houses, trees, grain, and cattle. It began a few miles southwest of that city, and proceeded in a northeast direction as far as the province of Holland [now *the Netherlands*], causing great destruction in its progress. There were 19 villages being more or less destroyed.<sup>93</sup>

In August 1767, a great Atlantic hurricane struck the island of Martinique in the *Caribbean* causing approximately 1,600 deaths.<sup>107, 141</sup>

On 1 September 1767 in Genoa, *Italy*, there was great damage done to the city by hail and lightning.<sup>93</sup>

On 21 September 1767, an Atlantic hurricane struck off the coast of North Carolina in the *United States*. A number of vessels were lost during this violent storm.<sup>141</sup>

The year 1767 was no less dry. In Paris, *France*, the Seine River fell to 10.6 inches (27 centimeters) below the zero water mark of 1719. This was significantly lower than ever seen before. In Bordeaux, *France* 18.5 inches (469 millimeters) of rain fell instead of the typical 25.8 inches (656 millimeters). In Denainvilliers, *France*, Duhamel described this year as cold and dry. In Montpellier, *France*, the amount of rainfall was 4.2 inches (106 millimeters) less than the typical yearly rainfall. The total number of rainy days was twenty-three days less than seen in a common year.<sup>79</sup>

In 1767, a powerful cyclone struck Backerganj (Barisal), *Bangladesh* causing 30,000 deaths.<sup>98</sup>

In 1767, floods struck Hupeh (now Hubei province) in central *China* at Wuchang, Ao-ch'êng, Huang-p'o, Hanyang, Ching-mên, Huang-kang, Ch'i-shui, Lo-t'ien, Kuang-chi, Chiang-ling, and Chih-chiang. During the same year, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou.<sup>153</sup>

In 1767 during the summer, there was a flood in the vicinity of Shanghai, *China*.<sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: February 28<sup>th</sup> – warm and pleasant. March 3<sup>rd</sup> – a great rain. March 4<sup>th</sup> – storm. March 12<sup>th</sup> – cold. March 17<sup>th</sup> – charming day; good walking. March 24<sup>th</sup> – rainy. March 30<sup>th</sup> – we had smelts [fish] today; two coppers a dozen. March 31<sup>st</sup> – charming spring-like weather. April 6<sup>th</sup> – the robins came and began to sing. May 12<sup>th</sup> – strangely cold. May 15<sup>th</sup> – the heat breaks in upon us. May 22<sup>nd</sup> – the heart cherries are in the blow [bloom]. May 27<sup>th</sup> – cold. June 5<sup>th</sup> – Curtis Chute and one Young were killed instantly by lightning, at the widow Gooding's; Harrison and others hurt and near being killed, and the house near being destroyed also. June 11<sup>th</sup> – a growing season, but poor prospect of grass. June 16<sup>th</sup> – cold. June 21<sup>st</sup> – extremely hot; shower in the evening. June 27<sup>th</sup> – no rain since June 21<sup>st</sup>. June 30<sup>th</sup> – showers. July 20<sup>th</sup> – people are concerned about the drought. July 23<sup>rd</sup> – great showers. July 31<sup>st</sup> – deluge of rain. [There appears that a tornado swept through Falmouth on the 31<sup>st</sup> of July. “It commenced near Sebago Pond, took an easterly direction, passing through Windham, and directly over the Duck Pond, passed through the north part of Falmouth, and the south part of North Yarmouth, (now Cumberland) to the sea. It appears to have been the most violent in the town of Falmouth. It took the roof off the house of Mr. Purrington, situated near the Duck Pond, and prostrated every tree in its way, except a few sturdy oaks, but abated in some measure after it entered North Yarmouth, so as not to do much damage in that town. It extended in breadth about three quarters of a mile.”] August 18<sup>th</sup> – the grass grows more than in the spring. August 23<sup>rd</sup> – extremely hot. August 26<sup>th</sup> and 28<sup>th</sup> – extremely hot. September 28<sup>th</sup> – we began to dig our potatoes; moderate fall.<sup>78</sup>

The maximum temperature during the summer in Manila, *Philippines*, was 113.5° F (45.3° C) on 20 June.<sup>62</sup>

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**Winter of 1767 / 1768 A.D.** Extreme frost in *England*. “A severe frost set in from the east-southeast, which was followed by a deep snow, by which the navigation of the River Thames has been obstructed, and the posts retarded all over the kingdom.” The frost was especially severe in the west of *England*.<sup>47, 93</sup>

In *England* in January 1768, “We have had very severe frost and deep snow this month; my thermometer was one day 14 ½° below freezing point, within doors. The tender evergreens were injured pretty much. It was very providential that the air was still, and the ground well covered with snow, else vegetation in general must have suffered prodigiously. There is reason to believe that some days were more severe than any since the year 1739-40.”<sup>47, 93</sup>

In Selborne, Hampshire in the southern coast of *England*, in 1768, the year began with a fortnight's [14 days] frost and snow. On the 3<sup>rd</sup> of January, a thermometer indoors, in a closed parlor, where there was no fire, fell at night to 20° F (-6.7° C). On the 4<sup>th</sup>, it measured 18° F (-7.8° C). On the 7<sup>th</sup>, it read 17.5° F (-8.1° C). The cold was very severe. It froze under people's beds for several nights. Meat was so hard frozen that it could not be spitted and could only be secured in cellars. Thereafter wet and rainy weather prevailed to the end of February.<sup>70</sup>

In 1768 in *Scotland* there was a very severe frost.<sup>47,93</sup>

The frost began on 21 December 1767. By the 23<sup>rd</sup>, the cold 19° F (-7.5° C) drove the Seine River in *France* to ice. The ice held on until 13 January 1768.<sup>62</sup>

A bitter cold raged during the winter of 1768. In Paris, *France*, the thermometer fell to -0.8° F (-18.2° C), in Viviers 9.5° F (-12.5° C) and at Montpellier 14° F (-10° C). The cold this winter, with snow, began in December, reached its maximum during the first days of January.<sup>79</sup>

During the winter of 1767-68, in *America*, in all of *Europe* and especially in *France* there was very severe cold. But the winter was not of long duration and did not bring much snow. The intense cold was generally felt between 20 December and 9 January. During these 26 days it froze constantly. The Seine River froze between the bridges, however, at Pont-Royal the river remained open in the middle of the flow. The lowest observed temperature during the winter were:

Warsaw, <i>Poland</i>	(-13.0° F, -25.0° C)
Cologne, <i>Germany</i>	( -6.9° F, -21.6° C) on 6 January
Brussels, <i>Belgium</i>	( -2.9° F, -19.4° C) on 5 January
Namur, <i>Belgium</i>	( -0.2° F, -17.9° C)
Paris, <i>France</i>	( 1.2° F, -17.1° C) on 5 January
Denainvilliers, <i>France</i>	( 1.6° F, -16.9° C) on 6 January
Utrecht, <i>the Netherlands</i>	( 1.9° F, -16.7° C)
Leyden, <i>the Netherlands</i>	( 3.9° F, -15.6° C) [now Leiden]
Amsterdam, <i>the Netherlands</i>	( 7.7° F, -13.5° C)
London, <i>England</i>	( 16.9° F, -8.4° C)

In Provence, the cold was also very severe. In the area of Toulouse, *France*, the corn was completely frozen. On 5 January, at 7 o'clock in the morning near Denainvilliers, *France* in a well of 16 meters deep and 2 meters wide was found ice 4.5 millimeters thick. At Montmorency, *France*, another well, this one 10 meters deep was also frozen.<sup>62</sup> [Montmorency is now in the northern suburbs of Paris.]

On 5 January 1768, 30, 50 and 55 foot deep wells in Paris, *France* froze.<sup>80</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1767 on October 13<sup>th</sup> – cold weather. October 28<sup>th</sup> – snowstorm. October 30<sup>th</sup> – charming pleasant since the storm. December 14<sup>th</sup> – snow. December 19<sup>th</sup> – snow. December 21<sup>st</sup> – exceeding cold; the thermometer down to 0° F (-18° C). In 1768 on January 20<sup>th</sup> – we rode to Windham and round Gorham in sleighs. February 1<sup>st</sup> – there was a great body of snow on the ground. February 10<sup>th</sup> – four and a half feet (1.4 meters) [of snow] in the woods, so that people beat out [paths], and [retrieve] wood with their teams. February 27<sup>th</sup> – all the week has been warm like April, and indeed all the month. The winter must be accounted moderate, except December, and a week in November; the thermometer in generally between 36 and 40 degrees. March – generally cold and windy. March 20<sup>th</sup> – a terrible snowstorm. April 1<sup>st</sup> – a great snowstorm. April 9<sup>th</sup> – it continues cold and windy.<sup>78</sup>

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**1768 A.D.** On 9 May 1768 in northwestern *France*, there was a great hailstorm at Laval. The hailstones resembled fowls' eggs. Fruit and crops were destroyed. Also trees were broken and cattle killed. "In some places the hail was found 3 or 4 feet deep after it fell. The damage was incredible."<sup>93</sup>

In June 1768 in *England*: "By letters from different parts it appears that the thunder and hailstorms of last week [1st week in June] were felt more or less throughout the Kingdom; and that great damage had been sustained by them. They also reached the [European] Continent, and the Island of Guernsey, where considerable damage was done." <sup>93</sup> [Island of Guernsey is one of the British Channel islands off the coast of Normandy.]

On 6 June 1768 in *England*, there was a hailstorm in Hertfordshire and Kent. <sup>93</sup>

On 7 June 1768 in *England*, there was a hailstorm in Middlesex and Surrey. <sup>93</sup>

On 8 June 1768 in *England*, there was a hailstorm in Wiltshire. <sup>93</sup>

On 21 June 1768 in *England*, there was a great hailstorm in Devonshire and Yorkshire. <sup>93</sup>

The summer of 1768 in New England in what was to become the *United States* was noted for an extreme number of lightning strikes that destroyed people, houses, barns, taverns, businesses, trees, and animals in the cities of Boston, Rehoboth, Mendon, Uxbridge, Charlestown and Wrentham, Massachusetts, and in Hartford and Norwalk, Connecticut. <sup>199</sup>

On 9 July 1768 in *England*, there was a hailstorm in Northumberland. <sup>93</sup>

On 14 July 1768 in *England*, there was a hailstorm in Norfolk. <sup>93</sup>

On 18 July 1768 in *England*, there was a hailstorm in Kent. <sup>93</sup>

On 19 July 1768 in *England*, there was a hailstorm in Somersetshire. <sup>93</sup>

On 23 July 1768 in *England*, there was a hailstorm in Gloucestershire. <sup>93</sup>

On 30 July 1768 in *England*, there was a hailstorm in Norfolk, Suffolk, and Worcestershire. <sup>93</sup>

In July in *Scotland*, there was a great hailstorm in Selkirk. Cattle and crops were severely damaged; some persons injured. <sup>93</sup>

On 1 October 1768 in *France*, there was a great hailstorm in Laval. The hailstorm only lasted 6 minutes, but it destroyed fruit and ungathered grain and also trees in 5 parishes. Pieces of ice fell in different shapes, some weighing 2 pounds. <sup>93</sup>

On 15 October 1768, a hurricane struck Havana, *Cuba*. Most accounts give the number of deaths as greater than 1,000. <sup>141</sup>

A hurricane struck Havana, *Cuba* on 25 October 1768. It destroyed 96 public offices and 4,048 houses. One thousand inhabitants almost instantly perished. <sup>174</sup>

On 25 October 1768, a hurricane struck Havana, *Cuba* destroying 96 public edifices and 4,048 houses. Above 1,000 persons perished almost instantaneously. The storm began from the southward, and died away from the north. It did not continue more than two hours. The harbor was also very much injured. <sup>143</sup>

In Havannah (Havana, *Cuba*) on the 25<sup>th</sup> of October, there was a dreadful hurricane; 4,048 houses and many public edifices destroyed. About 1,000 inhabitants perished. <sup>57, 90</sup>



On 25 October 1768, a hurricane struck Havana, *Cuba*. The storm killed 1,000 persons and destroyed 4,048 houses.<sup>197</sup>

On the 29 October 1768, a cyclone struck the coast of Coromandel in southern *India*, fatal to the Chatham Indiaman [A large merchant ship formerly used on trade routes to India], which neglected to put to sea.<sup>191</sup>

There were heavy floods in Behar and the district Bengal in August.<sup>47</sup> [Behar remained part of *India* after “The Partition of India” in 1947. Bengal today is West Bengal in *India* and East Bengal in *Bangladesh*]

On 4 December 1768, a gale struck the coast of New England in what was to become the *United States*. At New Haven, Connecticut, two ships were driven ashore. At Guilford, Connecticut, one ship went ashore. A brigantine was driven on the rocks near the lighthouse in Boston harbor and instantly dashed to pieces. Another brigantine was cast away near Cape Ann in Massachusetts. A coaster was lost before it reached Pownalborough, Maine and every person onboard drowned. Another vessel was wrecked at Fox Island. Many other vessels were also wrecked by this storm.<sup>199</sup>

In 1768, droughts engulfed many regions of *China* including:<sup>153</sup>

— During the period between 16 May and 14 June, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin and Kao-yu.

— During the period between 6 May and 8 November, a severe drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Lien.

— During the period between 14 July and 11 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Jih-chao and Chekiang (now Zhejiang province) on the east coast of *China* at Ch’ung-tê and Chia-hsing.

— During the period between 12 August and 10 September, a drought engulfed Hupeh (now Hubei province) in central *China* at Hsiao-kan, Yün-mêng, Ying-ch’êng, Ying-shan, Ao-ch’êng, Chung-hsiang, An-lu and Tsao-yang.

— During the period between 11 September and 10 October, a severe drought engulfed Kiangsu province at T’ai. The rivers dried up.

In 1768 during the period between 12 August and 10 September, floods struck Shansi (now Shanxi province) in northern *China* at Taiyuan; and Hopei (now Hebei province) in northern *China* at Wu-ch’ing, Ch’ing-yün [“Ch’ing” possibly the word “yün” was left off by mistake], Ning-ho, Nan-yüeh, Hsü-shui and Wang-tu.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 21<sup>st</sup> – a backward spring. April 29<sup>th</sup> – thermometer rose to 64° F (18° C) then sunk to 47° F (8° C). May 13<sup>th</sup> – cold still, and the spring unusually backward. May 20<sup>th</sup> – the thermometer up to 72° F (22° C). May 21<sup>st</sup> – now 76° F (24° C), but in the afternoon it dropped 20 degrees. The cherry and damson [plum] trees begin to blow [blossom]. May 28<sup>th</sup> – the face of the earth is renewed and beautifully green. June 1<sup>st</sup> to 12<sup>th</sup> – frequent showers. June 14<sup>th</sup> – a great storm, as ever we knew; wind S.S. E. that did a great deal of damage. June 20<sup>th</sup> – warm; here we may reckon summer begins. July 16<sup>th</sup> – it rains almost every day. July 22<sup>nd</sup> – a happy season for Indian corn. July 25<sup>th</sup> – very hot. July 26<sup>th</sup> – the cherries are a good deal colored. July 31<sup>st</sup> – hot weather continues. September 16<sup>th</sup> – seasonable weather all the week. September 29<sup>th</sup> – a great frost last night spoiled the unripe corn. November 6<sup>th</sup> – pleasant. November 20<sup>th</sup> – a great rainstorm.<sup>78</sup>

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**Winter of 1768 / 1769 A.D.** In *England* in April 1769, there was a severe frost.<sup>47, 93</sup>

In *England*, “Last month [April] we had such a series of cold turbulent weather, such a constant succession of frost and snow, and hail and tempest, that the regular migration or appearance of the summer birds was much interrupted.”<sup>57</sup>

In Selborne, *England*, from the middle of November to the end of 1768 there were alternating periods of rain and frost. In January and February 1769, the weather was frosty and rainy with gleams of fine weather in the intervals; then to the middle of March, wind and rain.<sup>70</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1768 on November 27<sup>th</sup> – snow. November 30<sup>th</sup> – it has been an uncommon cold, cloudy, rainy fall, as well as summer. December 31<sup>st</sup> – the snow is all gone and the ground bare. January 1769 – very moderate weather most of the month. February – cold weather came on. February 17<sup>th</sup> – the harbor and whole bay frozen up. February 18<sup>th</sup> – warm, like summer. February 21<sup>st</sup> – still warmer. February 28<sup>th</sup> – here the weather changes to winter again. March 31<sup>st</sup> – a spell of true winter weather.<sup>78</sup>

### 1769 A.D. – 1770 A.D. Bangladesh and India. Famine

During the famine of 1769-70, it is estimated that a fully 15,000,000 souls, a full third of the population of Bengal perished. [Bengal today is West Bengal in *India* and East Bengal in *Bangladesh*.] This famine resulted from a failure of rain, supplemented by bad administration by the East India Company.<sup>84</sup>

In *India*, there was a great famine that devastated the lower valley of the Ganges in 1769-70. One-third of the population is reported to have perished.<sup>54</sup>

In 1770 in Bengal [*India* and *Bangladesh*], the area was devastated by famine; “one-third of the population reported as perished.”<sup>91</sup>

The maximum temperature during the summer in Puducherry, *India* was 109.0° F (42.8° C) in June.<sup>62</sup> [Pudcherry is known today as Pondicherry located on the southern peninsula of *India*.]

In *India* (Hindustan) during 1769-70, there was the first great Indian famine of which we have record. It was estimated that 3,000,000 people perished. The air was so infected by the noxious effluvia of dead bodies, that it was scarcely possible to stir abroad without perceiving it; and without hearing also the frantic cries of the victims of famine who were seen at every stage of suffering and death. Whole families expired; and villages were desolated. When the new crop came forward in August it had in many cases no owners. Other estimates have been that one-third of the population perished.<sup>57</sup>

In *India* (Hindustan) during 1769-70, “Alarming want of rain was also reported throughout all the upper parts of Bengal [*India* and *Bangladesh*]. Madras [Chennai] was also suffering from drought, and from the ravages of the enemy, and the demands for grain caused a scarcity also in Calcutta. During September, October, and November [1769], the drought continued nearly all over Bengal [*India* and *Bangladesh*], the calamity being most severely felt in Behar and the Bengal districts north of the Ganges. A plentiful rain fell in June 1770; but the hopes of relief from the next crop which were thereby raised, were disappointed by the overflowing of the rivers in the eastern provinces; but the new crops in all the districts not greatly injured by floods were good.” The famine ceased by the end of the year [1770].<sup>57</sup> [In 1769-70, historical Hindustan is usually applied to the Ganges Plain of North *India* and sometimes used to denote the whole of *India*. Madras is the southwestern coast of *Indian* sub-continent. Calcutta is now Kolkata, capital of the northwestern *Indian* state of West Bengal. Behar is a state in northeastern *India*.]

There was a great famine in *India* in 1769-70.<sup>155</sup>

In 1769-70, there was a great famine in Bengal [Bengal today is West Bengal in *India* and East Bengal in *Bangladesh*]. During this famine, it was estimated that a third of the inhabitants of Bengal died.<sup>156</sup> — Bengal, previous to 1769, had been prosperous for some time; both its physical and moral wants were supplied. But in 1768 a warning note of alarm arose in Behar – first the destructive flood, and afterwards an all but total cessation of the rains from August. In 1769, due to a total failure of the rains throughout

the whole of Bengal proper, except the southeast corner and Behar, the region was laid to waste. Want was felt in Madras at the same time. The famine did not prevail in the Northwest Provinces.

— During the winter of 1769, the effects of the drought became more palpable and widespread. Reports said the plough was standing still, and numbers of husbandmen [farmers] deserted their homes. By March it was reported that the “most affecting scenes of poverty and distress were visible” and that “depopulation in the interior was now much more rapid than could well be imagined.” In Patna, no less than 150 died daily. Purneah, in the northeast, which was once a plentiful country, retained nothing but the name of its former abundance. The living fed on the dead. The famine lasted till the harvest in December 1770, and the results of the famine was the death of 30,000,000 human beings. [This figure appears too high. During this time period the population of Bengal was 30 million. If 1/3 of the inhabitants died in the famine, the death toll would be about 10 million.]

In 1770, a great famine struck Bengal [today this is *Bangladesh* and the state of West Bengal in *India*]. On 9 May 1770, the Government of Bengal wrote that not a drop of rain fell in most districts during the past six months. The ensuing famine, the mortality, the beggary, - exceeded all description. Over 1/3 of the inhabitants perished in the once plentiful Province of Purneah [now Purnia]; and in other parts the misery was equal. Also Behar [now Bihar in northern *India*] suffered in an extreme degree from famine at this time. Northern Bengal especially suffered. Even reports from the usually moist northeastern districts of Rungpore [now Rangpur, *Bangladesh*] and Dinagepore [now Dinajpur, *Bangladesh*] were distressing. Rajeshye, Moorshedabad, Rajmahal, Jessore, Hooghly, Bheerbhoom, Burdwan and Calcutta were all affected at some time during this famine. Even Dacca [now Dhaka, *Bangladesh*] was affected but in this case it was caused by a dreadful inundation that destroyed a considerable part of the crops.<sup>183</sup>

This famine first appeared in Behar [now Bihar in northern *India*], which suffered two bad years. There had been floods in August 1768 and from that time until the beginning of January, there had been no rain. By July 1769, there had been only a few trivial showers. The sown grain was entirely spoiled. Grain prices skyrocketed.<sup>183</sup>

On 26 December 1769, a resident of the city of Patna, *India* wrote, “From fifty to sixty people have died of absolute hunger in the streets every day for these ten days past.” On 16 March 1770, a resident of Behar [now Bihar in northern *India*] wrote, “The depopulation of the interior parts of the country is now more rapid than can well be imagined by any person who has not been witness to it; and such is the disposition of the people that they seem rather inclined to submit to death than extricate themselves from the misery of hunger by industry and labour.” Patna reported, “The miseries of the poor of this place increased in such a manner that no less than 150 have died in a day in Patna.” On 30 March, Bengal [today this is *Bangladesh* and the state of West Bengal in *India*] reported, “The distress of the inhabitants does not only proceed from scarcity of provisions, but in many parts they are without water to drink.” The European Supervisor, Mr. Daniel, reported that in the higher pergunnahs “I do not believe I should in anywise exaggerate in saying that half of the ryots [peasant farmers] were dead, for if I were to speak from reports or what I have seen, I should judge the number to be rather more than less.” At Jessore [in *Bangladesh*], the land became as hard as a rock, then things went from bad to worse till “mankind are employed in bringing the leaves of the trees from the jungle for food, and they offer for sale their sons and daughters.” In June, a resident of Moorshedabad [now Murshidabad, *India*] wrote, “in several parts the living have fed on the dead”.<sup>183</sup>

In 1769 in a year of the famine, so many cattle perished that the tigers, deprived of their ordinary food, attacked the town of Bhawapar in Gorakhpur, *India* and killed about four hundred people. The inhabitants fled, and the place remained for some years deserted.<sup>181</sup>

There was a terrible famine that ravaged Bengal [today this is *Bangladesh* and the state of West Bengal in *India*] and Bihar [in northern *India*] in 1770.<sup>181</sup>

In 1770, there was a famine in Bengal [today this is *Bangladesh* and the state of West Bengal in *India*], which destroyed nearly half of the inhabitants.<sup>182</sup>

In 1769-70, a great famine struck *India*. It ravaged primarily the northern portions of the continent. The rice crops of December 1768 and August 1769 were both minimal and the crop for December 1769 almost failed due to the lack of periodic rains which usually fall in October. The drought caused the destruction of the crops of inferior grain and pulse generally reaped between February and April. The famine was felt in the northern districts of Bengal [*Bangladesh*], as early as November 1769 and was general by the end of April. During the most severe period of the famine, rice was 10 times its usual price, and in some places, was not to be had at any price. Large numbers of people, after vainly trying to obtain subsistence from leaves and the barks of trees, perished miserably of starvation. The fields and highways were strewn with their bodies. The number of people who perished during these 12 months was estimated at three million, or a fifth of the whole population of Bengal [today this is *Bangladesh* and the state of West Bengal in *India*], Behar [now Bihar in northern *India*] and Orissa [now Odisha on the east coast of *India*]. In many cases, the starving sustained themselves with the flesh of forbidden and abhorred animals, and there were instances in which child fed upon its dead parent, and the mother on her child.<sup>188</sup>

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**1769 A.D.** In May 1769 in Calcutta, *India*, it is recorded that in the month of Muharram [1183 A.H.] such showers of hailstones fell that the whole of that part of the city where the English resided was reduced to ruins. Many of the inhabitants perished.<sup>93</sup>

On 16 July 1769 in *England*, there was a hailstorm at the Isle of Ely in Cambridgeshire. As a result of this hailstorm, 8 farmers were reported to have suffered an aggregate loss of £3,000. Some of the hailstones measured 6 inches round. Others fell in square pieces. The hailstones killed crows, lapwings, etc. This storm extended into Norfolk and Yorkshire.<sup>93</sup>

In Venice, *Italy* in August, a flash of lightning penetrated the theater at Venice, during the performance with 600 people in the house, several of whom were killed; it put out the candles; melted a lady's gold watch case; the jewels in the ears of others, which were compositions, and split several diamonds.<sup>56</sup>

The summer of 1769 in New England in what was to become the *United States* was unusual. At Salem, Massachusetts on 10 May, the temperature in the shade reached 84.5° F [29.2° C]. The next day, there was a snowstorm that dropped 6 inches [15 centimeters] of snow. A severe frost struck on 2 June. Two days later in Boston, the temperature reached 99.5° F [37.5° C]. On 5 July, a severe rainstorm struck Northampton, Massachusetts. The meadows were covered with water to a depth of 3 - 4 feet [0.9-1.2 meters]. A severe hailstorm struck Massachusetts, Rhode Island and Connecticut on 31 July. A day later at Scituate, Massachusetts, the hail lay on the ground a foot [30 centimeters] deep in many places. At Newport, Rhode Island, the hailstones were the size of musket balls; at West Greenwich they were the size of pullets' eggs. Some of the hailstones that fell at Scituate were the size of goose eggs.<sup>199</sup>

The summer of 1769, at the Observatory of the College of *France* observed a high temperature of 98.4° F (36.9° C) in August. However, the mean temperature of the summer was very low. In Paris, there were only 13 hot days, 4 days of very high heat and one extremely hot day. In Denainvilliers, *France* only 26 hot days and 5 very hot days were observed. The grape harvest began to Burgundy on 27 September; the harvest was small in quantity and quality was mediocre.<sup>62</sup>

On 5-6 September 1769, a hurricane struck coastal North Carolina in the *United States*. The *Neptune* from North Carolina to London, failed on the 4<sup>th</sup> of September during a violent storm on that coast, and it is thought that all perished. One entire street of houses was washed away, along with several residents.<sup>141</sup>

In 1769, floods struck many regions of *China* including: <sup>153</sup>

— During the period between 4 June and 2 July, floods struck Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Ts'ang-wu and Huai-chi; Hopei (now Hebei province) in northern *China* at Hsin-yüeh; and Kiangsu (now Jiangsu province) on the east coast of *China* at Li-shui.

— During the period between 3 July and 1 August, floods struck Kiangsu province at Wu-chin; Anhwei (now Anhui province) in eastern *China* at Ch'ien-shan; and Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Chia-shan.

— During the period between 29 October and 27 November, floods struck Hupeh (now Hubei province) in central *China* at Wuchang, Ao-ch'êng, Ch'ung-yang, Huang-p'o, Hanyang, Huang-kang, Kuang-chi, Chiang-ling and Chih-chiang.

In 1769 during the period between 3 July and 1 August, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-ch'un. <sup>153</sup>

The year 1769 was a year of abundance in the vicinity of Shanghai, *China*. <sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 15<sup>th</sup> – we set out our cabbage stumps. April 20<sup>th</sup> – very cold spring so far. April 29<sup>th</sup> – very dry and very cold weather. May – generally cold and rainy. June – generally cold. June 25<sup>th</sup> – fine hot weather. June 29<sup>th</sup> – cold again. July 5<sup>th</sup> – raw; cold. July 14<sup>th</sup> – very dry. July 22<sup>nd</sup> – thermometer at 83° F (28° C). From this time, much rain to the end of the month. August – a full and good crop of hay, and success in making it; and there is as good a prospect as the latter harvest. September – foggy days. September 8<sup>th</sup> – dreadful northeast storm. September 12<sup>th</sup> – cold nights but pleasant days. September 16<sup>th</sup> – an extraordinary week of warm days. September 26<sup>th</sup> – delightful weather. September 29<sup>th</sup> – charming weather every day. October 12<sup>th</sup> – a deluge of water. October 17<sup>th</sup> – another cold day. October 27<sup>th</sup> to 31<sup>st</sup> – pleasant weather. November 7<sup>th</sup> – we had a cold fall. <sup>78</sup>

*Also refer to the section 1769 A.D. – 1770 A.D. for information on the drought and famine in Bangladesh and India during that timeframe.*

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**Winter of 1769 / 1770 A.D.** In Selborne, *England* during the last half of November 1769, the weather was dry and frosty. During December it was windy, with rain and intervals of frost, and the first fortnight [14 days] very foggy. The first fortnight of January 1770 was frosty, but on the 14<sup>th</sup> and 15<sup>th</sup>, all the snow melted and to the end of February mild hazy weather prevailed. March was frosty and bright. <sup>70</sup>

In 1769 during the winter in the vicinity of Shanghai, *China*, Tien Lake rose into an ice hill; several tens of *tsiang* (50 feet) high, and two *li* (approximately two thirds of a mile) long. Just before it occurred the residents heard a noise as of a myriad of soldiers [sheets of ice crashing into each other]; looking out of the windows by night, they saw more than a thousand lights; in the morning they saw the ice hill, it remained a month before melting. <sup>166</sup>

New England in what was to become the *United States* experienced a great freshet in 1770. On 8 January 1770 due to a combination of rainstorm, wind and tide many regions experienced flooding. <sup>199</sup>

— The Connecticut River overflowed its banks and flooded ½ mile [0.8 kilometers] on either side of the river. At Hartford, Connecticut, the river was impassable for several days.

— The Tunxis or Farmington River was much swollen and very rapid. At Simsbury, Connecticut, it destroyed an ironworks; entirely destroying the whole plant.

— On the Androscoggin and Kennebec Rivers, the freshet was great and caused serious damage. At Bowdoinham, Maine, the tide rose 30 to 40 feet [9-12 meters] higher and in some places 50 feet [15 meters] higher above its usual heights. The thick ice covered river broke up and smashed huge sheets of ice weighing several tons each. The floodwaters and icebergs created a deluge pulling along whole trees,



immense logs, timbers, boats, barns, houses and small buildings, crushing and grinding them against each other in a thundering torrent.

— At Swan Island, huge ice dams were created that cause the river to overflow its banks

— On the Androscoggin River, the freshet was extremely destructive. At Brunswick Falls, Maine, the flood destroyed two double sawmills, a gristmill, two other sawmills, and a monstrous dam. The broken ice below the falls measured 60 feet [18 meters] high above the water.

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1769 on November 16<sup>th</sup> – very cold. November 29<sup>th</sup> – last night the thermometer was down to 12° F (-11° C). December 2<sup>nd</sup> – more moderate. December 8<sup>th</sup> – severe cold. December 13<sup>th</sup> – thermometer at 3 o'clock down to 3° F (-16.1° C). December 23<sup>rd</sup> – at 4° F (-15.6° C). December 31<sup>st</sup> – at 2° F (-16.7° C), but fair weather and good walking. In 1770 on January 5<sup>th</sup> – thermometer -2° F (-19° C). January 7<sup>th</sup> – storm of rain; thermometer 47° F (8° C). January 18<sup>th</sup> – thermometer -3° F (-19° C). January 23<sup>rd</sup> – the harbor remained shut up [due to the ice]. January 24<sup>th</sup> – John went over the Ferry in a sleigh, and back in six minutes. January 25<sup>th</sup> – colder still. The Dutch sleigh went over the Ferry four times and returned in thirty minutes. January 28<sup>th</sup> – a warm day. February 1<sup>st</sup> – thermometer -3° F (-19° C). February 15<sup>th</sup> – thaw. February 23<sup>rd</sup> – snowed all last night. February 27<sup>th</sup> – thermometer -3° F (-19° C). We had a closed [overcast] winter, as cold perhaps as ever was. March 9<sup>th</sup> - delightful fair morning. March 14<sup>th</sup> – very cold, and good sledding. March 18<sup>th</sup> – the last sleighing. March 31<sup>st</sup> – snow gone. Not much windy weather the month past.<sup>78</sup>

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**1770 A.D.** In *India*, there were heavy floods in the Eastern Provinces, Bengal [today eastern Bengal is in *Bangladesh*] by which much of the benefit, which would have followed a two years' drought, was diverted.<sup>47</sup>

In Holland [now *the Netherlands*] in 1770-71, “there were terrible floods, combined with an infectious disease rife among the cattle.”<sup>47, 92</sup>

The summer of 1770 in New England in what was to become the *United States* was noted for its heat, for the drought and the severe thunderstorms it spawned. The lightning in these summer storms destroyed houses, barns, buildings, churches and trees, killed people and livestock. On 1 August, the temperature reached 100° F [38° C] in deep shade at Sharon, Connecticut. A tornado ripped through Rochester, New Hampshire on 19 July. Another struck Salem, Massachusetts on 18 August.<sup>199</sup>

The summer of 1770 in central *France* was cold. The month of May was cold and damp and in the beginning of May, it snowed and froze. June and July were cold and damp. On the 20<sup>th</sup> of July, the grain was still green, as in the springtime. On 10 August the wheat harvest began: which was delayed by three to four weeks compared to a normal year. This harvest was not completed until the end of August. During the first days of September, the corn was cut. September was dry and cold. In short, this summer passed without heat, and the harvest was very late. The maximum temperature in Paris was 95.0° F (35.0° C) which was higher than in Denainvilliers where the peak was 89.4° F (31.9° C). In the south the cold of winter was felt in September. The grape harvest began in Burgundy on 6 October. The wine was plentiful and of quite good quality. This demonstrated the fact that Burgundy was much warmer than Orléans.<sup>62</sup>

In 1770, in Montpellier, *France*, the annual rainfall decreased 17 inches (431 millimeters) below the average. The average number of rainy days dropped by 17 days. In Marseille, during the month of January there was not a drop of rain. The mistral wind [strong, cold and usually dry regional wind in *France*] blew for fourteen consecutive months from 24 November 1769 to 13 October 1770. During this interval, there was only 6.4 inches (162 millimeters) of rainfall. Abundant dews fortunately helped out and made up for this desperate drought.<sup>79</sup>



At Coventry in the West Midlands of *England*, 70 persons drowned, and much damage done from floods, as well as in Cambridgeshire, Gloucestershire, etc. in November.<sup>41, 43</sup>

In Bohemia [now western *Czech Republic*] in 1770, there was a famine and pestilence said to have killed 168,000 people.<sup>57, 91</sup>

In *Russia* and *Poland* in 1770, famine and pestilence killed some 20,000 people.<sup>57, 91</sup>

In 1770, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ningpo and Ch'ing-yüan [“Ch'ing”, possible that the word “yüan” was left off by mistake.].

— During the period between 6 May and 8 August, floods struck Hopei (now Hebei province) in northern *China* at Mi-yün, Ts'ang, Pao-ti, Wu-ch'ing and Wang-tu; Shensi (now Shaanxi province) in central *China* at Hsün-yang and Pai-ho; Jehol province at Luan-p'ing; Kiangsi (now Jiangxi province) in southern *China* at Wu-ning; and Hupeh (now Hubei province) in central *China* at Yün-hsi. Jehol (formally Rehe province) was located north of the Great Wall, west of Manchuria, and east of Mongolia. In 1955, the area was divided between Hebei province, Liaoning province and *Inner Mongolia*.

— During the period between 8 August and 8 November, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan, Liao-ch'êng and Shou-kuang. At Shou-kuang, innumerable people and cattle drowned.

In 1770 during the summer, there was a flood in the vicinity of Shanghai, *China*.<sup>166</sup>

In 1770 during the period between 6 May and 8 August, a drought engulfed Shensi (now Shaanxi province) in central *China* at Lin-t'ung and Szechwan (now Sichuan province) in southwest *China* at Kung. During the period between 21 August and 18 September, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-shan.<sup>153</sup>

On 19 October 1770, a severe storm from the northeast swelled the tide at Boston, Massachusetts in the *United States* considerably higher than anytime during the past 50 years. It filled the cellars and stores, and did much damage. Fifty or sixty sail of vessels were cast ashore at Plymouth and elsewhere, and many lives lost.<sup>174</sup>

A violent and destructive storm struck New England in what was to become the *United States* on 20 October 1770. The wind blew down stores, barns and sheds, unroofed houses, and tore up fences and trees. Many of the goods stored along the wharves and in the warehouses that fronted the ports were damaged and destroyed. Along the coast, a large number of vessels were wrecked and many lives lost. Two schooners were driven ashore at Cape Ann. Another schooner was smashed to pieces on the rocks near Thatcher's Island. Another schooner was driven on the eastern point of Duck Island and dashed to pieces. Several vessels were riding at anchor in the Shoals road, and were sunk at their mooring. Three or four other schooners were lost off the Shoals. In the bay at Portsmouth, New Hampshire, two schooners left the harbor and were never seen or heard from again. A new ship left Newburyport, Massachusetts and was driven onto Plum Island. Prior to this during the storm, this ship collided with a sloop, breaking it into pieces. At Salem, Massachusetts many vessels in the harbor and at the wharves were damaged during the storm. A large schooner broke away from its mooring and dashed against the North Bridge causing considerable damage to the bridge. Another schooner, which was fastened to the wharf, broke her cables and was driven ashore across a sandy beach and up onto the grassy upland. Another schooner, which recently arrived from the West Indies, broke away from the wharf and was driven ashore to a great height. In the southern section of the harbor was anchored a ship, a snow, a brig, and nine other vessels. Only one ship *Antelope* rode out the storm successfully. In the harbor of

Marblehead, Massachusetts, twenty-one brigs, schooners and sloops were cast ashore. In the harbor of Boston, Massachusetts, 15 or 16 vessels were cast ashore on the several small islands in the harbor. A schooner, with no one onboard, was driven ashore on Deer Island. In Plymouth, Massachusetts, sixty-one vessels were driven ashore and from forty to fifty lives were lost. At the backside of Eastham, Massachusetts, on Cape Cod, a vessel was driven ashore. A Rhode Island sloop was wrecked at nearly the same place. Another sloop was driven ashore at Race Point [a lighthouse on Cape Cod]. A whaling schooner was smashed to pieces on a sand bar at the entrance to the harbor of Chatham. At Tarpaulin Cove, on Martha's Vineyard, a brig [a sailing vessel with two square-rigged masts] and a schooner were cast away. More than a hundred vessels were wrecked and a hundred lives lost.<sup>199</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 8<sup>th</sup> – pleasant. April 19<sup>th</sup> – windy and cold. April 28<sup>th</sup> – very hot; thermometer up to 23° F (-5° C). May 5<sup>th</sup> – thermometer 74° F (23° C). May 16<sup>th</sup> – English cherries began to blow [blossom]. May 25<sup>th</sup> – rainy. May 29<sup>th</sup> – showery; the spring was unusually forward. June – some raw cold days. June 25<sup>th</sup> – hot growing season. June 29<sup>th</sup> – thermometer 90° F (32° C). July 11<sup>th</sup> – hot, dry weather since the 25<sup>th</sup> of June; after which, there were frequent rains. September 8<sup>th</sup> – dry again. September 14<sup>th</sup> – a deluge of rain. September 20<sup>th</sup> – Indian corn was thought to be out of danger. October 1<sup>st</sup> – a delightful day. October 3<sup>rd</sup> – stormy and cold. October 11<sup>th</sup> – a deluge of rain. October 20<sup>th</sup> – an exceeding great northeast storm. October 29<sup>th</sup> – pleasant; most of the month has been raw, cold, rainy and stormy. November – generally moderate and pleasant till the 27<sup>th</sup>.<sup>78</sup>

*Also refer to the section 1769 A.D. – 1770 A.D. for information on the drought and famine in Bangladesh and India during that timeframe.*

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**Winter of 1770 / 1771 A.D.** In *England*, “Dreadful springs.” Frost and snow.<sup>47, 93</sup>

On 11 January 1771, the River Thames froze at Fulham [now southwest London], *England*.<sup>128</sup>

On 2 February 1771, there was a storm at Whitehaven in Cumbria in northwest *England*, which undermined and destroyed nearly one half of the fort.<sup>128</sup> [The fort was a historical Roman fort.]

On 16 February 1771 [in *England*], the frost was so intense, that within a few days several persons were found frozen to death in the streets.<sup>128</sup>

In Selborne in Hampshire in southeast *England* from the middle of October 1770 to the end of the year, there were incessant rains. Then in January 1771, there were severe frosts. After that rain and snow prevailed for a fortnight [14 days], followed by spring weather until the end of February. March and April were frosty. The spring of 1771 was so exceptionally severe in the Isle of Skye that it was called the Black Spring; in the south it was also severe.<sup>70</sup> [Isle of Skye is an island in the Hebrides, an archipelago off the west coast of *Scotland*.]

During the winter of 1770-71 in the months of January, February and March there was severe cold in northern *France* and a lot of snow. There were ice floes on the Seine River at Paris in the month of February. The lowest recorded temperature observed during the winter were:

Cambridge, <i>England</i>	( 6.0° F, -14.4° C) on 12 February
Paris, <i>France</i>	( 7.7° F, -13.5° C) on 13 February
Denainvilliers, <i>France</i>	( 8.4° F, -13.1° C) on 13 February
Brussels, <i>Belgium</i>	( 9.0° F, -12.8° C) on 13 January

In *Italy*, there was very abundant snow.<sup>64</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1770 on November 18<sup>th</sup> – an exceedingly great northeast snowstorm, with a vast abundance of rain and very high tides. November 20<sup>th</sup> – we hear that the late snowstorm was much more severe in Boston, Massachusetts than here,

and the greatest that ever was there. The tides rose two-feet (0.6 meters) higher than ever was known. From the Conduit through the lower and Maine-streets, they sailed in boats, where the water was up to a man's chin. The cellars were all full. Some warehouses afloat. The vessels were damaged. One schooner thrown on Clark's wharf. December – generally moderate and pleasant, and (no snow); thermometer almost down to 0° F (-18° C). In 1771 on January 13<sup>th</sup> – the frost seemed to be getting out of the ground. January 17<sup>th</sup> – a vast deal of rain. January 31<sup>st</sup> – it began to snow; thus far an unusually moderate winter; but February has paid us off. February 21<sup>st</sup> – thermometer down to 0° F (-18° C). February 27<sup>th</sup> – a terrible and terrifying night, the last was; a prodigious tempest that seemed as if it would blow down our houses; the wind easterly and a great storm of rain and then snow, and very cold today, and continues snowing.<sup>78</sup>

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**1771 A.D.** The inundation in the north of *England* (Northumberland) causing the Newcastle Bridge to be carried away.<sup>40, 43, 47</sup>

On 28 May 1771, the Susquehanna River rose to unprecedented heights, inundating both the towns at Sheshequin and Wyalusing, Pennsylvania in the *United States*. At Wyalusing, the flood swept away fences and livestock. At Sheshequin (Ulster), the inhabitants were compelled to take to their canoes and retire to the wooded heights in back of the town.<sup>178</sup>

The summer of 1771 in New England in what was to become the *United States* was the last of four consecutive summers, in which showers with thunder and lightning were unusually frequent. A considerable number of lives were lost and great amounts of property destroyed. The lightning destroyed or damaged houses, a business, barns, churches, a tavern, ships in harbor, trees and killed people and livestock (horses, cattle, oxen, sheep, swine, and geese). These thunderstorms took place between April and 3 September. Some of the places that received damage were in Massachusetts at Danvers, Boston, Petersham, Abington, Hopkinton, Westford, Ipswich, and Andover; in Connecticut at Stonington, New Haven, North Haven, Fairfield, Wallingford, and Stratford; in Rhode Island at Warwick, Newport, and Providence; in New Hampshire at Durham, and Kensington. The summer had been very oppressively warm for a long time. On 6 August, the temperature at Salem, Massachusetts reached 91° F [33° C] indoors.<sup>199</sup>

The maximum temperature during the summer in Lyon, *France* was 94.3° F (34.6° C).<sup>62</sup>

During the summer of 1771 Provence, *France*, felt very strong heat, due to the absence of breezes.<sup>79</sup>

The year 1771 was among the dry years in southern *France*.<sup>79</sup>

The years 1771 produced excessive rainfall and heat in southern *France*.<sup>79</sup>

In *Italy* in 1771, failure of the harvest produced a famine.<sup>57, 91</sup>

[In 1771, a great famine occurred in the Bay of Honduras by locust. Bay of Honduras is a large inlet of the Caribbean Sea, indenting the coasts of *Belize*, *Guatemala*, and *Honduras*. They ate up every green thing, and said in some parts, to have laid upon the ground a foot thick. It was computed that upwards of 80,000 Indians died from the famine.<sup>143</sup>]

In 1771, *Germany* suffered greatly from a bad harvest. The winter had been uncommonly severe. The spring was unfavorable and the rains of summer spoiled the grain and caused inundations in many parts.<sup>128</sup>

On 1 August 1771, there was incredible damage done in the neighborhood of Hamburg [Hamburg, *Germany*] by an inundation.<sup>128</sup>

In 1771, the area surrounding Namur, *Belgium* was ravaged by hailstones that weighed nearly eight pounds (3.6 kilograms).<sup>190</sup>

In Bengal [*India and Bangladesh*] in 1771 there was a devastating famine.<sup>90</sup>

In 1771, floods struck several regions of *China* including:<sup>153</sup>

— During the period between 15 February and 15 March, floods struck Anhwei (now Anhui province) in eastern *China* at Fêng-yang.

— During the period between 13 June and 11 July, floods struck Shantung (now Shandong province) on the east coast of *China* at Ning-yang, An-ch'iu, Shou-kuang and Po-hsing.

— During the period between 8 August and 8 November, floods struck Anhwei province at Wu-ho and Shantung province at Tsou-p'ing, Shang-ho, Hui-min, Liao-ch'êng and Tê-p'ing.

In 1771 during the period between 16 March and 14 April, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Chi-mo. During the period between 6 May and 8 August, a drought engulfed Anhwei (now Anhui province) in eastern *China* at Wu-ho. During the period between 8 November 1771 and 5 February 1772, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Shui-an and Hupeh (now Hubei province) in central *China* at Tang-yang and I-ch'êng.<sup>153</sup>

Towards the end of April 1771, Sir Josph Banks on the ship *Endeavour* observed a very dry climatic period [at the Cape of Good Hope as defined as the southern part of Africa as far as 30° latitude] in *South Africa* resulting in major sandstorms/duststorms, “The Climate tho not at all too hot for those who come from India would doubtless appear sufficiently warm could any one be transported immediately from England to this place; upon the whole it seems much of the same temperature as the Island of Madera tho scarce quite so hot, this I judge from the productions in general. During the whole Summer the air is frequently fanned by SE winds which come off the hills above the town with vast violence and during the time of their blowing, especialy at the beginning, are very troublesome to such as are obligd to be abroad in them by raising the Sand with which the whole countrey abounds and filling their eyes with it; nor are the houses quite free from its effects however close they are shut up, the Sand will find an entrance and in a short time cover every kind of furniture with a thick dust.”

“Nor does the Countrey immediately in the neighbourhood of the Cape give any reason to Contradict the idea of immense barrenness which must be formd from what I have said. The Countrey in general is either bare rock, shifting sand or grounds coverd with heath etc. like the Moors of Derbishire, Yorkshire etc. except the very banks of the few rivulets, where are a few plantations cheifly employd if well shelterd in raising Garden stuff, and if rather less so in vineyards; but if expos'd nothing can stand the violence of the winds which blow here through the whole summer or dry season. During my whole stay I did not see a tree in its native soil so tall as myself; indeed Housekeepers complain of the Dearnnes of firewood as almost equal to that of provisi[o]ns, nothing being burnt here but roots which must be dug out of the ground. What indeed proves the influence of the wind in prejudice to vegetation is that a stem not thicker than my thumb will have a root as thick as my arm or leg and thicker they never are.”<sup>168</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April – (until towards the last of the month) was generally cold and unpleasant. May 6<sup>th</sup> – the spring was thought to be very forward. May 20<sup>th</sup> – the heart cherry trees were all in blossom. June 17<sup>th</sup> – unusual cold days hitherto. June 30<sup>th</sup> – a remarkable growing season for everything but Indian corn, which was exceeding backward. July 4<sup>th</sup> – thermometer up to 84° F (29° C). July 11<sup>th</sup> – cool day. July 18<sup>th</sup> – cool still. July 30<sup>th</sup> – very hot. August 14<sup>th</sup> – people admired the seasonableness of the weather through the summer, and the universal fruitfulness. October 19<sup>th</sup> – a delightful summer day. October 20 and 23 – the same.<sup>78</sup>

**Winter of 1771 / 1772 A.D.** The winter of 1771-72 was one of the most severe, one has witnessed since time immemorial in the southern parts of *Russia* and the environments of the Caspian Sea. In the month of December 1771, it snowed for three consecutive weeks. The orange trees in the *Persian* province of Ghilan were frozen and the weather was ruled by consistently strong east winds. [Ghilan is currently located in northern *Iran*.] This severe weather stopped in the first days of January and spring weather followed immediately. In *France*, the winter was not very strict, and the lowest temperature observed in Denainvilliers, *France* was 19.6° F (-6.9° C), on 19 January. And the months of December, February and March were very mild. In Brussels, *Belgium* the lowest temperature occurred on 31 January at 7.5° F (-13.6° C).<sup>62</sup>

In Selborne, *England* in November 1771, there was frost with intervals of fog and rain. December was mild and bright weather with hoar frosts. During January and the first week of February 1772, there was frost and snow. And then to the end of the first fortnight [14 days] in March, there was frost, sleet, rain and snow.<sup>70</sup>

On 2 December 1771, there were land floods in Northumberland and Durham, *England*, which did great mischief, and the like in the Isle of Ely. The bridges on the Tyne were all carried away. Several ships were driven on shore, and some collieries filled with water. Solway Moss [a lowland peat bog], near Carlisle, overflowed its banks, and did great mischief.<sup>128</sup>

The following are excerpts from the diary of a 12-year-old schoolgirl who lived in Boston, Massachusetts in what was soon to become the *United States* of America. Her name was Anna Green Winslow. These excerpts describe the winter of 1771-72 in Boston.<sup>12, 65</sup>

December 6<sup>th</sup>, 1771 – “Yesterday I was prevented dining at unkle Joshua’s by a snow storm which lasted till 12 o’clock today, I spent some part of yesterday afternoon and evening at Mr. Glovers. When I came home, the snow being so deep I was bro’t home in arms. My aunt got Mr. Soley’s Charstown to fetch me. The snow is up to the peoples wast in some places in the street.”

December 24<sup>th</sup> – “Elder Whitwell told my aunt, that this winter began as did the Winter of 1740. How that was I dont remember but this I know, that to-day is by far the coldest we have had since I have been in New England. . . . Every drop [of rain] that fell froze, so that from yesterday morning to this time the appearance has been similar to the description I sent you last winter.”  
[freezing rain]

February 13<sup>th</sup>, 1772 – “Eveybody says that this is a bitter cold day, but I know nothing about it but hearsay for I am in aunt’s chamber (which is very warm always) with a nice fire, a stove, sitting in Aunt’s easy chair, with a tall three leav’d screen at my back, & I am very comfortable.”

February 21<sup>st</sup> – “This day Jack Frost bites very hard, so hard aunt won’t let me go to any school. I have this morning made part of a cobby with the very pen I have now in my hand, writting this with. Yesterday was so cold there was a very thick vapor upon the water, but I attended my school all day. My unkle says yesterday was 10 degrees colder than any day we have had before this winter. And my aunt says she believes this day is 10 degrees colder than it was yesterday; & moreover, that she would not put a dog out of doors. The sun gives forth his rays through a vapor like that which was upon the water yesterday.”

February 22<sup>nd</sup> – “Since about the middle of December, ult. we have had till this week, a series of cold and stormy weather – every snow storm (of which we have had abundance) except the first, ended with rain, by which means the snow was so hardened that the strong gales at N.W. soon turned it, & all above ground to ice, which this day seven-night was from one to three, four & they say, in some places, five feet (1.5 meters) thick, in the streets of this town.”



February 25<sup>th</sup> – “This is a very stormy day of snow, hail & rain.”

February 27<sup>th</sup> – “This day being too stormy for me to go to any school.”

March 4<sup>th</sup> – “We had the greatest fall of snow yesterday we have had this winter.”

March 6<sup>th</sup> – “I think the appearance this morning is as winterish as any I can remember, earth, houses, trees, all covered with snow, which began to fall yesterday morning & continued falling all last night. The Sun now shines very bright, the N.W. wind blows very fresh.”

March 9<sup>th</sup> – “This has been a very snowy day today.”

March 11<sup>th</sup> – “Uncle said yesterday that there had not been so much snow on the ground this winter as there was then – it has been vastly added to since then, & is now 7 feet deep (2.1 meters) in some places round this house; it is above the fence in the court & thick snow began to fall and continu’d till about 5 o’clock P.M. (it is about 1/4 past 8 o’clock) since which there has been a steady rain.”

March 14<sup>th</sup> – “This morning the sun shines clear (so it did yesterday morning till 10 o’clock.) It is now bitter cold, & such a quantity of snow upon the ground, as the Old people don’t remember ever to have seen before at this time of the year. . . . It is now ½ after 12 o’clock noon. The sun has been shineing in his full strength for full 6 hours, & the snow not melted enough anywhere in sight of this house, to cause one drop of water.”

March 17<sup>th</sup> – “While I was out, a snow storm overtook me.”

March 21<sup>st</sup> – “Yesterday, we had by far the gratest storm of wind & snow that there has been this winter. It began to fall yesterday morning & continued falling till after our family were in bed.”

April 1<sup>st</sup> – “The snow is near gone in the streets before us, & mud supplys the place thereof.”

April 3<sup>rd</sup> – “The wind was high at N.E. all day yesterday, but nothing fell from the dark clouds that overspread the heavens, till 8 o’clock last evening, when a snow began which has continued falling ever since. The bell being now ringing for 1 o’clock P.M. & no sign of abatement.”

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1771 on October 28 and 29 – two very cold freezing days. November – very similar to last November. December paid us severely; the whole of it (except two or three days) was steadily cold, extraordinarily so, and stormy and snowing. December 24<sup>th</sup> – the thermometer was -4° F (-20° C). In 1772 on January 17<sup>th</sup> – peerless sledding. January 31<sup>st</sup> – though it has snowed very often this month, there has been no deep snows. February 12<sup>th</sup> – thermometer at 0° F (-18° C), and in the evening, -4° F (-20° C). February 13<sup>th</sup> – thermometer at -16° F (-27° C). February 14<sup>th</sup> and 15<sup>th</sup> – thermometer at -8° F (-22° C). February 16<sup>th</sup> – a moderate day. February 20<sup>th</sup> – a deluge of rain. February 25<sup>th</sup> – easterly storm. February 28<sup>th</sup> – a beautiful gay morning. There have been many storms and gales of wind through the winter, and three severe snaps of cold weather as ever was. February 29<sup>th</sup> – it has snowed more than twenty-one times [this winter]; all of them except the last, very level [not drifted]. March – a cold, stormy, blustering month. March 11<sup>th</sup> – we lived upon [a killed] moose several days. March 15<sup>th</sup> – (Sunday) I rode down through the town to meeting. There was a good footpath as far as Mr. Codman’s; and from a canal [tunnel] very narrow, dug through the deep snow, so that most of the people went through it singly in a long continued string, close upon the heels of one another. March 29<sup>th</sup> – (Sunday) I could not see any way to get to the meeting [church service], and therefore did not attempt it. There is no sleighing through the Main Street, and through the other streets. The snow is up to the fences. April – several storms and a number of pleasant days. May 1<sup>st</sup> and 2<sup>nd</sup> – very hot. May 12<sup>th</sup> – frosts and ice.<sup>78</sup>

In Philadelphia, Pennsylvania in the *United States* during the winter of 1772, the Delaware River was covered with ice for three months.<sup>1</sup>



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**1772 A.D.** On 22 March 1772, there was a violent storm of hail, which did great damage in London, *England*. One man was killed.<sup>128</sup>

On 22 March 1772 in London, *England*, there was a great storm of hail during Sunday afternoon. The congregations in the churches on the south side of the Metropolis were in great terror. Windows were broken, etc.<sup>93</sup>

A hailstorm struck Girgenti (Agrigento), *Italy* on April 18<sup>th</sup>; the hailstones weighed twenty ounces.<sup>41, 43</sup>

On 18 April 1772 in Sicily, *Italy*, there was a great hailstorm at and near Girgenti. The hailstones weighed 20 ounces. The hailstones killed a great number of cattle, while lightning killed 84 persons. "The Commandant of the Castle, in order to dispel the cloud, fired several cannons, but fresh lightning issued from it and killed several of the gunners."<sup>93</sup>

In Leeds, (Yorkshire) *England* on the 20<sup>th</sup> of June, there were hailstones as large as nutmegs.<sup>40, 41, 43, 57</sup>

On 20 June 1772 in *England*, there was a hailstorm in Northumberland and Yorkshire. "Hailstones as large as nutmegs" at Leeds.<sup>93</sup>

On 16 July 1772 in *Cuba*, there was a hailstorm at St. Jago. The "hailstones as large as oranges."<sup>93</sup>

In St. Jago, *Cuba* on the 16<sup>th</sup> of July, there were hailstones as large as oranges. The hailstorm did great damage.<sup>40, 41, 43, 56, 57</sup>

On 17 July 1772 in *France*, there was a hailstorm at Belford [Belfort in northeastern *France*]. The storm lasted 12 minutes, and destroyed all the fruit and grain of the district. Some of the hailstones weighed half a pound. Several persons wounded, glass and buildings damaged. On the same day another storm caused great ravages at Sarguemines [Sarguemines is now Sarreguemines in northeastern *France*], and 29 neighboring villages of Lorraine; extending also into the principality of Nassau (Rhine).<sup>93</sup>

On 18 July 1772 in *Saxony*, there was a violent hailstorm in district of Zittau (Upper Lusatia) [now located in the southeastern corner of *Germany*], destroying all the grain and fruit crops and beating down some ten villages, several of which were utterly despoiled. The stones were of a prodigious size.<sup>93</sup>

In the little kingdom of *Saxony* [now part of northwest *Germany*], in the famine of 1772, it is said that 150,000 died of starvation.<sup>155</sup>

In July in Holland [now *the Netherlands*], there was a hailstorm at Brome, in the district of the Zell [Today Brome might be Brohl in the Cochem-Zell district in Rhineland-Palatinate, *Germany*]. This storm not only destroyed all the fruit and grain crops, but "whole villages, besides the loss of their harvest, had all their fowls killed or dangerously wounded, and the cattle of all sorts have suffered greatly. The linen which was spread in order to be whitened [bleached] was torn in pieces, and several persons who were not able to reach shelter were killed or mortally wounded."<sup>93</sup>

On 21 August 1772 in London, *England*, the water in the River Thames was so low, that people might have waded across the Thames at Pepper Alley Stairs.<sup>128</sup>

Between 28 August and 3 September 1772, one or more hurricanes struck the islands of Hispaniola [now *Haiti* and the *Dominican Republic*], *Puerto Rico*, *Jamaica*, *Dominica*, *St. Kitts*, *St. Eustatius*, *Suba*, *St.*

*Martin, Antigua, Montserrat, Nevis, Saint Croix, St. Thomas* and North Carolina, Alabama and Louisiana in the *United States*. Refer to the following entries:

On 28 August to 3 September 1772, a hurricane struck *Hispaniola, Puerto Rico* and *Jamaica* causing approximately 280 deaths.<sup>141</sup>

On 30 August 1772, a hurricane struck *Dominica* in the *Lesser Antilles* and *St. Kitts* in the *West Indies*. The storm killed a large number of people.<sup>141</sup>

On 31 August 1772, a hurricane struck *St. Kitts* in the *West Indies* causing £ 500,000 worth of damage.<sup>144</sup>

On 31 August 1772, a hurricane caused wide destruction in the *Caribbean*.<sup>143</sup>

— At daylight upon the 31<sup>st</sup> of August, a heavy gale of wind from the N.E., at *St. Christopher's island* [*St. Kitts*], blew down several sugar works, and destroyed most of the plantations. At noon the gale abated, and the inhabitants thought the storm was over; but the wind shifted suddenly to the S.W. by S., and came on with increased violence. Almost every house, sugar-mill, tree, and plant at *Basse Terre* [*Basseterre*], *Sandy Point*, and *Old Road* was blown down or very much damaged — several persons were killed, and a great number dangerously wounded. The damage was estimated at £ 500,000 sterling.

— At *St. Eustatius*, 400 houses, on the higher grounds, were destroyed or rendered untenable; all the plantation houses, except two, were blown down; and the Dutch church was blown into the sea.

— At *Saba*, 180 houses were blown down.

— At *St. Martin's*, very few houses were left standing, and all the plantations were destroyed.

— At *Antigua*, all the men of war, except one, were driven on shore, and several ships foundered at their anchors in *St. John's roads*.

— At *Dominica*, eighteen vessels were driven on shore and lost.

— *Montserrat* and *Nevis* had scarcely a house left standing.

— At *Santa Cruz*, [*Saint Croix, Virgin Islands*] the sea rose seventy feet above its usual height, and carried away every thing before it. Large stones were washed down from the mountains; meteors, like balls of fire, made visible the horrors of the night; 460 houses were thrown down at *Christianstadt* [*Christiansted*]. All the houses in *Frederickstadt* [*Frederiksted*], but three, were destroyed; and all the magazines and stores quite ruined. Every ship at the island was driven on shore, some of them 100 yards on the land. The damage was estimated at 5,000,000 of dollars.

— At *St. Thomas*, the damage was estimated at 200,000 dollars.

On 1 September 1772, a hurricane struck *North Carolina* in the *United States* causing 50 deaths.<sup>141</sup>

On 2 September 1772, a hurricane struck *Louisiana* in the *United States*. The ship *El Principe de Orange* was wrecked by the hurricane at the entrance of the *Mississippi River*, where she quickly went to pieces, only six survivors.<sup>141</sup>

The town of *St. Johns* in *Antigua* [an island in the *West Indies*, in the *Leeward Islands* in the *Caribbean*] was destroyed by a storm, August 17 and 31, 1772.<sup>40, 56</sup>

On 31 August 1772, a hurricane struck *Jamaica*.<sup>124</sup> [A devastating hurricane struck *St. Kitts* on 31 August 1772. Another followed three days later.]

On 22 November 1772, reports were received of a dreadful hurricane at the *Island of St. Christopher* (now *Saint Kitts*), which destroyed most of the houses and sugar-works in the island; the neighboring islands also suffered severely, especially at *St. Eustatius*.<sup>128</sup> [*St. Eustatius* is an island in the *West Indies* in the *Caribbean*.]

From 31 August to 3 September 1772, the most destructive storm [hurricane] as yet experienced; vessels, boats, and logs driven into the heart of *Mobile, Alabama* in the *United States*. The sea [storm surge] rose

to a prodigious height; all the vessels at the Belize blown on shore; salt spray was carried inland 5 miles.<sup>117</sup>

A terrible storm struck *St. Kitts* [an island in the *West Indies* in the Caribbean Sea] and did immense damage in that island and the adjoining islands on August 30.<sup>40, 41</sup>

On 7 September 1772, there was a terrible flood at Inveraray in western *Scotland*, which carried away trees of vast magnitude, and all the Duke of Argyle's cascades, bulwarks, and bridges at his seat there.<sup>128</sup>

On 25 September 1772, there was great damage done on the Thames, and in and near London, *England*, by a storm of wind.<sup>128</sup>

The summer of 1772 in Paris, *France* was characterized by:

Hot days	25 days
Very hot days	5 days
Extremely hot day	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The summer in Denainvilliers, *France* was characterized by:

Hot days	41 days
Very hot days	4 days

The month of June was very warm. The high temperatures observed during the summer were:

Paris, <i>France</i>	( 98.2° F, 36.8° C)	on 24 June
Auxerre, <i>France</i>	( 96.6° F, 35.9° C)	on 26 June
Montmorency, <i>France</i>	( 96.1° F, 35.6° C)	on 26 June
Denainvilliers, <i>France</i>	( 95.0° F, 35.0° C)	on 26 June
Brussels, <i>Belgium</i>	( 95.0° F, 35.0° C)	on 26 June
Mulhouse, <i>France</i>	( 92.8° F, 33.8° C)	on 27 June
Berlin, <i>Germany</i>	( 88.3° F, 31.3° C)	on 27 June
St. Petersburg, <i>Russia</i>	( 87.1° F, 30.6° C)	on 26 July

In northern *France* and in the region of Toulouse, they suffered from a huge drought. In September, the Seine River was 24 centimeters (9.4 inches) above the lowest water level in the [dry] year 1719. But in the south, abundant rain fell. In Burgundy, the grape harvest began on 24 September. Montmorency wine production was around twice that of a normal year, but in the region around Orleans, *France* the yield of wine was low.<sup>62</sup>

During the summer of 1772 Provence, *France*, felt very strong heat, due to the absence of breezes.<sup>79</sup>

Abundant rains fell in 1772, mainly in southern *France*. The annual rainfall in Montpellier was 45.9 inches (1,167 millimeters), which was approximately 15.9 inches (403 millimeters) above the average annual rainfall. The rainfall in Marseille was 48.9 inches (1,243 millimeters) or 30.3 inches (770 millimeters) above the annual rainfall. The rivers overflowed in Lyon, in the Languedoc, Roussillon and Provence. Rains began in September, redoubled in November, and became excessive in December.<sup>79</sup>

In 1772 during the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Wên-têng. During the period between 8 August and 8 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hsüan-p'ing.<sup>153</sup>

In 1772 during the 6<sup>th</sup> moon on the 18<sup>th</sup> day, a typhoon struck in the vicinity of Shanghai, *China*. The storm of great wind and rain tore up trees, overturned vessels and houses.<sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 20<sup>th</sup> – growing time, the plum and cherry trees are blooming. May 25 to 30<sup>th</sup> – raw, cold and rainy. May 31<sup>st</sup> – a summer day. June – several cold days, yet a growing season. July 28<sup>th</sup> – extremely hot. The thermometer at the highest. July 29<sup>th</sup> – there was a prodigious tempest, with thunder and lightning in all the neighboring towns. August 12<sup>th</sup> – the grass uncommonly well grown and good. August 26<sup>th</sup> – a deluge of rain. August 30<sup>th</sup> – hot weather, and a growing time as ever was. September 30<sup>th</sup> – it has been a remarkable fruitful summer. October 8<sup>th</sup> – there is a famine of bread in town, no Indian [maize] and no flour; no pork in town or country. October 30<sup>th</sup> – it is thought that near a quarter of the spring, summer and fall, has been rainy weather, and most of it stormy. December – several summer-like days this month.<sup>78</sup>

From 1772 to 1777, the northern part of St. Domingo experienced five years of extraordinary drought. The plains covered with sugar canes and the hills cultivated with coffee were afflicted with a desolating sterility.<sup>143</sup> [Saint-Domingue (in French) or Santo Domingo (in Spanish) was a French colony on the Caribbean island of Hispaniola that in 1804 became the independent nation called *Haiti*.]

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**Winter of 1772 / 1773 A.D.** During the winter of 1772-73, the month of February was very cold in northern *France*. The Seine River produced ice floes. The lowest temperature observed during the winter were:<sup>62</sup>

Paris, <i>France</i>	( 12.9° F, -10.6° C) on 5 February
Denainvilliers, <i>France</i>	( 15.6° F, -9.1° C)
Brussels, <i>Belgium</i>	( 15.6° F, -9.1° C) on 6 February

In Selborne, *England* the winter of 1772-73 would fairly compare with the mildest in recent years, except for a fortnight [14 days] of hard frost in February 1773. From the end of September to 22 December, there were rain and mild weather. The first ice appeared on 23 December but then to the end of the month it was foggy. During the first week of January there was frost but the rest of the month was dark rainy weather. During the first fortnight in February there was a hard frost, but this was followed by misty showery weather until the end of the first week in March. Then there were bright spring days till April.<sup>70</sup>

On 4 February 1773, in that neighborhood [Flintshire, in northeast *Wales*?], there was a fall of snow that was so great that it buried cottages, men and cattle, and some have perished.<sup>128</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: February 1773 – a cold, blustering, uncomfortable month, except the three last days, which were pleasant and moderate. Extremely cold this winter. March 1<sup>st</sup> – very moderate. March 14<sup>th</sup> – pretty cold.<sup>78</sup>

In Philadelphia, Pennsylvania in the *United States* on 9 January 1773 the mercury was -9.0° F (-22.8° C), and there was much snow and cold weather until the 10<sup>th</sup> of March.<sup>1</sup>

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**1773 A.D.** In *England* on the 22<sup>nd</sup> of February, there was a violent gale of wind, made havoc among the shipping in the British Channel. It is more than twenty years since the like happened in this island.<sup>57</sup>

In *England* on the 26<sup>th</sup> of February, it blew a hurricane in London by which the shipping in the Thames is said to have sustained damage to the amount of 50,000l.<sup>57</sup>

In February 1773, a famine prevailed in *Moravia* and *Bohemia* [now *Czech Republic*].<sup>128</sup>

In 1773, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

A storm struck *France* and *England* in March 1773.<sup>40, 41</sup>

In *Ireland*, there were great mountain torrents of water.<sup>47, 92</sup>

In Calcutta, *India*, there was great destruction from rain and floods.<sup>40, 41, 43, 47</sup>

In *Cuba*, there was a terrible storm in July 1773.<sup>40, 41, 56</sup>

On 26 July 1773, it was reported that during a storm in Moscow, *Russia*, a great fire happened which spread nearly a mile round destroying the palaces of nobility and many public buildings.<sup>128</sup>

In Boston, Massachusetts in the *United States* in August, there was a most terrible storm.<sup>40, 41, 56</sup>

On 14 August 1773, a very violent tornado struck Salisbury, Massachusetts in the *United States* and vicinity. It lasted about 3 minutes and destroyed or damaged upward of 40 buildings in Salisbury, and about the same number in Almsbury. It first struck Salisbury Point, and then followed the course of the Merrimac River. Its devastation were one mile wide to about ¼ mile wide above Almsbury Ferry.<sup>174</sup>

On 14 August 1773, a tornado struck Massachusetts in what was to become the *United States*, cutting a path ¼ mile [400 meters] wide. It first appeared along the Merrimack River above Deer Island then struck Salisbury Point, the town of Amesbury, and then it swept through Haverhill. More than 150 buildings were blown down or damaged by the tornado. Within those buildings were two hundred people, many of them trapped and injured in the debris field left behind. At Salisbury Point, eight houses were completely leveled, fifteen others were unroofed and twenty-six more considerably damaged. In Amesbury, one house was leveled, eight more lost their roofs, and twenty-two others were considerably damaged. Sixteen barns were leveled and five others considerably damaged. Three blacksmith shops were leveled and another unroofed. A millhouse was blown down and a hatter shop was unroofed. A cooper's and a barber's shop were significantly damaged. A large workhouse and a large storehouse were leveled. Two large vessels, each of 90 tons burden, were lifted off their blocks and hurled through the air 22 feet [6.7 meters]. At Haverhill, a large dwelling house and a barn were destroyed.<sup>199</sup>

On 14 August 1773, there was a storm of thunder and lightning in *England*, which did much damage to St. Peter's Church, Cornhill and did other damage.<sup>128</sup> [St. Peter upon Cornhill is an Anglican church in the city of London.]

On 16 October 1773, a hurricane storm at Oxford, *England* damaged many of the public buildings and the Church of All Saints was completely unroofed.<sup>128</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 31<sup>st</sup> – spring-like day. April showers and melodious singing of the birds; among which were two robins, in such a manner, as I never knew the like. April 3<sup>rd</sup> – raw; cold. April 8<sup>th</sup> – spring-like weather. April 15<sup>th</sup> – raw; cold. April 21<sup>st</sup> – some warm days. April 25<sup>th</sup> – rainy. April 30<sup>th</sup> – raw, cold easterly weather. May 1<sup>st</sup> – the spring is thought to be a month forwarder than usual. May 10<sup>th</sup> – wonderful hot summer weather. May 12<sup>th</sup> – the heart cherry and pear trees in blow [blossom], and the common cherry and plum trees are just upon it. May 22<sup>nd</sup> to 26<sup>th</sup> – rainy. June 3<sup>rd</sup> – a hot day. June 7<sup>th</sup> – cooler. June 11<sup>th</sup> – cold. June 15<sup>th</sup> – strawberries plentiful. June 23<sup>rd</sup> – wonderful weather. June 28<sup>th</sup> – extremely hot, thermometer at 92° F (33° C). July 7<sup>th</sup> – a melancholy dry time. July 8<sup>th</sup> – the thermometer was up to 100° F (38° C). July 12<sup>th</sup> – a smart thundershower. July 20<sup>th</sup> – a great rain. September 9<sup>th</sup> – Damsons [plums] begin to be ripe. September 12<sup>th</sup> – very cold. September 18<sup>th</sup> – very hot. September 27<sup>th</sup> – the wells fail [the wells went dry]. September 28<sup>th</sup> – extremely hot. September 29<sup>th</sup> – a storm of rain. September 30<sup>th</sup> – there has been no frost to do any damage. October 31<sup>st</sup> – this month has been a wonderful moderate, pleasant season. December 10<sup>th</sup> – a storm of rain. December 11<sup>th</sup> – surprising pleasant day.<sup>78</sup>

In Venice, *Italy*, a flood caused a village to be carried away.<sup>47</sup>

In Naples, *Italy*, there was great damage from the sea.<sup>47</sup>

At Venice and at Naples, *Italy* on the 10<sup>th</sup> of November an inundation carried away a whole village and drowned 200 of the inhabitants.<sup>40, 41, 43, 56</sup>

On 10 November 1773, there was an inundation at Venice and Naples, *Italy*. Many lives were lost.<sup>128</sup>

A storm struck Oxford, *England* on November 15.<sup>40, 41</sup>

The summer of 1773 was remarkable for extremely high temperatures, but they were always short-lived. In Denainvilliers, *France*, there was a series of 15 successive hot days (from 4 to 18 August). The summer in Paris, *France* was characterized by:

Hot days	18 days
Very hot days	2 days
Extremely hot day	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The summer in Denainvilliers, *France* was characterized by:

Hot days	45 days
Very hot days	4 days
Extremely hot day	2 days

The highest temperatures occurred in the month of August. The high temperatures observed during the summer were:

Paris, <i>France</i>	(102.9° F, 39.4° C) on 14 August
Denainvilliers, <i>France</i>	( 96.6° F, 35.9° C) on 15 August
Berlin, <i>Germany</i>	( 90.5° F, 32.5° C) on 23 May and 15 August
Brussels, <i>Belgium</i>	( 89.1° F, 31.7° C) on 14 August
Mulhouse, <i>France</i>	( 88.7° F, 31.5° C) on 14 August
Moscow, <i>Russia</i>	( 88.3° F, 31.3° C) on 20 June
The Hague, <i>the Netherlands</i>	( 87.8° F, 31.0° C)
St. Petersburg, <i>Russia</i>	( 87.1° F, 30.6° C) on 24 July

The summer was very dry [in *France*]. In Burgundy, the grape harvest only began on 27 September. In the region around Orleans, the wine was of medium quality. In Provence, it was very hot this year. In Languedoc the grape harvest was immensely damaged in July by a very heavy fog.<sup>62</sup>

During the summer of 1773 Provence, *France*, felt very strong heat, due to the absence of breezes.<sup>79</sup>

The years 1773 produced excessive rainfall and heat in southern *France*.<sup>79</sup>

From 1772 to 1777, the northern part of St. Domingo experienced five years of extraordinary drought. The plains covered with sugar canes and the hills cultivated with coffee were afflicted with a desolating sterility.<sup>143</sup> [Saint-Domingue (in French) or Santo Domingo (in Spanish) was a French colony on the Caribbean island of Hispaniola that in 1804 became the independent nation called *Haiti*.]

In 1773 during the period between 6 May and 8 August, a drought engulfed Shensi (now Shaanxi province) in central *China* at Lo-ch'uan. During the period between 18 August and 15 September, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Shou-kuang; Chekiang (now Zhejiang province) on the east coast of *China* at Hsüan-p'ing; and Hopei (now Hebei province) in northern *China* at Tientsin, Ch'ing, Ching-hai, Wu-ch'ing, Tung-kuang and Ning-ching.<sup>153</sup>

In 1773 during the 7<sup>th</sup> moon on the 20<sup>th</sup> day in the vicinity of Shanghai, *China*, a group of dragons burnt [rice] paddy in the fields, drew houses into the air and travelers also; hailstones of two or three catties weight fell, killing horses and animals. [A catty or Chinese pound was historically about 605 grams weight. Therefore these individual hailstones weighed around 2.7 to 4.0 pounds.] [In early *China*,



tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

The year 1773 was a year of abundance in the vicinity of Shanghai, *China*.<sup>166</sup>

**Winter of 1773 / 1774 A.D.** In Selborne, *England*, there were four weeks of frost after the end of the first fortnight [14 days] in November 1773, then rain to the end of the year, and rain and frost alternating to the middle of March 1774.<sup>70</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1773 on December 19<sup>th</sup> – it snowed all last night and most of today. In 1774 on January 10<sup>th</sup> – the thermometer in the study was down to 0° F (-18° C), and in the wood house, -8° F (-22° C). January 11<sup>th</sup> – it was 6° F colder. January 22<sup>nd</sup> – the thermometer was down to the bottom of the plate. January 31<sup>st</sup> – more moderate. February 11<sup>th</sup> – moderate. February 14<sup>th</sup> – the snow is about a foot (0.3 meters) deep in the woods.<sup>78</sup>

Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>

In 1774, there was a snowstorm, which extended over most of Florida in the *United States*. The inhabitants long afterwards spoke of it as an extraordinary white rain.<sup>115</sup>

**1774 A.D.** In *England*, there were great floods at Battersea and Chelsea [both cities are now part of greater London] on March 9, 1774.<sup>40, 41, 43, 47</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Kiev, <i>Ukraine</i>	( 99.1° F, 37.3° C)	on 22 July
Marseille, <i>France</i>	( 97.9° F, 36.6° C)	
Edinburgh, <i>Scotland</i>	( 88.0° F, 31.1° C)	
Riga, <i>Latvia</i>	( 81.5° F, 27.5° C)	

On 20 March 1774, there were such heavy rains in *England*, that level or lowlands both at Chelsea and Battersea were overflowed.<sup>128</sup>

On 20 May 1774, there was great damage done in Saxony [now part of *Germany*] by storms of hail and rain; whole districts were laid waste.<sup>128</sup>

In May of 1774 in *Saxony*: "Accounts from different parts of the Electorate of Saxony are full of the damage done in that part of *Germany* by violent storms of hail and snow. Whole districts have been laid waste, and many cattle destroyed."<sup>93</sup>

On 26 July 1774 in *England*, there was a great hailstorm in Bedfordshire, in Buckinghamshire, and in various parts of Hertfordshire. "It cut off the corn as if with a sickle, and has done incredible damage to the fruit trees, and fruits of the earth, insomuch that many farmers will be ruined." This storm also struck Shropshire.<sup>93</sup>

On 3 August 1774 in northern *France*, a hailstorm at Alençon in Normandy began about noon. At 5 o'clock, the thunder became louder and the sky was on a sudden covered with thick black clouds, causing almost entire darkness: in the midst of which there occurred such a dreadful storm of hail that it was at first thought to be a shower of stones. "It broke down all before it, roofs, windows, etc., and wounded all those who were unhappily then in the streets. Hailstones have been found as large as a hat; others measured 18 inches in circumference. A countryman was killed by one of them, and many people were dangerously wounded—18 of whom had the Viaticum [part of the Last Rites] administered." This storm

lasted 45 minutes, and did enormous damage.<sup>93</sup>

On 3 August 1774, it was reported that there was a hailstorm at Alençon, *France*. The hailstones measured eighteen inches round.<sup>128</sup>

In Alençon, *France* on the 3<sup>rd</sup> of August, there was a hailstorm; stones measured 18 inches round.<sup>40, 41, 43, 56, 57</sup>

In 1774, Paris, *France* received 5.9 inches (149 millimeters) of annual rainfall above average and had sixteen more rainy days than normal. Denainvilliers, *France* received an extra 6.3 inches (160 millimeters) rainfall and eight more rainy days than normal. Montmorency, *France* received an extra 3.2 inches (81 millimeters) rainfall and nine more rainy days than normal.<sup>79</sup>

In *England*, there were great storms at London on September 30 and on December 5<sup>th</sup>-7<sup>th</sup>, which did great damage to the shipping.<sup>40, 41, 56</sup>

On 28 September 1774, it was reported that a great part of the Russian fleet was destroyed by a storm in the *Mediterranean Sea*.<sup>128</sup>

On 21 November 1774, a violent gale struck along the coast of New England in what was to become the *United States*. There were several wrecks on the coast of Massachusetts, between Cape Cod and Cape Ann. On the back of Cape Cod, a brig [a sailing vessel with two square-rigged masts] was wrecked and only one sailor survived. A brig and a schooner were seen bottoms up off Plymouth. At Marblehead, three or four vessels were driven ashore. In Salem harbor, a sloop was driven ashore and a schooner was driven with such violence against Blaney's wharf, that her quarterdeck was caved in and her side greatly damaged. Several vessels were driven ashore at Stage Point. At Beverly, a brig was driven onto a mussel bed. A sloop was upset and sank off Cape Ann. A brig and a sloop foundered on the back of Cape Ann, and all the people onboard perished.<sup>199</sup>

On 25 November 1774, in a storm more than forty ships were driven on shore between Yarmouth and Leith in *Great Britain*.<sup>128</sup> [Great Yarmouth is located in Norfolk in eastern *England*. Leith is located north of Edinburgh, *Scotland*.]

On 5-7 December 1774, there was a storm at London, *England*, which did considerable damage to the shipping in the River Thames.<sup>128</sup>

In 1774 during the period between 7 August and 5 September, a drought engulfed Hupeh (now Hubei province) in central *China* at Chung-hsiang, Ching-mên, Ying-ch'êng and Huang-an. During the period between 6 September and 4 October, a drought engulfed Kansu (now Gansu province) in northwest *China* at T'ien-shui and Min-ch'in; and Hopei (now Hebei province) in northern *China* at Ch'ing-yün, Pa and Nan-yüeh.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 31<sup>st</sup> – this month has been very moderate. The robins came and tuned up. April 8<sup>th</sup> – it has not frozen in the house since the beginning of February. April 13<sup>th</sup> – the spring is very forward; we began to dig our garden. April 21<sup>st</sup> – a surprising hot summer day. April 29<sup>th</sup> – rainstorm. May – a raw cold month; the spring backward. May 31<sup>st</sup> – a hot day. June 6<sup>th</sup> – cold. June 10<sup>th</sup> – summer breaks in upon us. June 17<sup>th</sup> – set out cabbage plants. July 10<sup>th</sup> – not a cherry or plum this year. July 12<sup>th</sup> – a memorable growing season. July 20<sup>th</sup> – we have had an abundance of peas. July 29<sup>th</sup> – very hot; a fine hay season. August 11<sup>th</sup> – a melancholy dry time. August 29<sup>th</sup> – the flies are vastly troublesome. September 1<sup>st</sup> – very hot and dry. September 16<sup>th</sup> – it is an exceeding dry time. September 29<sup>th</sup> – cold. September 30<sup>th</sup> – very hot. October 10<sup>th</sup> – everyday is unusually warm and constantly dry. October 14<sup>th</sup> – thundershower, with a deluge of rain. October 23<sup>rd</sup> – warm. November 3<sup>rd</sup> – it was almost as dry as before.

November 5<sup>th</sup> – it rained plentifully. November 11<sup>th</sup> – a calm and pleasant day. November 16<sup>th</sup> – a deluge of rain fell. November 20<sup>th</sup> – very cold. November 22<sup>nd</sup> – snowstorm. November 25<sup>th</sup> – rainstorm. November 28<sup>th</sup> – warm and pleasant. December 8<sup>th</sup> – there is no frost in the ground. December 14<sup>th</sup> – cold. December 19<sup>th</sup> – rain all day, and at night a prodigious tempest; the rest of the month, snow and cold.<sup>78</sup>

From 1772 to 1777, the northern part of St. Domingo experienced five years of extraordinary drought. The plains covered with sugar canes and the hills cultivated with coffee were afflicted with a desolating sterility.<sup>143</sup> [Saint-Domingue (in French) or Santo Domingo (in Spanish) was a French colony on the Caribbean island of Hispaniola that in 1804 became the independent nation called *Haiti*.]

**Winter of 1774 / 1775 A.D.** The winter in 1774-75 started with a very intense cold. On 27 November 1774 in Paris, *France*, the Seine River was covered with ice, and the thermometer read 16.2° F (-8.8° C). In Franeker in *Friesland*, the cold was also very severe. The lowest temperature observed in Brussels, *Belgium* was on 25 January at 9° F (-12.8° C).<sup>62</sup>

In Selborne, *England*, there seemed to be no winter at all worth mentioning. From August 24 to the end of the third week in November, there was rain, with frequent intervals of sunny weather. Then to the end of December, dark dripping fogs. January, February and the first half of March 1775, there was rain almost every day; and to the end of the first week in April, cold wind, with showers of rain and snow.<sup>70</sup>

During the winter of 1774-75 in New England in what was to become the *United States*, no snow fell, the farmers plowed their land, flowers bloomed, and fruit grew and ripened. Spring came early and the grass waved in the wind in Massachusetts on the 19<sup>th</sup> of April.<sup>199</sup>

**1775 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: January 2<sup>nd</sup> – there is a great scarcity of corn in this part of the country. January 6<sup>th</sup> – very cold days. January 23<sup>rd</sup> – very moderate weather. January 27<sup>th</sup> – a summer's day. January 28<sup>th</sup> – wonderful, moderate. February 7<sup>th</sup> – there has been no snow, and but little rain since the 29<sup>th</sup> of December; wonderful weather; we saw two robins. February 11<sup>th</sup> – warm day. February 18<sup>th</sup> – cold. February 20<sup>th</sup> – snow, incomparable sledding. February 21<sup>st</sup> – a summer's day. February 23<sup>rd</sup> – a great snowstorm. March 7<sup>th</sup> – the frost seems out of the ground in the street. March 15<sup>th</sup> – we have wonderful moderate weather. March 28<sup>th</sup> – it has been a wonder of a winter, so moderate and unfreezing. April 4<sup>th</sup> – cold days. April 5<sup>th</sup> – a very stormy, snowy day. April 12<sup>th</sup> – cold northeast storm. May 6<sup>th</sup> – the spring has to this time been cold, wet and backward, except the grass. May 19<sup>th</sup> – hot summer's day. May 31<sup>st</sup> – the cherry and plum trees are out of, and the apples in the midst of blossoms. June 7<sup>th</sup> – a hot and dry season. June 16<sup>th</sup> – there was a small frost. June 22<sup>nd</sup> – cold for several days. June 29<sup>th</sup> – a great rainstorm. July 2<sup>nd</sup> – the face of the earth is renewed, but no grass on the Neck [peninsula]. July 11<sup>th</sup> – it rained plentifully. July 12<sup>th</sup> – an extreme hot day. July 21<sup>st</sup> – a fine shower. August 12<sup>th</sup> – we had plentiful rains. August 20<sup>th</sup> – a wonderful year for fruit of all sorts. August 29<sup>th</sup> – it rained abundantly.<sup>78</sup>

On 1 February 1775, there was a violent storm of wind and rain, which did much damage at Portsmouth, *England*; the water rose higher than was ever known.<sup>128</sup>

On 3 February 1775 there was incredible damage done by floods in *Germany* and *Hungary*.<sup>128</sup>

On 30 April 1775 in *England*, there was a hailstorm in the Midland Counties, and particularly at Northampton and Buckingham. The hailstorm was of considerable magnitude and did great damage to fruit trees and windows.<sup>93</sup>

On 13 May 1775 in southeastern *Spain*, there was a hailstorm in and about Murcia. The hailstorm only lasted 20 minutes. Many of the stones were of the size of oranges, weighing a pound and some 20 ounces, and the greatest part of them 8 ounces. The consequences of this storm were very serious due to the quantity of grain, silk, barilla, etc., destroyed.<sup>93</sup>

On 3 June 1775 in *England*, there was a great hailstorm in Buckinghamshire.<sup>93</sup>

The summer of 1775 was warm and dry in central *France*. The summer in Denainvilliers, *France* was characterized by:

Hot days	67 days
Very hot days	8 days
Extremely hot day	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The month of June was warm but the highest temperatures occurred in July and August. The high temperatures observed during the summer were:

Paris, <i>France</i>	( 96.1° F, 35.6° C)
Denainvilliers, <i>France</i>	( 96.1° F, 35.6° C) on 22 July
Stockholm, <i>Sweden</i>	( 93.9° F, 34.4° C)
Wroclaw, <i>Poland</i>	( 91.0° F, 32.8° C)
Berlin, <i>Germany</i>	( 90.5° F, 32.5° C) on 24 July
Mulhouse, <i>France</i>	( 90.1° F, 32.3° C) on 10 June
Brussels, <i>Belgium</i>	( 89.4° F, 31.9° C) on 6 June
Nancy, <i>France</i>	( 87.6° F, 30.9° C) on 19 August
London, <i>England</i>	( 86.0° F, 30.0° C) on 2 August
Moscow, <i>Russia</i>	( 83.8° F, 28.8° C) on 16 July
Riga, <i>Latvia</i>	( 81.5° F, 27.5° C)

In Burgundy, the grape harvest only began on 25 September. The grape harvest was common and the quality was good. In the area of Orleans, *France*, the harvest was less abundant, but of very good quality.<sup>62</sup>

In 1775, a real scarcity of corn [grain] prevailed in *France*.<sup>128</sup>

In July 1775 a famine at the *Cape de Verde Islands* carried off over 16,000 people.<sup>128</sup> [Cape de Verde Islands are located in the central Atlantic Ocean off the coast of Western Africa.]

At Cape de Verde [*Cape Verde Island*] in 1775, there was a great famine – 16,000 people perished.<sup>57, 90, 91</sup>

From 1772 to 1777, the northern part of St. Domingo experienced five years of extraordinary drought. The plains covered with sugar canes and the hills cultivated with coffee were afflicted with a desolating sterility.<sup>143</sup> [Saint-Domingue (in French) or Santo Domingo (in Spanish) was a French colony on the Caribbean island of Hispaniola that in 1804 became the independent nation called *Haiti*.]

On 31 July 1775, a hurricane struck the *Caribbean Sea*. The English merchantman *Gill*, sailing from St. Eustatius to St. Vincent Island, sank during the hurricane.<sup>141</sup>

On 25 August 1775, at eight o'clock in the evening, a hurricane from the west, struck Montpellier, *France*. It levelled walls and uprooted trees. The gales lashed for an hour with frightening speeds. But only 0.1 inches (3 millimeters) of rain fell during this period. The barometer went down to 736 millimeters.<sup>79</sup>

On 2-6 September 1775, a hurricane struck North Carolina and Virginia in the *United States* causing more than 163 deaths.<sup>141</sup>

On 9-12 September 1775, a hurricane struck Newfoundland Banks, *Canada* causing 4,000 deaths. The storm struck the northwest coast of Newfoundland and on the coast of Labrador.<sup>141</sup>

The Newfoundland Hurricane of 1775, also called the Independence Hurricane. It struck the Outer Banks of North Carolina in the *United States* on 29 August 1775, then struck Virginia (Norfolk, Hampton and York), traveled up the East Coast of the *United States* and struck Newfoundland on 9 September 1775. In Newfoundland, *Canada*, 4,000 sailors, mostly from *England* and *Ireland*, were reported to have drowned. Localized storm surge at Newfoundland reached heights of between 20 and 30 feet.<sup>49</sup>

During the dreadful storm and tempest on the coast of Newfoundland, *Canada* on 11 September 1776 [Misprint: 1775], eleven ships, and several hundred smaller vessels with all their crews were lost.<sup>1</sup>

On 11 September 1775, at Newfoundland, *Canada*, there was a tempest. The sea rose thirty feet and over thirty fishing boats and nearly 700 men were lost.<sup>128</sup>

During 9-12 September 1775, a great Atlantic hurricane struck the Newfoundland Banks in *Canada* causing approximately 4,000 deaths.<sup>107</sup>

On 20 September 1775 in *England*, there was a hailstorm in Oxfordshire and Wiltshire, which caused much damage by hail and lightning.<sup>93</sup>

In *England*, during 1775-76 there was a wet autumn and winter. "The land-springs, which we call levants, break out much of the downs of Sussex, Hampshire, and Wiltshire. The country people say, when the levants rise, corn will always be dear; meaning that when the earth is so glutted with water as to send forth springs on the downs and uplands, that the corn vales must be drowned; and so it has proved for these last ten or eleven years past; for land-springs have never obtained more since the memory of man than during that period; nor has there been known a greater scarcity of all sorts of grains, considering the great improvements of modern husbandry."<sup>47</sup>

In *England* on the 29<sup>th</sup> of October, there was an awful storm in the north of *England*; many vessels destroyed; four Dublin packets lost.<sup>57,90</sup> (Other references gives the date as 19 October.<sup>40,41</sup>)

On 2 November 1775, a hurricane struck Caicos Islands in the *Caribbean*. During the hurricane at least eleven merchantmen and several English warships were lost in the Windward Passage near the Caicos Islands.<sup>141</sup>

In *England* on the South coast a storm struck in November 1775.<sup>40,41</sup>

In Rotterdam, Holland [now *the Netherlands*], the Meuse River overflowed, doing considerable damage.<sup>47,92</sup>

On 11 November 1775, there was a dreadful storm and inundation in Holland [now *the Netherlands*].<sup>128</sup>

Rainfall patterns were compared at Lyndon in Rutland in the east Midlands of *England*. During the 4 years 1740-1743 there was a total of 66.361 inches of rainfall. During the part four years 1772-1775, there was 124.957 inches of rainfall, which is almost twice as much.<sup>239</sup>

In 1775, there was an extreme drought on the island of Sumatra [in western *Indonesia*]. The dry monsoon set in about the middle of June and continued with very little intermission until March of 1776. So long and severe a drought had not been experienced there in the memory of the oldest man. The verdure of the ground was burnt up, the trees were stripped of their leaves, the springs of water failed, and the earth everywhere gaped in fissures. For some time a copious dew falling in the night supplied the deficiency of rain; but this did not last long; yet a thick fog, which rendered the neighboring hills invisible for months

together, and nearly obscured the sun, never ceased to hang over the land, and add a gloom to the prospect already but too melancholy. The Europeans on the coast suffered extremely by sickness. Around a quarter of them died by fevers and other bilious distempers. The natives also died in great numbers. In November 1775, the sea was observed to be covered, to a distance of a mile, and in some places a league from shore, with fish floating on the surface. These were various species of fish and most were dead or dying. Many of the rivers on the island dried up.<sup>232</sup>

In 1775 during the period between 5 February and 6 May, floods struck Hopei (now Hebei province) in northern *China*. During the period between 28 June and 26 July, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hangchow. During the period between 26 August and 24 September, floods struck Shansi (now Shanxi province) in northern *China* at Ho-ching. During the period between 25 September and 23 October, a drought engulfed Hupeh (now Hubei province) in central *China* at Fang; Kiangsu (now Jiangsu province) on the east coast of *China* at Li-shui, Wu-chin and Kao-yu; and Shantung (now Shandong province) on the east coast of *China* at Wên-têng and Jung-ch'êng.<sup>153</sup>

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**Winter of 1775 / 1776 A.D.** In Selborne, *England* to the end of the year 1775 was rainy, with intervals of hoar frost and sunshine. During the first three weeks of January 1776, dark frosty weather prevailed with great snowfalls. Afterwards the weather turned foggy with hoar frost. The cold weather in January 1776 was remarkable.<sup>70</sup>

On 7 January 1776, there was a fall of snow, the greatest ever remembered in this country [*Great Britain*].<sup>128</sup>

During the winter of 1775-76 in London, *England*, there were 11 snowy days in January. There was a great frost on 7 January, which ushered in the first snow of the season. There was 1 frosty day in October; 2 in November; 8 in December; 25 in January; and 1 in February.<sup>239</sup>

During the winter of 1775-76 in Northampton, *England*, a severe frost struck during the last four days of January, the lowest state of the thermometer was 9° F [-12.8° C]. On 1 February, the temperature was 16° F [-8.9° C]. February 2<sup>nd</sup> brought in pleasant, spring-like day, ushered in a very mild and agreeable thaw and the temperature rose to 40° F [4.4° C].<sup>239</sup>

In England on 14 January 1776 after a week of frost, sleet and snow, which after the 12<sup>th</sup> of January overwhelmed all the works of men, drifting to the tops of gates, and filling in the hollow lanes. Gilbert White of Selborne believed he had never before or since encountered such rugged Siberian weather. "Many of the narrow roads were now filled above the tops of the hedges, through which the snow was driven into most romantic and grotesque shapes, so striking to the imagination as not to be seen without wonder and pleasure. The poultry dared not to stir out of their roosting places; for cocks and hens are so dazzled and confounded by the glare of snow that they would soon perish without assistance. The hares also lay sullenly in their seats, and would not move till compelled by hunger: being conscious, poor animals, that the drifts and heaps treacherously betray their footsteps and prove fatal to many of them." From the 14<sup>th</sup> the snow continued to increase, and began to stop the road-wagons and coaches, which could no longer keep their regular stages; and especially on the western roads. "The company at Bath that wanted to attend the Queen's birthday were strangely incommoded; many carriages of persons who got on their way to town from Bath, as far as Marlborough, after strange embarrassment, here met with a *ne plus ultra*. The ladies fretted and offered large rewards to labourers, if they would shovel them a road to London; but the relentless heaps of snow were too bulky to be removed; and so the 18<sup>th</sup> passed over, leaving the company in very uncomfortable circumstances, at the Castle and other inns."<sup>70</sup>



On the 21<sup>st</sup> of January, the thermometer measured 20° F (-6.7° C), and had it not been for the deep snows, the winter would not have been remarkable. On the 22<sup>nd</sup> of January, Gilbert White of Selborne traveled to London, *England* “through a sort of Laplandian scene, very wild and grotesque indeed.” But London exhibited an even stranger appearance than the country. “Being bedded deep in snow, the pavement of the streets could not be touched by the wheels or the horses’ feet, so that the carriages ran almost without the least noise.” Such an exemption from the din and clatter, says White, “was strange but not pleasant; it seemed to convey an uncomfortable idea of desolation.”<sup>70</sup>

The worst had not yet, however been reached. On the 27<sup>th</sup> much snow fell all day, and in the evening the frost became very intense. At South Lamberth, for the four following nights, the thermometer fell to 11° F, 7° F, 6° F, 6° F (-11.7° C, -13.9° C, -14.4° C, -14.4° C). At Selborne, the temperature fell to 7° F, 6° F, 10° F (-13.9° C, -14.4° C, -12.2° C) and then on the 31<sup>st</sup>, just before sunrise, with rime on the trees and on the tube of the glass, the quicksilver sank exactly to zero (0.0° F, -17.8° C) – a most unusual degree of cold for the south of *England*. During these four nights, the cold was so penetrating that ice formed under beds; and in the day the wind was so keen, that persons of robust constitutions could hardly endure to face it. “The Thames was at once frozen over, both above and below the bridge, that crowds ran about on the ice. The streets were now strangely encumbered with snow, which crumbled and trod dusty; and turning gray, resembled bay salt; what had fallen on the roofs was so perfectly dry that from first to last it lay twenty-six days on the houses in the city; a longer time than had been remembered by the oldest housekeepers living.”<sup>70</sup>

The snow in *England* was remarkably deep in 1776.<sup>40</sup>

The winter of 1776 was recorded as being intensely cold throughout *Europe*.<sup>1</sup>

In the year 1776, the Danube River was frozen in excess of five feet (1.5 meters) thick below Vienna, *Austria*.<sup>30</sup>

In 1776, the Seine River in *France* was entirely frozen over.<sup>38</sup>

In 1776 in Paris, *France*, there were 25 days of frost.<sup>58, 80</sup>

The winter of 1776 proceeded very unevenly. It was violence in northern *France*. It was among the harshest. It was generally less intense in the provinces of central and southern *France*. In Paris, the frost began on January 9 and lasted until February 2; that is to say for 24 consecutive days, the thermometer remained constantly below the freezing point. It was freezing constantly both night and day. The thaw occurred at 3 o’clock in the morning on February 2. The Seine River began to carry ice on January 19. The temperatures dropped to 8.6° and 6.8° F (-13° and -14° C) on the 20<sup>th</sup> and 21<sup>st</sup> of January. The river froze during night of the 24<sup>th</sup> and 25<sup>th</sup>. The Seine River froze across its entire width below the Bridge Tournelle and beyond the Pont Royal. The middle of the current was kept free of ice between Pont Neuf and the Pont-Royal. This inexplicable peculiarity was also observed during the winter of 1709. This frost was accompanied by overcast skies mixed with fog and northeast winds. The cold caused many people to die on the highways, in the countryside and in the streets.<sup>79</sup>

In Lyon, *France*, the cold of 1776 surpassed that of 1709. The frosts lasted 17 days. It began on January 16<sup>th</sup>. Between the 16<sup>th</sup> and the 27<sup>th</sup>, the thermometer varied between 16.3° and 18.5° F (-7.5° and -8.7° C). Then on the 31<sup>st</sup> the temperature rapidly dropped to -0.4° F (-18° C), and on 1 February it fell further down to -5.8° to -7.6° F (-21° to -22° C). A southerly wind brought a very cold thaw the next morning. The Rhône River carried an enormous amount of ice below the town. On the Saone River, the freezing process was complete, except between the two bridges.<sup>79</sup>

During the winter of 1776, the temperature of Bordeaux, at the other end of *France*, contrasted by producing gentle temperatures as compared to the rigorous winter experienced at Lyon. The temperature at Bordeaux only went below zero on the mornings of the 16<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 19<sup>th</sup> and 25<sup>th</sup> of January. The coldest temperature observed was 20.8° F (-6.2° C) on January 19<sup>th</sup>.<sup>79</sup>

In southern *France*, the cold was not very severe at Nimes, Viviers and in some parts of Provence. It brought intense cold for only a very short duration. At Nimes, there was a very violent north wind on 26 and 28 December 1775, that brought a severe frost that caused temperatures to drop down to 5° F (-15° C). The thaw came the day after by a northwest wind, accompanied by rain. The frost lasted only seven days at Viviers, but it reached 2.1° F (-16.6° C) on 31 January 1776. Elsewhere, the cold was moderate. In Montpellier, the frost occurred from January 14 to February 24. At its coldest on 31 January, the temperature only dropped down to 18.5° F (-7.5° C). In countryside around Marseille the temperature only fell to 23° F (-5° C). But the Étang de Berre was frozen enough so that the carriages could cross it. At Aix the temperature fell to 20.8° F (-6.2° C) on January 18<sup>th</sup>. At Perpignan the temperature fell to 30.9° F (-0.6° C) on January 18<sup>th</sup>. The brevity of the cold, its little intensity, or heat on the air in many regions of the south and central *France* offset the bitterness and persistence of this winter in most northern countries.<sup>79</sup>

In the winter of 1776, many bells in Paris, *France* cracked when they were rung rigorously [cold induced metal brittleness].<sup>58</sup>

In 1776, the vines and fruit trees in *France* were killed [by the extreme cold].<sup>58, 80</sup>

Since the water in tree sap acquires greater volume when it freezes, in extreme cold, trees burst apart [explode] with a loud noise. In Strasbourg, *France* more fruit trees burst when the cold reaches -16° Reaumur (-20° C, -4° F). A great number of trees in *France* burst in the winter of 1776.<sup>58, 80</sup>

On 19 January 1776, the Seine River in *France* experienced drift ice; on the 25<sup>th</sup> the river was frozen beyond the bridges (in Paris); on the 29<sup>th</sup> the river was frozen at its mouth at Havre, and in Paris they crossed the river on the ice, which was 17 centimeters (7 inches) thick, until the 31<sup>st</sup>. The thaw came on February 2<sup>nd</sup>, and the ice held on until the 6<sup>th</sup>. The Rhine River in *Germany* froze; the Rhône River and the Saône River were also almost completely frozen over. On the Medway River in *England*, individuals crossed the river on foot on the ice. In *Russia*, the cold was also extremely violent, and the Neva River on 10 April was traveled by wagon in all directions without danger.<sup>62</sup>

The winter in 1776 was severe throughout *Europe*. The cold was particularly violent during the month of January, and an extraordinary amount of snow fell. The very intense cold in Paris, *France* produced 25 frost days; and reached a low temperature on 29 January 1776 at -2.4° F (-19.1° C). In Denainvilliers, *France* there were 22 frost days in a row from 10 January to 2 February and the lowest temperature observed was on 29 January at 0.5° F (-17.5° C). The frost penetrated the ground 0.6 meters (2 feet) deep.<sup>62</sup>

The wine froze in Paris, *France* in 1776. The thermometer scored for 24 days from 9 January to 2 February, a temperature of -17.5° Reaumur (-7.4° F, -21.9° C).<sup>80</sup>

The lowest temperature observed during the winter in different cities is as follows: <sup>62</sup>

St. Petersburg, <i>Russia</i>	(-28.5° F, -33.6° C) on 18 January
Dresden, <i>Germany</i>	(-24.2° F, -31.2° C)
Leipzig, <i>Germany</i>	(-19.7° F, -28.7° C) on 27 January
Krakow, <i>Poland</i>	(-17.5° F, -27.5° C)
Warsaw, <i>Poland</i>	(-14.1° F, -25.6° C) on 27 January

Bienne (Biel), <i>Switzerland</i>	( -10.8° F, -23.8° C )	on 29 January
Stockholm, <i>Sweden</i>	( -8.5° F, -22.5° C )	on 15 January
Nancy, <i>France</i>	( -8.5° F, -22.5° C )	on 1 February
Montdidier, <i>France</i>	( -8.5° F, -22.5° C )	on 29 January
Lyon, <i>France</i>	( -7.4° F, -21.9° C )	on 1 February
Franeker, <i>the Netherlands</i>	( -7.4° F, -21.9° C )	
Grenoble, <i>France</i>	( -6.9° F, -21.6° C )	in February
Berlin, <i>Germany</i>	( -6.5° F, -21.4° C )	
Tournai, <i>Belgium</i>	( -6.3° F, -21.3° C )	on 28 January
Frankfurt, <i>Germany</i>	( -6.3° F, -21.3° C )	on 28 January
Hamburg, <i>Germany</i>	( -6.3° F, -21.3° C )	on 27 January
Copenhagen, <i>Sweden</i>	( -6.2° F, -21.2° C )	on 26 January
Mannheim, <i>Germany</i>	( -6.2° F, -21.2° C )	on 1 February
Brussels, <i>Belgium</i>	( -6.0° F, -21.1° C )	on 28 January
Saint. Quentin, <i>France</i>	( -5.1° F, -20.6° C )	on 28 January
Douai, <i>France</i>	( -5.1° F, -20.6° C )	on 28 January
Rotterdam, <i>the Netherlands</i>	( -4.7° F, -20.4° C )	on 29 January
Amiens, <i>France</i>	( -4.5° F, -20.3° C )	on 27 February
Löwen, <i>Germany</i>	( -4.0° F, -20.0° C )	on 28 January
Dijon, <i>France</i>	( -4.0° F, -20.0° C )	on 1 February
Vienna, <i>Austria</i>	( -4.0° F, -20.0° C )	on 2 February
Strasbourg, <i>France</i>	( -4.0° F, -20.0° C )	on 29 January
Meaux, <i>France</i>	( -3.1° F, -19.5° C )	
Montmorency, <i>France</i>	( -2.7° F, -19.3° C )	on 28 January
Amsterdam, <i>the Netherlands</i>	( -2.6° F, -19.2° C )	on 28 January
Paris, <i>France</i>	( -2.4° F, -19.1° C )	on 29 January
Breda, <i>the Netherlands</i>	( -2.0° F, -18.9° C )	
Maastricht, <i>the Netherlands</i>	( -2.0° F, -18.9° C )	
Le Havre, <i>France</i>	( -1.8° F, -18.8° C )	on 28 January
Zurich, <i>Switzerland</i>	( -1.7° F, -18.7° C )	on 29 January
Nieuwport, <i>Belgium</i>	( -0.9° F, -18.3° C )	on 28 January
Namur, <i>Belgium</i>	( -0.6° F, -18.1° C )	
Denainvilliers, <i>France</i>	( 1.2° F, -17.1° C )	on 29 January
Geneva, <i>Switzerland</i>	( 3.0° F, -16.1° C )	on 30 January
Poitiers, <i>France</i>	( 7.7° F, -13.5° C )	
Padua, <i>Italy</i>	( 8.2° F, -13.2° C )	
Northampton, <i>England</i>	( 9.3° F, -12.6° C )	on 30 January
Nantes, <i>France</i>	( 9.5° F, -12.5° C )	
London, <i>England</i>	( 12.6° F, -10.8° C )	on 31 January
Saint-Jean-d'Angély, <i>France</i>	( 12.7° F, -10.7° C )	
Montpellier, <i>France</i>	( 18.5° F, -7.5° C )	
Aix, <i>France</i>	( 20.8° F, -6.2° C )	on 18 January
Toulouse, <i>France</i>	( 20.8° F, -6.2° C )	
Bordeaux, <i>France</i>	( 20.8° F, -6.2° C )	on 19 January
Brest, <i>France</i>	( 21.2° F, -6.0° C )	on 27 January
Marseille, <i>France</i>	( 23.0° F, -5.0° C )	
Saint-Jean-de-Luz, <i>France</i>	( 30.1° F, -0.6° C )	
Perpignan, <i>France</i>	( 30.1° F, -0.6° C )	

The Rhine, the Seine, the Rhône, the Saône, the Medway, and many other rivers almost completely frozen over. At Nieuwport in *Flanders* [now *Belgium*] the brandy and rum froze. In Paris, *France*, the wine froze in the cellars and shattered the wine barrels. On 29 January, the ice was up to 2.4 meters (7.9 feet) thick on the seacoast at the mouth of the Seine River and the following days at a width of more than 8000 meters (5 miles). A portion of the sea between the Bay of Caen and the Cap de la Hève in *France* was all covered with ice. The Havre from the sea to the horizon seemed to be covered with ice. This ice was

broken by the ebb and flow of the tides, so that our sea was like the *Baltic Sea*. In *Italy*, the Tiber River near Perugia was blocked from one bank to the other by ice, which is a very rare occurrence, and the lagoons of Venice were covered with ice. The frost damaged the plants, the apricots and peaches, the alaternen, phillyräen, some pine species, ivy, the holly and the gorse. A large number of trees (elm, linden) were cracked from top to bottom near Paris. Many people were victim of the cold. A courier, who drove from Paris to Picardy, was found on his arrival at Clermont-en-Beauvaisis frozen to death in his carriage. Several other passengers were found dead in the snow. In Paris, Louis XVI. had large fires set in the streets. Many of the beggars who slept in the barns suffered frozen feet; others were killed on the roads, and some even found dead in the houses. Many old people were carried off by sudden death. One could hear oak trees burst apart with a crash. In *Provence*, the olive trees survived the cold.<sup>62</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1775 on September 30<sup>th</sup> – a great frost. October 11<sup>th</sup> – very hot. October 21<sup>st</sup> – a great storm after the burning of the town, that lasted three days. November – the whole of this month has been one continued spell of severely cold, windy, winter-like weather. December 24<sup>th</sup> – severely cold. In 1776 on January 29<sup>th</sup> – this month, like the two past months, had been constantly and severely cold. The wind has been westerly all winter. February – a dismal cold snap of weather. February 29<sup>th</sup> – the past winter has been the coldest, in the whole, that has been known. The ground has been constantly covered with snow. March 19<sup>th</sup> – it seems as if the summer was breaking upon us. April 22<sup>nd</sup> – it was a very cold, wet and backward spring. May 8<sup>th</sup> – the ground was frozen for the past three nights.<sup>78</sup>

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**1776 A.D.** In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.<sup>1</sup>

In Kent, *England*, there were great floods.<sup>40, 41, 43, 47</sup>

On 25 March 1776 in Lorraine, *France*, there was a hailstorm. At 2 P.M. there fell such a prodigious quantity of hail and rain that in less than half an hour, 99 houses, composing the lower and principal street of the village of Tremont, were entirely laid under water and filled with mud and hail. Several of the inhabitants were drowned or buried under the ruins of their houses; and the rest to the number of 500 would have perished with hunger and cold had not their neighbors given assistance. All the poultry of the village, with 530 head of cattle, which formed the riches of the inhabitants, were destroyed, and the territory laid waste.<sup>93</sup>

On 6 April 1776, the village of Bois-le-Duc, France (now called 's-Hertogenbosch in southern *Netherlands*) was destroyed by rain.<sup>128</sup> [This account appears to identify the wrong city Bois-le-Duc instead of Bar le Duc and the wrong date of 6 April instead of 25 April.]

In northeastern *France* on the 25<sup>th</sup> of April, the village of Bar le Duc was destroyed by floods and other village's damaged.<sup>47, 92</sup>

The rains in Languedoc, *France*, destroyed the village of Bar le Duc on April 26, 1776.<sup>40, 41, 43, 56</sup>

In Holland [now *the Netherlands*] and Antwerp, *Belgium* on 11 June, there was a hailstorm; stones as large as hen's eggs, and weighed three-quarters of a pound; several horses killed, and the fruits of the earth destroyed.<sup>40, 41, 43, 56, 57</sup>

On 17 June 1776 in Flanders [now *Belgium*] in and about Antwerp, there was a violent hailstorm. The hailstones were as big as fowls' eggs. The hailstones together with pieces of ice, not only broke the windows to the south, but destroyed all the fruit. "The hail was so violent that men, horses, etc., were knocked down by it and very much hurt. This storm was also felt at Deschel, Rethy, Arendork, and Diest, on the frontiers of the principality of Liege."<sup>93</sup>

In June 1776 in southeastern *Ireland* in Clonegal (Carlow County), there was a great thundershower with lightning and amazing flakes of ice.<sup>93</sup>

The summer of 1776 was warm in central *France*. From 8 July to 5 August, with the exception of 2 interruptions, the temperature was above 77° F (25° C) at Denainvilliers. The summer in Denainvilliers, *France* was characterized by:

Hot days	45 days
Very hot days	4 days
Extremely hot day	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

In October [at Denainvilliers] the weather was so beautiful and warm, just like summer days. The high temperatures observed during the summer were:

Denainvilliers, <i>France</i>	( 98.4° F, 36.9° C) on 5 August
Montpellier, <i>France</i>	( 96.1° F, 35.6° C)
Perpignan, <i>France</i>	( 95.0° F, 35.0° C) on 26 June
Clermont-Ferrand, <i>France</i>	( 95.0° F, 35.0° C)
Mulhouse, <i>France</i>	( 92.3° F, 33.5° C) on 6 July
Paris, <i>France</i>	( 91.6° F, 33.1° C) on 2 and 3 August
Berlin, <i>Germany</i>	( 90.5° F, 32.5° C) on 17 July
Aix, <i>France</i>	( 89.4° F, 31.9° C)
Bordeaux, <i>France</i>	( 88.3° F, 31.3° C)
Brussels, <i>Belgium</i>	( 86.5° F, 30.3° C) on 16 July
Nancy, <i>France</i>	( 86.0° F, 30.0° C) on 3 August
London, <i>England</i>	( 86.0° F, 30.0° C) on 2 August
St. Petersburg, <i>Russia</i>	( 84.9° F, 29.4° C) on 22 July
Moscow, <i>Russia</i>	( 76.6° F, 24.8° C) on 17 July

In Burgundy, the harvest only began on 30 September. Despite the severity of the preceding winter, the grain harvest was good. The vine in the region around Orleans produced a good grape harvest. The fall was so mild that the fruit trees bloomed in some places a second time. Some apple trees, even for a second time wore fruit.<sup>62</sup>

During the two days of the maximum observed in Paris, *France*, the temperature level was measured for a direct exposure to the sun, in free air. On 2 August the reading was 133.0° F (56.1° C) and on 3 August the reading was 126.9° F (52.7° C). So the thermometer with direct exposure to the sun was 71.6° F (22.0° C) and 64.4° F (18° C) respectively higher than those measured in the shade.<sup>62</sup>

On 4 September 1776, a hurricane visited St. Christopher (now Saint Kitts), Antigua, Martinico (now Dominican Republic), Guadeloupe Island and other adjacent regions. On 6 September there was a storm in the *West Indies*, the severest ever known.<sup>128</sup> [

On 4 September 1776, a fire accidentally started at a bakery swept through Basseterre in St. Kitts in the *West Indies*. It was followed the next day by a hurricane. The island's council wrote the following message to King George III:<sup>144</sup>

The most considerable and most opulent part of Basseterre, the capital of our island, the seat of commerce and the magazine from whence the merchants supplied our plantations hath been destroyed with all the stores of provision in it by a dreadful and irresistible [irresistible] fire, so rapid and destructive in its progress that the security of life admitted of little attention to preservation of property. Scarcely had the afflicted inhabitants recovered from their consternation, when it pleased Divine providence to send an additional calamity, as violent in its operation and injurious in its consequence to the landed as the preceding one was to the commercial interest. A dreadful storm accompanied with astonishing torrents, unprecedented in the memory of the oldest

resident amongst us, has destroyed large tracts of our land and swept away almost all the provision in our ground. By this heavy visitation a large number of Your Majesty's commercial and other faithful subjects, before happy in the exercise of honest industry have lost their whole property and a town once the abode of content and affluence is ~~not~~ [now] become the residence of poverty, desolation and ruin.

At *St. Kitts* on 5 September 1776, a storm greatly damaged the island and the damage was immense.<sup>56</sup>

In the *West Indies*, the severest storm ever known struck on 6 September.<sup>40, 41, 56</sup>

On 6 September 1776, a hurricane struck Pointe-a-Pitre Bay in Guadeloupe in the *Leeward Islands*. The hurricane caused over 6,000 deaths.<sup>107, 141</sup>

In 1776 during the period between 15 July and 13 August, floods struck Hopei (now Hebei province) in northern *China* at Wan-p'ing. The city walls and houses were damaged by the floodwaters. Many people drowned. During the period between 8 August and 8 November, floods struck Shansi (now Shanxi province) in northern *China* at Tai. Houses and fields were damaged. During the same time, a drought engulfed Shansi province at P'ing-ting and Hsi-yang.<sup>153</sup>

The year 1776 was a year of abundance in the vicinity of Shanghai, *China*.<sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 10<sup>th</sup> – a hot day and night. May 12<sup>th</sup> – hot. May 17<sup>th</sup> – the heat continues. May 26<sup>th</sup> – cold weather all the week. May 31<sup>st</sup> – very cold still. June 12<sup>th</sup> – hot summer. June 19<sup>th</sup> – a drought seems to be coming on, with worms. June 22<sup>nd</sup> – a small shower. June 28<sup>th</sup> – hot for several days past. June 29<sup>th</sup> – showers. July – plentiful rain through this month and the next. September 20<sup>th</sup> – remarkable warm weather. September 30<sup>th</sup> – no frost yet to do any harm. A great prospect of Indian corn. November – this whole month has been remarkable for fine, moderate weather. December 6<sup>th</sup> – it was constantly moderate. December 18<sup>th</sup> – signs of snow, but none.<sup>78</sup>

From 1772 to 1777, the northern part of St. Domingo experienced five years of extraordinary drought. The plains covered with sugar canes and the hills cultivated with coffee were afflicted with a desolating sterility.<sup>143</sup> [Saint-Domingue (in French) or Santo Domingo (in Spanish) was a French colony on the Caribbean island of Hispaniola that in 1804 became the independent nation called *Haiti*.]

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**Winter of 1776 / 1777 A.D.** In Selborne, *England*, in November and December of 1776, the weather was dry and frosty, with some periods of hard rain. On 10 January 1777, a hard frost struck. That was followed by foggy weather with frequent showers to the 20<sup>th</sup>. That was followed by hard dry frost with snow until February 18. That was followed by heavy rains, with intervals of warm dry spring weather to the end of May.<sup>70</sup>

In *England* on 19 February 1777, it was noted that there was no rain, generally speaking, since the last harvest. Springs have not begun to rise, deep wells in general want water, and many ponds are not yet filled: even the surface of the earth is not satisfied.<sup>175</sup>

During the winter of 1776-77 covering the months from December to March, the coldest temperature observed in Montreal, *Canada* was -6° F [-21° C].<sup>239</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1776 on December 20<sup>th</sup> – very cold. December 27<sup>th</sup> – extreme cold. December 31<sup>st</sup> – cold; very poor sledding. In 1777 on January 18<sup>th</sup> – pretty good sledding. February 11<sup>th</sup> – it snowed all day. February 15<sup>th</sup> – very cold. February 21<sup>st</sup> – snowstorm. February 28<sup>th</sup> – continual snowstorms.<sup>78</sup>



December 1776 was a desperate time for George Washington and the American Revolution. During the night of December 25, Washington led his small Continental army of 2,400 troops from Pennsylvania (*United States*) across the Delaware River made dangerous and barely navigable by huge chunks of ice. Once across they launched a surprise attack on the Britain's Hessian mercenaries at Trenton, New Jersey, capturing 1,000 prisoners and seizing muskets, powder, and artillery.<sup>13, 14</sup>

Reverend Henry Muhlenberg who lived thirty-five miles from Trenton, New Jersey (*United States*) wrote that the snow was “a foot deep and it’s bitter cold” in his journal in December 1776. Thomas Jefferson mentioned the snow accumulation was 22 to 24 inches (0.6 meters) deep at his home in Monticello, Virginia. A large snowstorm struck Pennsylvania on 24 February 1777, where snow “perhaps as much as two feet (0.6 meters) fell.”<sup>27</sup>

**1777 A.D.** In Dublin, *Ireland*, there was a great flood; 6 feet of water in St. Patrick’s cathedral.<sup>47, 92</sup>

In *England*, there was a great flood of the River Tyne.<sup>47</sup>

In *England* [Southern counties] on 23 June 1777, it was reported that the springtime was moist, but not remarkably wet: the clouds reserved their bounty for May and June. The middle of May was very wet, and so was the middle of June. The last ten days were, except one, uniformly rainy. Last night it poured for eight or nine hours; perhaps never more rain fell in so short a time; the ground was never so wet since the [Great] Deluge. Then from the 23<sup>rd</sup> of June until the 8<sup>th</sup> of July, there was scarcely a fair day. The rain set in June 13 and lasted 26 days with scarcely one fair day intervening.<sup>175</sup>

The summer of 1777 in Denainvilliers, *France* was characterized by:

Hot days	47 days
Very hot days	8 days
Extremely hot day	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

Intense heat took place in July and especially August. The high temperatures observed during the summer were:

Luçon, <i>France</i>	(101.8° F, 38.8° C)
Saint Omer, <i>France</i>	( 99.5° F, 37.5° C)
Montargis, <i>France</i>	( 99.5° F, 37.5° C)
Udine, <i>Italy</i>	( 99.1° F, 37.3° C) on 17 August
Paris, <i>France</i>	( 97.0° F, 36.1° C)
Denainvilliers, <i>France</i>	( 95.0° F, 35.0° C) on 18 July
Montpellier, <i>France</i>	( 92.8° F, 33.8° C)
Tarascon, <i>France</i>	( 92.8° F, 33.8° C)
Bordeaux, <i>France</i>	( 92.8° F, 33.8° C)
Brussels, <i>Belgium</i>	( 92.1° F, 33.4° C) on 9 August
Mulhouse, <i>France</i>	( 89.4° F, 31.9° C) on 18 July
Nancy, <i>France</i>	( 87.6° F, 30.9° C) on 18 July
Moscow, <i>Russia</i>	( 87.1° F, 30.6° C) on 31 May
Berne, <i>Switzerland</i>	( 86.2° F, 30.1° C)
Berlin, <i>Germany</i>	( 86.0° F, 30.0° C) on 10 August
London, <i>England</i>	( 82.0° F, 27.8° C) on 8 August
St. Petersburg, <i>Russia</i>	( 80.8° F, 27.1° C) on 6 July

In the region around Orleans, *France*, the summer was cold and rainy. As a result, the grape harvest produced very little and there was almost no wine. In Burgundy, the grape harvest only began on 1 October. In the area of Toulouse food production was satisfactory. Little wine was produced in lower Languedoc. In the north [of *France*] the grain harvest was good.<sup>62</sup>

In June 1777, a hurricane struck off the coast of Florida in the *United States*. A Spanish man-of-war foundered in the hurricane and all hands were lost.<sup>141</sup>

On 10 September 1777, a hurricane struck the central *Atlantic Ocean*. The *Ariadne* from Dominica to London foundered at sea in a gale of wind on the 10<sup>th</sup>. The crew and passengers were saved. Five others [ships] of the Fleet were missing the next morning.<sup>141</sup>

On September 23, Petersburg, *Russia*, suffered damage to the amount of 1,000,000 rubles from an inundation and storm.<sup>41</sup>

On 17 September 1777, there was an inundation at Petersburg [St. Petersburg, *Russia*], which did considerable damage.<sup>128</sup>

On 15 October 1777 in Tuscany, *Italy*, there was a great hailstorm in the province of Muzello, accompanied by lightning and thunder. The hailstones were of extraordinary size. They did great damage to the buildings and fruit trees. The devastation was very extensive.<sup>93</sup>

A storm struck Florence, *Italy* and its neighborhood on October 16, doing immense damage.<sup>40, 41</sup>

In 1777 during the period between 6 May and 8 August, a drought engulfed Shensi (now Shaanxi province) in central *China* at Lo-ch'uan and Hupeh (now Hubei province) in central *China* at Tzū-kuei and Ku-ch'êng. During the period 2-30 September, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Wu-ch'uan; Kiangsi (now Jiangxi province) in southern *China* at Wu-ning; and Chekiang (now Zhejiang province) on the east coast of *China* at Hsüan-p'ing.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 17<sup>th</sup> – it has been surprisingly warm weather for some time. April 6<sup>th</sup> – bad walking. April 12<sup>th</sup> – a wonderful week of warm weather. May 15<sup>th</sup> – it is agreed to be the coldest weather, and the most backward spring there ever was. May 20<sup>th</sup> – raw; cold. May 25<sup>th</sup> – a hot summer day. May 26<sup>th</sup> – raw, cold, with a deluge of rain. June 30<sup>th</sup> – cold, very cold; nothing ever like it through the whole spring, and yet everything is flourishing, perhaps never more so, except Indian corn. July 9<sup>th</sup> – a great cold storm, with much rain. July 13<sup>th</sup> – dismal cold. July 15<sup>th</sup> – a hot summer's day. July 17<sup>th</sup> – everything is flourishing. July 29<sup>th</sup> – a marvellous fruitful season as to everything. August 18<sup>th</sup> – never was there such gardens, never such fields, never such pastures, never such a year for everything. Hot weather to the end of the month. September 2<sup>nd</sup> – the earth produced an abundance of its fruits. September 8<sup>th</sup> – there was a frost in several of the back towns that killed the corn leaves. September 13<sup>th</sup> – another great frost. The corn not hurt. September 23<sup>rd</sup> – northeast storm. September 27<sup>th</sup> – fair. September 30<sup>th</sup> – comfortable. October 9<sup>th</sup> – hitherto, this month, very pleasant weather. October 10<sup>th</sup> – deluge of rain, and very high wind. October 11<sup>th</sup> – very cold. October 21<sup>st</sup> – it snowed all day. October 25<sup>th</sup> – the week past, raw, cold winter weather. November – a cold stormy month.<sup>78</sup>

From 1772 to 1777, the northern part of St. Domingo experienced five years of extraordinary drought. The plains covered with sugar canes and the hills cultivated with coffee were afflicted with a desolating sterility.<sup>143</sup> [Saint-Domingue (in French) or Santo Domingo (in Spanish) was a French colony on the Caribbean island of Hispaniola that in 1804 became the independent nation called *Haiti*.]

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**Winter of 1777 / 1778 A.D.** In Selborne, *England*, the autumn weather to 12 October had been remarkably fine and warm. From then to the end of the year, gray mild weather prevailed, with but little rain and still less frost. During the first thirteen days of January, there was frost but a little snow; then rain to 24 January, followed by six days of hard frost. After this, harsh foggy weather with rain prevailed till 23 February; then five days of frost; a fortnight [14 days] of dark harsh weather; and spring weather to

the end of the first fortnight in April. The second fortnight of April, however, was cold with snow and frost.<sup>70</sup>

During the winter of 1777-78, the coldest temperature was measured at Nain and Okak in Labradore [Labrador, *Canada*]. At Nain, the coldest temperature in December was -26° F [-32.2° C]; in January -30° F [-34.4° C]; in February -27° F [-32.8° C]; in March -25° F [-31.7° C]; and in April -8° F [-22.2° C]. At Okak, the coldest temperature in December was -28° F [-33.3° C]; in January -27° F [-32.8° C]; in February -25° F [-31.7° C]; in March -18° F [-27.8° C]; and in April -10° F [-23.3° C].<sup>239</sup>

The winter of 1777-78 in Bradford County, Pennsylvania in the *United States* produced a heavy snowstorm on 12 & 13 February 1778. Snow fell to the depth of 2 feet [0.6 m].<sup>178</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: January and February 1778 – true winter, both as to cold and snow. March 31<sup>st</sup> – the whole month past has been a tedious spell of severely cold, stormy, snowy weather.<sup>78</sup>

**1778 A.D.** Storms, hurricanes, earthquakes, hail, rain and floods devastated *France* in 1778. On 21 January, near Pontorson in Normandy, lightning split and overturned at one stroke 99 apple, oak and elm trees. On 21 and 22 January in Paris, violent winds with waves of rain struck. Lightning and thunder were added to the storm on the evening of the 22<sup>nd</sup>. On 24 June, a storm followed by hail ravaged Toulouse, Biollet near Moulins, Condé-sur-Noireau. The same day, at Saint-Pierre-du-Regard, in Normandy, a terrible hurricane vomited lightning, hail and rain. The thunder fell at six locations, and it hailed furiously for three quarters of an hour. There were a few locations where the hailstones were 2 feet (610 millimeters) deep. Hailstones were of various shapes; some equalled the size of an egg. This mass of hailstones kept for six days, despite the heat. The next day, in Gland, envied for its thunder, a similar hurricane destroyed all the crops. On 20 July, the southwest winds furious upset Étampes and flooded the city with rain. On 31 July, a hurricane devastated St. Marcellin on the banks of the Isere River, Chatte, Saint Vincent and the Vinoy. Floods and earthquakes desolated Alsace, Franche-Comté, Champagne and Béarn.<sup>79</sup> [Gland is located in central *France*. Étampes is now in Paris. Marcellin and Chatte are located in southeastern *France*. Saint Vincent in in the French Alps. Vinoy, now Venoy is in central *France*. Alsace and Franche-Comté are in eastern *France*. Champagne is in southern *France*. Béarn is located in southwestern *France*.]

In 1778 in *Ireland*, there were great thunderstorms at Tralee, Abbeyfeale, and Clonmel. “The hailstones were as large as musket-balls.”<sup>93</sup> [Tralee and Abbeyfeale are located in southwestern *Ireland*. Clonmel is in southern *Ireland*.]

In 1778 in *France*, there was a great hailstorm in the vicinity of Paris.<sup>93</sup>

The summer of 1778 in Paris, *France* and the greater part of *Europe* was very warm and very dry. The summer in Paris was characterized by:

Hot days	27 days
Very hot days	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The summer in Denainvilliers, *France* was characterized by:

Hot days	54 days
Very hot days	15 days
Extremely hot day	3 days

The summer in Denainvilliers was unusual. In July, the thermometer was always over 77° F (25° C). The high temperatures observed during the summer were:<sup>62</sup>

Chennai (Madras), <i>India</i>	(104.0° F, 40.0° C) in May
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Montargis, <i>France</i>	( 99.5° F, 37.5° C)
Denainvilliers, <i>France</i>	( 98.4° F, 36.9° C) on 5 July
Bordeaux, <i>France</i>	( 97.9° F, 36.6° C)
Soissons, <i>France</i>	( 97.9° F, 36.6° C)
Paris, <i>France</i>	( 97.2° F, 36.2° C) on 5 July
Rouen, <i>France</i>	( 96.1° F, 35.6° C)
Vienne, <i>France</i>	( 95.5° F, 35.3° C)
Nantes, <i>France</i>	( 95.0° F, 35.0° C)
Brussels, <i>Belgium</i>	( 95.0° F, 35.0° C) on 20 July
Island of Oléron	( 93.9° F, 34.4° C) off the western coast of <i>France</i>
Mulhouse, <i>France</i>	( 93.4° F, 34.1° C) on 14 August
Franeker, <i>the Netherlands</i>	( 93.2° F, 34.0° C) on 20 July
Copenhagen, <i>Sweden</i>	( 92.8° F, 33.8° C) in July
Berne, <i>Switzerland</i>	( 92.8° F, 33.8° C)
Nancy, <i>France</i>	( 92.8° F, 33.8° C) on 7 and 14 August
Dijon, <i>France</i>	( 92.8° F, 33.8° C)
Toulon, <i>France</i>	( 92.8° F, 33.8° C)
Berlin, <i>Germany</i>	( 91.6° F, 33.1° C) on 14 August
Leyden (Leiden), <i>the Netherlands</i>	( 90.5° F, 32.5° C)
Marseille, <i>France</i>	( 90.5° F, 32.5° C)
Schaffhausen, <i>Switzerland</i>	( 88.7° F, 31.5° C) in July
Montauban, <i>France</i>	( 88.3° F, 31.3° C)
Moscow, <i>Russia</i>	( 86.9° F, 30.5° C) on 5 July
London, <i>England</i>	( 86.0° F, 30.0° C) on 13 and 14 July
Geneva, <i>Switzerland</i>	( 83.8° F, 28.8° C) in August
St. Petersburg, <i>Russia</i>	( 83.7° F, 28.7° C) on 20 July
Bristol, <i>England</i>	( 77.9° F, 25.5° C)

The great heat of 1778 was sustained, and accompanied by cloudless skies. The vegetable harvest was minimal and there was a lack of food generally. Around 5 August, the trees were already in a bad state. In the middle of the esplanade at Vincennes, *France* opposite the castle, the earth was dry and dusty to a depth of one meter (39 inches). The water level of the Seine River was very low for a long time. On 5 September, it was only 8 centimeters (3.2 inches) above the low water mark of the year 1719.<sup>62</sup>

The summer of 1778 produced high heat that was long and constant. Under this influence, many fruit trees blossom twice. At Malaquais in Paris, *France*, two grapevines against a wall of the former bodyguard of the wharf bloomed a second time on October 10<sup>th</sup> and later gave up large clusters of grapes. The same heat was observed in Montpellier and Salon in the south of *France*. This unusual heat ruled mainly during the months of July and August, which was dry and cloudless. The summer of 1778 was also noted for frequent floods, storms, hurricanes and earthquakes.<sup>79</sup>

In Paris, *France* in the garden of the arsenal, rasta trees bloomed a second time due to the high heat. This is a fairly common phenomenon in hot countries. This second blooming was also observed in other trees such as peach, plum and apple trees. Even more surprising were the grape vines that produced fruit twice in one season. After the first picking, the vineyards continued to flourish; and on 10 October they produced rather large grapes. The grapes were pressed tightly against each other and were in part black. It was observed that the majority would reach maturity, if the heat lasted for several more days.<sup>62</sup>

This heat of summer was felt in *France*. In several provinces, animal diseases were observed caused by the drought and the lack of water and green feed.<sup>62</sup>

The drought of 1778 was among the most severe and longest. The drought spread throughout *France* and much of Europe. The level of rainfall and the number of rainy days in many places were below the

average. In Paris, *France*, in particular, they only received 17.6 inches (446 millimeters) of rainfall and 113 rainy days. While on 7 October, the river marked 4 inches (10.2 centimeters) under the lowest water level [below the zero water mark of 1719].<sup>79</sup>

The weather [in *France*] also produced a number of storms, some reaching the level of hurricane strength and considerable floods.<sup>62</sup>

On 23 July 1778, much damage was done by lightning in the neighborhood of London, *England*.<sup>128</sup>

The warmth of 1778 covered a large part of *Europe*. In Genoa, *Italy*, the heat and dryness increased the price of food significantly. The same was the case in *France*. The hopes of a good harvest disappeared in Cologne, *Germany* due to lack of rain and the excessive and persistent "sun glow". The oldest people of the country had never seen anything like it. Instead of mature grapes; there were dried grapes in their place.<sup>62</sup>

In the area around Orleans, *France*, the grain was good; but vegetables and grapes were withered. Also the wine vintage quality was bad. In Burgundy, there was long and steady, intense heat, drought and a large number of storms. The grape harvest began on 22 September. In the Toulouse area, the year was in contrast to other regions, quite fertile.<sup>62</sup>

On 28-31 October 1778, a hurricane struck *Cuba*. This storm produced the greatest loss of human life by drowning.<sup>141</sup>

On 1 November 1778, a hurricane struck Cape Cod in Massachusetts in the *United States* causing between 50 and 70 deaths. [Loss of some crewmembers on *Somerset* in an "easterly storm (of) unusual fury." The Cape Cod storm may be related to a 28-31 October storm system over *Cuba*.]<sup>141</sup>

In 1778, droughts engulfed many regions of *China* including:<sup>153</sup>

— During the period between 28 January and 23 June, a drought engulfed Shansi (now Shanxi province) in northern *China* at Taiyuan.

— During the period between 6 May and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Ch'ung-tê; and Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing. The rivers dried up.

— During the period between 8 August and 8 November, a drought engulfed Hupeh (now Hubei province) in central *China* at Wuchang, Ao-ch'êng, Ch'ung-yang, Huang-p'o, Hanyang, Chung-hsiang, Ch'ien-chiang, Pao-k'ang and Chih-chiang.

— During the period between 8 November 1778 and 5 February 1779, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Kiukiang and Wu-ning.

In 1778 during the 8<sup>th</sup> moon, there were three tides in one day at Nanhwai, *China*.<sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 25<sup>th</sup> - it has been almost constantly cold, and very windy. April 28<sup>th</sup> - we sowed our garden five weeks sooner than last spring. April 30<sup>th</sup> - the spring is forward, the ground is dry, but the weather cold. May 8<sup>th</sup> - rainy. May 15<sup>th</sup> - a summer's day. May 31<sup>st</sup> - there has been a great frost two nights past. June 14<sup>th</sup> - cold weather a few days. June 27<sup>th</sup> - fine weather for the Indian corn, which grows wonderfully, and there is as great a prospect of all the fruits of the earth as ever was. July 2<sup>nd</sup> - it is a dry time. July 18<sup>th</sup> - the drought awfully continues. July 27<sup>th</sup> - it is as grievous a drought as ever was known. July 31<sup>st</sup> - people fear a famine. The Indian corn curls, and is like to come to nothing; and there is no prospect of any potatoes, or turnips, or any sauce at all. August 6<sup>th</sup> - plentiful rains. August 9<sup>th</sup> - uncommonly hot. It has been, through the whole, a fine, seasonable, hot summer. August 16<sup>th</sup> - rain. August 20<sup>th</sup> - extremely hot. August 21<sup>st</sup> - a shower, short but plentiful. August 26<sup>th</sup> - a shower. September 17<sup>th</sup> -

no frost to do any damage. September 30<sup>th</sup> – potatoes have grown to the wonder of all. October 1<sup>st</sup> to 8<sup>th</sup> – wonderful fine weather. October 19<sup>th</sup> to 22<sup>nd</sup> – same, and hot. October 28<sup>th</sup> – wonderfully moderate.<sup>78</sup>

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**Winter of 1778 / 1779 A.D.** In Selborne, *England*, from the end of September 1778 until the end of the year, the weather was wet, with considerable intervals of sunshine. January 1779 was characterized by alternating frost and showers. From February to April 21, the weather was warm and dry.<sup>70</sup>

A storm struck all over *England* in January 1779.<sup>40, 41</sup>

In *England* on 1 January 1779, there was a storm, one of the greatest ever known. There was scarcely a public building in the metropolis that did not receive damage. It extended several miles round London.<sup>128</sup>

In *England*, the frost in the winter of 1778-79 lasted eighty-four days.<sup>128</sup>

The winter of 1779 was very mild in [northern] *France* and the barometer was very high during this season.<sup>62</sup>

Snow and cold reigned extraordinary during the first three months of 1779 in regions of southern and central *France* only. Lakes and ponds in the South, experienced twenty-one days of frost and cold reaching down to 17.2° F (-8.2° C) on 16 January.<sup>79</sup>

On 19 January 1779, the temperature at Montreal, *Canada* fell to -22° F [-30° C]. On the same day 16 or 17 German soldiers were frozen to death in crossing the ice on Lake St. Pierre, a lake near Trois-Rivières; and about double that number were frost-bitten, many of whom lost their feet and hands.<sup>239</sup>

On 26 December 1778, the brig commanded by Captain James Magee was wrecked in a terrible snowstorm off Plymouth harbor in Massachusetts in the *United States*. More than half his crew perished in the cold. The dead, which amounted to 72, were carried ashore on the 29<sup>th</sup>. And interred at Plymouth. The survivors were at the same time brought off the wreck; some of whom, after living a few days in extreme pain, expired.<sup>174</sup>

The winter of 1779 was very mild in Philadelphia, Pennsylvania in the *United States* particularly in the month of February, when trees were in blossom.<sup>1</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

November and December 1778 – generally very cold and stormy. November 12<sup>th</sup> – there was a great southerly rainstorm. It blew down fences, Mr. Butler's house and other buildings. December 31<sup>st</sup> – Mr. Chase, minister of Kittery, was frozen to death. A team with four oxen and a horse, and the driver, were frozen to death on Boston Neck, all standing up, as were several other people. In 1779 on January 4<sup>th</sup> – it is wonderful how the people live here on the Neck [peninsula], for want of bread, there being little to be bought, and that so monstrous dear. January 8<sup>th</sup> – the people upon the Neck [peninsula], universally, have for some weeks past suffered extremely for want of wood, there having been no sledding, and the carting very bad, and wood thereupon raised to 20 dollars a cord. January 10<sup>th</sup> – it rained hard in the morning. January 21<sup>st</sup> – the harbor and whole bay froze over. January 23<sup>rd</sup> – good sledding; wood has fallen to eight dollars. January 26<sup>th</sup> – the harbor and the whole bay continues to remain frozen over. February 1<sup>st</sup> – pleasant. February 4<sup>th</sup> – hot, thawy [thawing of snow and ice] day. February 7<sup>th</sup> – fair and moderate. February 10<sup>th</sup> – thawy. February 13<sup>th</sup> – windy and cold. February 22<sup>nd</sup> – moderate. March 2<sup>nd</sup> to 3<sup>rd</sup> – delightful days. March 9<sup>th</sup> – snow. March 12<sup>th</sup> – snowstorm. March 19<sup>th</sup> – snow. March 22<sup>nd</sup> – southerly snowstorm. April 1<sup>st</sup> – a grievous cry for bread in all seaport towns, and there is but little meat and no fish yet. April 7<sup>th</sup> – Indian corn is sold at 30 dollars a bushel.<sup>78</sup>

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**1779 A.D.** The summer of 1779 in *France* was remarkably hot. The summer in Paris was characterized by:



Hot days 33 days

Very hot days 1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The summer in Denainvilliers, *France* was characterized by:

Hot days 65 days

Very hot days 5 days

The most intense heat occurred in Paris in July and August. The high temperatures observed during the summer were:<sup>62</sup>

Cairo, <i>Egypt</i>	(105.6° F, 40.9° C) on 15 June
Bordeaux, <i>France</i>	( 97.5° F, 36.4° C)
Perpignan, <i>France</i>	( 95.0° F, 35.0° C)
Besançon, <i>France</i>	( 95.0° F, 35.0° C)
Paris, <i>France</i>	( 93.9° F, 34.4° C) on 18 July
Denainvilliers, <i>France</i>	( 91.4° F, 33.0° C) on 17 August
Berlin, <i>Germany</i>	( 91.0° F, 32.8° C) on 7 August
Salon, <i>France</i>	( 90.5° F, 32.5° C)
Montauban, <i>France</i>	( 88.3° F, 31.3° C)
Mulhouse, <i>France</i>	( 87.4° F, 30.8° C) on 19 July
Nancy, <i>France</i>	( 86.0° F, 30.0° C) on 19 July
Brussels, <i>Belgium</i>	( 85.5° F, 29.7° C) on 18 July
Amsterdam, <i>the Netherlands</i>	( 85.3° F, 29.6° C)
Dieppe, <i>France</i>	( 85.1° F, 29.5° C) on 20, 23 & 24 May
London, <i>England</i>	( 84.0° F, 28.9° C) on 13 July
Dieppe, <i>France</i>	( 72.5° F, 22.5° C) on 23 & 24 May

In Denainvilliers, *France*, the heat began towards the end of May. June was mild but the heat picked back up in July and lasted until September. This summer suffered from a severe drought. On 19 October, the Seine River was only 22 centimeters (8.7 inches) above the lowest water level measured in 1719.<sup>62</sup>

On 8 August 1779, a hurricane suddenly advanced on New Orleans, Louisiana in the *United States*. The naval squadron of Governor Galvez of Louisiana was destroyed.<sup>117</sup>

On 18 August 1779, a hurricane struck Louisiana in the *United States*. All but one of a Fleet of Spanish warships was sunk by the hurricane. Slaves were drowned in ditches.<sup>141</sup>

On 28 August 1779, a hurricane struck Martinique in the *Caribbean Sea*. Many lives were lost.<sup>141</sup>

In Burgundy, the grape harvest began on 21 September. The grain harvest was good. In the south of *France* fruit was in abundance. Heavy rain fell before the harvest, and a portion of the grapes were rotten as a result.<sup>62</sup>

In northern *France* in 1779, there was unnatural heat, unusual calm air. It was excessive dry during the beginning of the year and excessively wet at the end of the year. During the first four months the barometer produced a large pressure rise. But in August, the barometer produced a great depression the last two months. There were extremely persistence winds from the north and west, and a great scarcity of winds from the south and east.<sup>79</sup>

In 1779, the drought was everywhere in the southern *France*. It produced significantly less rain and rainy days than average. The drop in Marseille, Montpellier, Bordeaux and Viviers was between 3.2 and 13.6 inches (81 and 352 millimeters) less rainfall and between 6 and 29 fewer rainy days.<sup>79</sup>

In 1779 in Antigua in the *West Indies* experienced a severe drought. Every part of the surface of the ground became parched up, and all the ponds were dry. The importation of water was altogether insufficient to supply the demand. A malignant fever at the same time threatened total destruction to all.<sup>143</sup>

Before 8 October 1779, a hurricane struck the coast of the *United States*. The *Mary* traveling from St. Kitts to New York was overset [overturned] in a whirlwind, a few leagues from Sandy Hook, [New Jersey]. The vessel and cargo were entirely lost. Also at the same time a brig with rum for Antigua was lost in the storm.<sup>141</sup>

Before 3 December 1779, a hurricane struck the *Atlantic Ocean* causing 120 deaths. “The *Spitfire* Privateer, Captain White, foundered in a gale of wind, and all the crew, in number 120, perished.”<sup>141</sup>

In 1779 during the period between 13 July and 11 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Lin-ch’ing; and Hupeh (now Hubei province) in central *China* at Ên-shih, Chung-hsiang, Chiang-ling, I-tu and Ao-ch’êng. At Chung-hsiang, houses were damaged and at Chiang-ling, crops were damaged by the floodwaters. Also during the period between 13 July and 11 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou; Shantung province at Wu-ch’êng, An-ch’iu and T’ai-an; and Anhwei (now Anhui province) in eastern *China* at Ch’ien-shan.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 10<sup>th</sup> – four days past pleasant and warm. April 19<sup>th</sup> – flounders plentiful. April 24<sup>th</sup> – pleasant. April 26<sup>th</sup> – began to dig our garden. April 27<sup>th</sup> – I hear wood is 52 dollars a cord in Boston, and flour at £50 per hundred, i.e. a barrel is more than my whole salary. May 18<sup>th</sup> – the cherries and plums begin to blow [blossom], but no grass yet. June 23<sup>rd</sup> – strawberries at their best. June 25<sup>th</sup> – several days of hot weather. Everything flourishes vastly. July 5<sup>th</sup> – the Indian corn was never so forward and flourishing. July 14<sup>th</sup> – a fine hot rain. July 25<sup>th</sup> – steady rain. A wonder of a season. August 31<sup>st</sup> – cut our corn stalks; never was the corn so forward; poor hay season, by reason of the almost daily rains. September 4<sup>th</sup> – a great tempest of rain. September 12<sup>th</sup> – rainy. September 18<sup>th</sup> – very hot. September 24<sup>th</sup> – a wonder of a potato year, so many, so large, and so good. October 1<sup>st</sup> – no frost yet, though very cold for three days past. October 4<sup>th</sup> – warm. October 10<sup>th</sup> – very hot. October 23<sup>rd</sup> – hot summer day. October 29<sup>th</sup> – wonderful fine weather; never such a fine season. November 30<sup>th</sup> – a moderate fall.<sup>78</sup>

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**Winter of 1779 / 1780 A.D.** The whole winter near Philadelphia, Pennsylvania in the *United States* was intensely cold. The Delaware River was entirely closed or greatly obstructed by ice from the last week in November 1779 until the first week in March 1780. The ice was from two to three feet (0.6-0.9 meters) thick. During the month of January the mercury was several times from -10° to -15° F (-23° to -26° C) and only once during the month did it rise to 32° F (0° C). A great deal of snow fell as far south as the Carolinas and Georgia along with all the western, northern and eastern States. Long Island Sound and the Chesapeake were so completely ice-bound as to be passable with horses and sleights.<sup>1</sup>

The winter of 1779-80 was known as a “Hard Winter”. The Delaware River at Philadelphia, Pennsylvania in the *United States* froze around 1 December 1779, and remained a layer of ice two or three feet (0.6-0.9 meters) thick at times until 14 March 1780. Thomas Jefferson recalled “in 1780 the Chesapeake Bay was frozen solid from its head to the mouth of the Potomac.” Weather historian David M. Ludlum wrote, “The Hard Winter of 1780 is the only winter in American history when the waters surrounding New York City have frozen over and closed to all navigation for five consecutive weeks.” Three strong snowstorms struck the area. These occurred on 28 December, 2 & 3 January and 4 & 5 January. When the storms ended, snow was “over three feet (0.9 meters) deep” in Lancaster County, Pennsylvania. George Washington noted in his journal that the depth of the snow in Morristown, New Jersey was 18 inches (0.5 meters) after this last storm. His colonial troops crossed from New Jersey to Staten Island on foot over the frozen bay to do battle with the British. The extreme cold froze harbors and

inland bays as far south as the Virginia-North Carolina border. In some places, snowdrifts from ten to twelve feet (3.0-3.7 meters) deep were reported.<sup>27</sup>

The winter of 1779-80 was one of the most severe winters ever known in Bradford County, Pennsylvania in the *United States*.<sup>178</sup>

During the winter of 1779-80 New York Harbor in the *United States* froze solid for five weeks. Troops and people walked across the ice from New York to Jersey City and Staten Island with all sorts of goods including heavy cannons.<sup>33</sup>

During the winter of 1779-80, the Hudson River between New York and Powles' Hook [now called Paulus Hook, Jersey City, New Jersey] in the *United States* was frozen and was crossed on the ice. [Manhattan, New York is located 1 mile across the Hudson River from Powles' Hook. "Crossed on the ice" generally means the ice was sufficiently thick to allow foot and wagon traffic.] [This is only one of four winters when the Hudson River was completely frozen over during the century from 1740-1840. The other winters were 1740-41, 1764-65, and 1820-21.]<sup>202</sup>

In the *United States* in December 1779, a correspondent of the National Intelligencer, a resident of Virginia, said Colonel Baylor's regiment of horse crossed the Potomac River at Georgetown (Washington, D.C.), upon the ice, on their march to the Carolinas.<sup>38</sup>

In the *United States* on 14 January 1780, the cold was very intense that the mercury sunk into the bulb of the thermometer. The ice upon the James River in Virginia was 38 inches (1 meter) thick; and the Chesapeake Bay was so completely bridged with ice that many persons crossed over upon it from Annapolis to Kent Island in Maryland. Loaded wagons passed over the Chesapeake Bay.<sup>38</sup>

In the *United States* an old revolutionary officer stated that on 7 March 1780, he rode from Falmouth to Fredericksburg, Virginia upon the ice of the Rappahannock River, in company with his regiment, which was returning to Virginia, from the north. The cold weather continued without intermission from 10 December 1779 to March 1780.<sup>38</sup>

In the *United States* during the winter of 1779-80, the ice was driven out of the mouth of the Mississippi River into the Mexican gulf.<sup>42</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1779 on December 31<sup>st</sup> – the past month has been a true winter month, very cold and stormy, with repeated snows. January 1780 – a cold, stormy month. January 31<sup>st</sup> – severely cold, as perhaps ever was; the harbor down to the sea lies frozen up entirely. Thus January leaves as it found us, dismal, cold and windy, and snow very deep. February – some thaws and some cold weather until the 15<sup>th</sup>, then to the 24<sup>th</sup> moderate. February 1<sup>st</sup> – the country is blocked up with snow, and they suffer for want of wood and water. February 25<sup>th</sup> – very cold. February 29<sup>th</sup> – a most delightful day; a weather breeder. March 2<sup>nd</sup> – blustery day, lion-like March. March 7<sup>th</sup> – pleasant. March 12<sup>th</sup> – tempestuous. March 18<sup>th</sup> – moderate and pleasant since the 12<sup>th</sup>. March 26<sup>th</sup> – windy and cold. March 31<sup>st</sup> – the street to the meetinghouse remains full of snow.<sup>78</sup>

In 1779, the frost in *Britain* lasted 84 days.<sup>41, 43, 47, 93</sup>

During the winter of 1779-80, there was an extraordinary degree of cold at Glasgow, *Scotland*. On 11 January 1780, twelve inches of snow fell. The following low temperatures were observed in January: on the 12<sup>th</sup>, the temperature fell to 22° F [-5.6° C]; on the 13<sup>th</sup>, the temperature fell to -6° F [-21.1° C]; on the 14<sup>th</sup>, the temperature fell to -14° F [-25.6° C]; then there was a thaw and on the 22<sup>nd</sup>, the temperature fell to 5° F [-15° C].<sup>239</sup>

On 14 January 1780 the temperature at Newcastle, *England* fell to  $-3^{\circ}\text{F}$  [ $-19.4^{\circ}\text{C}$ ].<sup>249</sup>

In Selborne, *England*, during October and November, the weather was fine with intervals of rain. December was rainy with occasional days of frost and snow. January 1780 was frosty. During February dark harsh weather prevailed, with frequent intervals of frost. March was characterized by warm, showery, spring weather.<sup>70</sup>

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#### **1780 A.D. – 1784 A.D. Bangladesh, Pakistan, and India. Drought and Famine**

From 1780-1784 in *India* and *Bangladesh*, “Great dearth has desolated the upper provinces of this beautiful country. Hardly any rain has fallen during four years. In consequence the crops have failed, and the poor starved. The scarcity was also in Bengal [*India* and *Bangladesh*]; but it being under better government, preserved it from monopolists and ruin. From my enquiries, I find half of the inhabitants of the Duab [Doab Region of *India*] and Rohileund have perished. Every ditch, road, brook, pond, and street, of these countries, were strewed with dead bodies of men, women, and children. As there is no police in this country, where the wretch expires, there he lies, till his flesh is stripped off by the dogs, which is generally done in two days. No one buries him; for who are friends to a starved wretch? Besides, the Hindoos do not bury their dead, but burn them if they have money to buy fuel. We have been often obliged to shift our camp on account of the stench, arising from the putrefaction of so many bodies. When you reflect, that the people of Hindostan are the most abstemious in the world; that their daily food is never stern; hardly anything else than about a seer (not quite two pounds weight) of wheat or barley made into cakes, and baked over a few lighted sticks: when you understand, that such is their food, and simple water their drink, you may form some judgment of the rage of this famine, which could deprive them of even this little. Men and women, with their children in their hands, flocked to camp, offering themselves for sale for a quart of corn. Mothers sold their children for four annas each, (or the fourth part of a rupee or half-crown.)”<sup>88</sup> [The Doab Region of *India* is a segment of the Indo-Gangetic Plain in western and southwestern Uttar Pradesh state, between the Ganges (Ganga) and Yamuna rivers in northeastern *India*.]

[In *India*, there was a famine largely due to the actions of man, rather than weather. In *India* from 1781-83, there was a famine in the Carnatic in southeast *India* and the Madras [Chennai] settlements. “The Carnatic had been devastated by Hyder Ali’s incursion in 1780-81, and the settlement of Madras [Chennai] was reduced to great straits for food, as the whole country in its vicinity was suffering from a general scarcity. Early in 1781 the government of Madras [Chennai] took steps to regulate the supply of grain; and the distress continuing, in January 1782, a public subscription was raised for the relief of the poor, to which the Government contributed. *This was the origin of the institution for the relief of the native poor, known as the Monegar Choultry*. Early in October the Government deemed it necessary to take the supply of rice and food-grain into their own hands. The scarcity seems to have come to an end in the early months of 1783.”<sup>57</sup>]

In *India* during the years 1782-83, there was no rainfall for two years in the Province of Sind [now Sindh in southeastern *Pakistan*].<sup>47</sup>

In *India* during 1782-84, there was a famine in Sind [now *Pakistan*], including Thar and Parkar. “When the Kulhora dynasty ceased in 1782, and that of the Talpors commenced, a very severe famine occurred, which lasted for two and a half years. During four months of this time not a grain of corn was procurable. This famine was caused by the burning of crops, and the suspension of cultivation during a period of hostilities. There was also no rainfall for two years.”<sup>57</sup>

In 1783, there was a great famine in the Northwest Provinces and Punjab region in *India*. The severest strain was felt in *Upper India*. The scarcity extended to Bengal. It also was believed to extended to Rajputana.<sup>156</sup>

— In *Northern India*, a drought had prevailed during the preceding year, which added, to the severity of the famine. As early as October emigration towards Oudh commenced, and “death left its mark freely along the road.” “Every man’s hand was against his neighbor, and the strong ruthlessly seized the portion of the weak, for the struggle to maintain life overcame all scruples.”

In *India* during 1783-84, there was no rainfall for two years in the northwest Provinces of the Punjaub [Punjab].<sup>47</sup>

In *India* during 1783-84, there was a famine in the northwest provinces of the Punjab. “The disturbance of the season of 1783 seems to have been general; but as the countries most affected were not then subject to British rule, very little information therein is obtainable. There are reasons for believing that the upper parts of Hindustan had been visited with extraordinary drought during the two previous years. In September and October 1783, there was an abnormal cessation of rain and extreme drought, and in the latter month a terrible famine was reported in all the countries from beyond Zahore to Karumna (the western boundary of Behar) . . . and the famine had been already felt in all the western districts towards Delhi. To the northward of Calcutta, the crops upon the ground had been scorched, and nearly destroyed.” By the middle of 1784, the famine had abated.<sup>57</sup> [Zahore, now is Lahore, the capital of the *Pakistani* province of Punjab. Karumna is a river in the northern part of *India*.]

In *India* in December 1784, some of the northwest provinces of the Punjaub [Punjab] suffered very severely from floods after a great drought.<sup>47</sup>

In 1781-82, there was a serious famine in Madras (now Chennai), *India*. The Carnatic region of southern India was devastated by Hyder Ali’s incursions in 1780-81 and the Madras was reduced to great straits for food. The whole country in this vicinity was suffering from a general scarcity. In 1782, the starvation became more acute with individuals dying in the streets. The scarcity came to an end during the early months of 1783.<sup>188</sup>

In 1782, there was a famine in the Madras territories [now Chennai] of *India*.<sup>182</sup>

French dispatches dated 19 November 1782 reported that “The famine which rages at Madras [the southeastern coastal region of *India* now referred to as Chennai] is dreadful indeed; but this calamity is not confined to the English settlements; it has reached the French army, and the dominions of Hyder Ally [the sultan and de facto ruler of the Kingdom of Mysore in southern *India*]. Its ravages were so great among our forces, the Mons. D.Offalis, who succeeded to the command on the death of Mons. Duchemin, found it impossible to maintain his post near Madras, and fell back three days march from his former station near that town. The supplies which used to be sent to our army from Hyder’s dominions, have fallen greatly short, and the prince is scarcely able to subsist his army. The Carnatic [southern coastal region of *India*] is so ravaged, that it can furnish him no subsistence, and he can draw very sparingly from home, for there the famine rages with infinitely more fury than at Madras. This has saved Madras, which, weakened by famine, must necessarily have fallen into our hands. Hyder Ally cannot recruit his army with the numbers he expected, as men begin to be as scarce as provisions. Whilst the Carnatic is thus famished, the utmost plenty reigns in Bengal [today *Bangladesh* and the Indian state of West Bengal]. But, what with the superiority of our fleet, and the storms that have raged of late, the unfortunate Carnatic derives little or no benefit from the plenty in Bengal. It was computed, when the dispatches came away, that upwards of 300,000 persons had perished by famine in the English territories and those of Hyder Ally; so that if this scourge should rage for any great length of time, as dreadful consequences may be



apprehended from it as were produced by the famine in Bengal some years ago, which carried off two millions of people.”<sup>253</sup>

In 1783, a severe famine struck Panjab, *India*.<sup>187</sup>

In a report from Goa, *India* of 4 October 1783 along with letters from officers at Onore and Carwar, describe the scarcity of grain and the sufferings on account in the upper provinces.<sup>249</sup>

A great famine in Bengal [today this is *Bangladesh* and the state of West Bengal in *India*] and Behar [now Bihar in northern *India*] occurred in 1783. But the countries most affected were not under British rule at the time. The upper parts of Hindustan had been visited with an extraordinary drought during the two previous years. At Madras [now Chennai] “the enemy was at their walls, and by his ravages in every part of the adjacent country, had destroyed the cattle, and reduced the inhabitants to the most pressing difficulty to obtain the most common necessaries of life.” By October 1783, the famine moved and affected all the countries from beyond Lahore to the Karumna (the western boundary of Behar). It affected Delhi and Calcutta. The long drought was succeeded by great floods in 1784, and on 1 December the provinces of Tipperah, Sylhet and Dacca suffered great distress from inundations.<sup>183</sup>

In 1783-84, there was a great famine in *India*. The famine was concentrated in central Duab [river region]. There was a complete failure of the autumn rains following two years of partial droughts. Mr. Girdlestone relates that the immigration of famine stricken to Oudh [now Awadh], where the scarcity was believed to be less severe, “death left its mark freely along the road. Such was the general apathy that the bodies were not removed from the place where they lay, even in towns and villages. No relief was held out to the sick and dying. Every man’s hand was against his neighbour, and the strong ruthlessly seized the portion of the weak, for the struggle to maintain life overcame all scruples.”<sup>181</sup>

In the spring of 1784, shocking accounts were received from *India* of the devastation along the coast caused by a great famine and by an epidemic disease. The region of Pondicherry in southern *India* sustained devastation. The disasters were compounded by war.<sup>247, 250</sup>

On 23 December 1784, a letter was received in England from the governor-general of Bengal. He described the scene upon his arrival at Lucknow in Uttar Pradesh, *India*. This great and opulent country is in a situation of misery and embarrassment, not to be described or conceived. The severity of the season had not only destroyed the accustomed crop, but also destroyed all vegetables by the roots. And one year more of so excessive a drought, would have the most dire consequences.<sup>247, 250</sup>

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**1780 A.D.** On 24 February 1780, it was reported that a violent storm did great damage at Montega Bay [Montego Bay] in the island of *Jamaica*.<sup>270</sup>

On 11 May 1780, a storm of wind did much damage on the [River] Thames in *England*.<sup>270</sup>

On 16 May 1780, it was reported that a violent storm struck Plymouth [*England*] and did much damage.<sup>270</sup>

On 19 May 1780, complete darkness enveloped New England in the *United States*. Some people believed it was the end of the world. It was so dark that a person could not see his hand when he held it up, nor a sheet of white paper held within a few inches of the eyes, and the sky could not be distinguished from the earth. The darkness extended over the middle and southern portions of New England. It was observed as far west as Albany, New York, north as far as Portsmouth, New Hampshire and out on the ocean for a score of miles. From about the first of May, great tracts of forest along Lake Champlain, extending down to the vicinity of Ticonderoga, were on fire. New settlements were being made in northern New



Hampshire and in Canada and the settlers were burning the forests in preparation of cultivation. This caused a soot to fall, which in some places were 6 inches [15 centimeters] thick. The unusual weather pattern combined with the smoke from the massive forest fires is believed to be the cause of “The Dark Day”.<sup>199</sup>

On 1 June 1780 in *England*, there was a hailstorm at Warminster (Wilts). The stones measured from 3 to 9 inches in circumference. The same storm was also felt in Oxfordshire with most destructive effect: geese, ducks, and poultry generally were killed, and the utmost destruction to glass ensued.<sup>93</sup>

On 13 June 1780, a hurricane struck *Puerto Rico* causing deaths and losses.<sup>141</sup>

The summer of 1780 was warm over a large area of *France*. The summer in Paris was characterized by:

Hot days	33 days
Very hot days	1 day
Extremely hot days	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The summer in Denainvilliers, *France* was characterized by:

Hot days	59 days
Very hot days	15 days
Extremely hot days	3 days

At Denainvilliers, the month of July was dry and quite hot and the month of August was very hot. The high temperatures observed during the summer were:<sup>62</sup>

Turin, <i>Italy</i>	(99.7° F, 37.6° C)	on 28 July
Bordeaux, <i>France</i>	(97.5° F, 36.4° C)	
Montpellier, <i>France</i>	(97.3° F, 36.3° C)	
Gray, <i>France</i>	(97.3° F, 36.3° C)	
Orleans, <i>France</i>	(96.4° F, 35.8° C)	
Denainvilliers, <i>France</i>	(95.0° F, 35.0° C)	on 1 June, 31 July and 1 August
Paris, <i>France</i>	(95.0° F, 35.0° C)	on 2 June
Mulhouse, <i>France</i>	(93.7° F, 34.3° C)	on 31 July
Verviers, <i>Belgium</i>	(92.8° F, 33.8° C)	
Vire, <i>France</i>	(91.6° F, 33.1° C)	
Nancy, <i>France</i>	(90.5° F, 32.5° C)	on 2 June
Rodez, <i>France</i>	(88.7° F, 31.5° C)	
Breda, <i>the Netherlands</i>	(87.8° F, 31.0° C)	
Bourbonne-les-Bains, <i>France</i>	(87.6° F, 30.9° C)	
Nain, <i>Labrador</i>	(84.4° F, 29.1° C)	
Okak, <i>Labrador</i>	(84.2° F, 29.0° C)	
London, <i>England</i>	(84.0° F, 28.9° C)	on 29 May
Amsterdam, <i>the Netherlands</i>	(83.3° F, 28.5° C)	
Agde, <i>France</i>	(81.5° F, 27.5° C)	

In Paris, *France*, it was very dry until August. On 9 August, the water level on the Seine River was 16 centimeters (6.3 inches) above the lowest water level measured in 1719. In Provence, the summer produced great heat. In Burgundy, the year was variable and wet. The grape harvest began on 18 September, and many grapes suffered from decay. In the area around Orleans, the grain harvest was plentiful and of good quality. In the south and the north of *France*, the harvest was average.<sup>62</sup>

During the summer of 1780, the temperature peaked at 89.6° F (32° C) at Marseille and 96.8° F (36° C) at Montpellier, *France*.<sup>79</sup>

The year 1780 in *France* was variable and wet.<sup>79</sup>

On 24 August 1780, a hurricane more furious than that of the 1779 hurricane struck the Gulf coast of the *United States*.<sup>117</sup>

On 25 August 1780, it was reported that a violent storm struck *St. Kitt's* island in the West Indies and did much damage.<sup>270</sup>

On 15 September 1780, it was reported that a violent storm on the coast of *France* did great damage to the shipping.<sup>270</sup>

On 3 October 1780, a hurricane struck *Jamaica*.<sup>124</sup>

On 2-5 October 1780, a hurricane struck *Jamaica* and *Cuba* causing approximately 1,115 deaths but accounts vary significantly. [Seon has upwards of 1000 deaths in Jamaica, while Evans (1848) and Millas (1968) indicate 300 deaths there. Ludlum (1963) account has 200 in Savanna-La-Mar (Sav), Jamaica and "several white people and some hundreds of negroes killed...in the whole parish."] <sup>141</sup>

The hurricane in *Jamaica* was different in many respects from the others: it was a week earlier (3 October 1780) than the hurricane that struck *Barbados* (on 10 October 1780), and was more complex, being accompanied by an earthquake, and a most extraordinary swell of the sea [tsunami]. Its effects were also more confined: it seems to have been only its eastern wing, which swept the western point of that island; the parishes of Westmoreland and Hanover suffered most.<sup>143</sup>

Upon the 3<sup>rd</sup> of October 1780, the inhabitants of Savannah-la-Mar, *Jamaica* were gazing with astonishment at the sea swelling as it never had before: on a sudden, bursting through all bounds, and surmounting all obstacles, it overwhelmed the town, and swept every thing away so completely upon its retreat, as not to leave the smallest vestige of man, beast, or habitation behind. About 300 persons perished in this dreadful irruption. The sea flowed half a mile beyond its usual limits; and so sudden and unavoidable was the destruction, although it took place at noon, that of the inhabitants of one gentleman's house, consisting of ten Whites and forty Negroes, not a soul escaped. Where the sea did not reach, the destruction was nearly as effectual by the succeeding earthquake and hurricane: between both, scarcely a house or building of any sort was left standing in the parishes we have named. In the parish of Westmoreland only, the damage was estimated at near £ 700,000 sterling.

The gale began from the S.E. at one p.m.; at four p.m. it veered to the south, and became a perfect tempest, which lasted in full force till near eight p.m. It then abated. Forty of the inhabitants, who had sought shelter in the courthouse, were killed by the house falling upon them. At ten p.m., there was a smart shock of an earthquake, and the waters subsided. All the vessels in the bay were dashed to pieces, or driven on shore. The earthquake lifted the *Princess Royal* from her beam-ends, and fixed her upright in a firm bed, where she afterwards served as a house for the inhabitants.

[The timeline indicates a massive wave swept the island at noon. At 1 p.m. the gale began. From 4-8 p.m. the full force of the hurricane struck the island. And then at 10 p.m., a powerful earthquake struck. If the massive wave was caused by a tsunami, I believe the earthquake should strike first followed by the tsunami. I have noticed that in several account of hurricanes *on the island*, that earthquakes occur during the hurricane. In other words, hurricanes trigger earthquake or earthquake like events. This series of events in my mind still pose a mystery.]

On 4 October, His Majesty's ship *Phoenix*, commanded by Captain Sir Hyde Parker, was wrecked on *Cuba*, three leagues to the eastward of Cape Cruz, in a hurricane: twenty of the crew were washed overboard with the masts.

*Jamaica* was struck by a hurricane on 3 October 1870, *Barbados* and the neighboring islands a week later. In *Jamaica* the southwestern part of the island suffered most, Savanna-la-Mar being completely destroyed. Rivers changed their courses, lakes were formed, roads blocked for miles and crops utterly destroyed, including all the slaves' provision grounds. Famine followed and epidemics soon broke out. But *Jamaica* was not the only sufferer. In *Barbados* more than 4,300 people died in the hurricane there, in *Martinique* fully 7,000, and on almost every *West Indian* beach bits of wrecked vessels – British, French and Spanish sprawled on the soft sands.<sup>152</sup>

A hurricane struck *Jamaica* in 1780. At Westmoreland parish, there was not a tree of any kind, shrub or fence left standing. The storm raged with such fury, that there was not a leaf to be seen the next day, nor a bird of any sort for many weeks after. The appearance of the mountains the next morning resembled the broken teeth of a comb. The trunks of the trees, here and there, standing without a branch or limb so that the whole face of the country, having been totally stripped of its verdure, wore the appearance of the dreary mountains of *Wales* in the winter season.<sup>241</sup>

On 10-11 October 1780, one of the most dreadful storms that ever happened in the *West Indies* spread desolation over Barbados, Jamaica, etc. and the adjoining islands of the French, particularly Martinico [Martinique].<sup>270</sup>

During a major hurricane in the *West Indies*, on 10 October 1780, the whole town of Bridgetown [capital of Barbados] was destroyed, and many thousand persons perished. St. Lucien [now St. Lucia], Grenada, and St. Vincent, were also laid to waste and many thousands perished. At Fort Royal (Martinique), fourteen hundred houses were blown down, and an incredible number of persons killed. Every house at St. Pierre on the island of Martinique was also blown down, and many thousands perished. At St. Eustatius [now called Statia], at least five thousand persons lost their lives. Many vessels with their crews were dashed to pieces in the above ports.<sup>1</sup>

On 10-16 October 1780, a Great Hurricane struck *Barbados*, *Saint Vincent*, *Granada*, *Saint Lucia*, *Martinique*, *Hispaniola*, *Dominica*, *Guadeloupe*, *Antigua*, *Saint Kitts*, *Sint Eustatius* [now called Statia], *Puerto Rico* and *Bermuda* killing over 27,500 people. The hurricane produced wind speeds (gusts) in excess of 200 miles per hour (320 kilometers per hour). In *Barbados*, “The winds stripped the bark off trees before the hurricane downed every tree on the island.” In *Barbados*, the winds and seas moved heavy cannons about 100 feet (30 meters). The hurricane destroyed 19 Dutch ships at *Grenada*; the British fleet of Admiral Rodney at *Saint Lucia*; a fleet of 40 French ships off *Martinique*; many ships washed ashore at *Saint Kitts*; and grounded 50 ships near *Bermuda*.<sup>48</sup>

A great storm struck all of the *West India* islands, particularly at Savannah-la-Mar (Sav-la-Mar), in *Jamaica*, and at *Barbados* in October, 1780.<sup>40, 41, 56</sup>

In 1780, a powerful cyclone struck *Lesser Antilles Islands* causing 22,000 deaths.<sup>98</sup>

During 10-16 October 1780, a great Atlantic hurricane struck the Caribbean islands of *Martinique*, *Barbados* and *St. Eustatius* causing approximately 22,000 deaths.<sup>107</sup>

On 31 October 1780, reports were received of a hurricane at *Barbados* that did great damage.<sup>128</sup> [The hurricane struck the Caribbean between 10-16 October.]

On 10-16 October 1780, a hurricane struck the *Caribbean* islands of Martinique, St. Eustatius [Statia] and offshore Barbados. The hurricane killed approximately 22,000 people. It is the deadliest known Atlantic hurricane.<sup>141</sup>

On 10-12 October 1780, a hurricane struck the islands of *St. Lucia*, *Granada*, *Jamaica*, Hispaniola [now the island of the *Dominican Republic* and *Haiti*], *Barbados*, *St. Kitts*, *Dominica*, *Martinique*, *St. Vincent* and *St. Eustatius* [*Statia*].<sup>143</sup>

— During the evening of the 10<sup>th</sup>, there arose a hurricane at *St. Lucia*. The *Ajax*, *Montagu*, *Egmont*, *Amazon*, *Deal Castle* and *Camelion* were all driven to sea by the hurricane. The winds blew with irresistible fury attended by an incessant flood of rain. A little after midnight, the *Vengeance* parted her cable and tailed upon the rocks. The sailors cut away her mast and moved a number of guns forward. The winds shifted and increased in intensity and the ship cleared the rocks. The *San Vincente* snow, with many of the transports, victuallers and traders were dismasted, and mostly all on shore. [A snow is a sailing vessel primarily used as a merchant ship but also used in war. A victualler is a supply ship.] The storm continued with incredible vehemence during the whole day of the 11<sup>th</sup>. On the 13<sup>th</sup>, the *Montagu* anchored before the harbor, without a mast or bowsprit standing, eight feet of water in her hold. The *Ajax* returned to anchorage on the 21<sup>st</sup> with the loss of her main-yard, maintop mast and mizzenmast. The *Beaver's* prize, being on her passage to Barbados was unfortunately wrecked on the back of *St. Lucia*, near Vieux Fort and all her officers and crew, except 17 men perished. [A prize ship was a captured enemy vessel with an associated monetary reward attached.]

— The ship *Amazon* was off *St. Lucia* during the hurricane when a gust of wind overturned the ship. The wheel on the quarterdeck was underwater. The water was up to the after-part of the sides of the carronades on the weather side. The ship righted herself as far as to bring the lee-gunwale even with the water's edge. The officers and men soon got the lee quarterdeck guns and carronades overboard [to lighten the load], and soon after one of the forecastle guns and sheet anchor cut away. This act raised the ship enough to allow the crew to reach the pumps and lee guns on the main deck. These were thrown overboard after great difficulty. The water was above the cables on the orlop deck, with a vast quantity between decks and the stump of the main mast. Due to the valiant efforts of the officers and crew the ship was saved.

— In the island of *Granada*, a type of African ant was accidentally brought to the island [probably from the slave trade ships]. The ant was extremely destructive to the vegetation on the island. These ants were of slender make of a middling size of a dark-red color, remarkable for the acidity of their taste when applied to the tongue. On the island their numbers became so immense that they covered the roads for many miles together; so that the impressions made by the feet of horses that travelled over them could be seen distinctly. When rubbed together, these ants emitted a strong sulphurous smell. They first appeared on a sugar plantation about five miles from *St. George*. In the space of a few years they covered a track twelve miles in length, blasting vegetation, and reducing the country to a state of the most deplorable desolation. After the hurricane of 10 October that struck the island, this curse was gone, destroyed.

— Admiral Rowley, who sailed with the *Jamaica* convoy for England, returned to that island with five of his squadron, mostly dismasted, and all disabled. The *Berwick* parted company with the fleet, was dismasted, and thought it less dangerous to proceed alone to England than to return. The *Stirling Castle*, of sixty-four guns, was totally lost on the coast of Española [Hispaniola now the island of the *Dominican Republic* and *Haiti*], and only a few of the crew saved. The part of the wreck from which these unfortunate people were taken, was driven to sea, with near twenty men upon it, without a drop of water or any provisions, excepting a few pieces of pork, which were washed overboard soon after they were adrift. In this situation they were driven about for several days, many of them dying raving mad, and those who survived were kept alive by sucking the blood of their dead companions. They were saved by a small vessel, and carried into Cape Francois [now Cap-Haïtien, *Haiti*].

— The *Thunderer*, seventy-four [guns], commanded by Commodore Boyle Walsingham, was supposed to have foundered in the gale: no particulars of her fate were ever known.

— The *Barbadoes* and *Victor* sloops of war, with the *Cameleon*, *Scarborough*, and *La Blanche* frigates, became likewise, upon different services, and with a partial or total loss of men, victims to the rage of the elements.

— The *Laurel* and *Andromeda* were wrecked. The *Marquis de Bouille* sent thirty-one sailors, all that were saved of their crews, with a flag of truce, to Commodore Holham at *St. Lucia*; he declared that he could not consider in the light of enemies men who, in common with his own people, had been partakers of the same danger, and were in like manner entitled to every comfort and relief which could be given in a season of such universal calamity and distress. He only lamented, he said, that their numbers were so small, and particularly that none of the officers were saved.

— The hurricane began at *Barbados* on the morning of the 10<sup>th</sup> of October, and continued, with little intermission, about forty-eight hours. In the afternoon of the first day, all the ships were driven from their anchors to sea. In the course of the night, Bridgetown was nearly laid level with the earth. Daylight presented a scene of desolation seldom equaled: not one house or building in the island, however strong or sheltered, was exempt from damage. Most of the livestock and 4,326 persons perished. The loss, which the colony sustained, was estimated at £ 1,320,564 sterling.

— The hurricane nearly ruined the Spanish fleet, under the command of Don Bernardo de Galvez. Four capital ships, besides others of different denominations, were totally lost, and all on board, above 2000 persons, perished. The remainder of the shattered fleet got to the Havana, *Cuba*.

— At *St. Lucia*, only two houses were left standing in the town. His Majesty's sloop *Badger* was dismasted and driven ashore in that harbor. All the barracks, huts, and other buildings, were blown down, and all the ships were driven to sea.

— At St. Christopher's island [*St. Kitts*], several vessels were driven on shore.

— Considerable damage was done at *Dominica*.

— Every building in *St. Vincent's* was blown down. The *Experiment*, of fifty [guns], and the *Juno*, a French forty-gun frigate, were entirely destroyed.

— At *Grenada*, nineteen sail [sailing ships] of loaded Dutch ships were stranded, and beat to pieces.

— At Martinico [*Martinique*], on the 12<sup>th</sup>, four ships foundered in Fort Royal Bay, and every soul perished. Every house in St. Pierre's was blown down, and more than 1000 persons perished. At Fort Royal town, the cathedral, seven churches, the governor's house, the senate-house, the prisons, the hospitals, the barracks, and upwards of 1,400 houses, were blown down. In the hospital of Notre Dame, 1,600 patients, with the nurses and attendants, were almost all of them buried in the ruins. In the shipwrights' sick house, 100 perished. Upwards of 9,000 persons were computed to have perished in the island, and the damage was estimated at 700,000 louis-d'ors.

— At St. Eustatius [*Statia*], on the 10<sup>th</sup>, at eleven a.m., the sky suddenly blackened all round: it rained violently, and thundered and lightened. In the afternoon the gale increased: seven homeward bound ships were dashed to pieces, and every soul on board perished; nineteen others were driven to sea. In the night, every house to the northward and southward was blown down, or washed away, with the inhabitants, into the sea. Some few who had hid themselves in large holes in the mountain were saved. In the afternoon of the 11<sup>th</sup>, the wind shifted suddenly to the eastward, and swept away every house to the east and west. Between four and five thousand persons perished; and the damage was estimated at £ 150,000 sterling. The cathedral and four churches, and the barrack and hospital, were left standing.

The following account by Major-General Cunninghame, Governor of Barbados in the *Lesser Antilles*, describes the hurricane that struck Barbados in the *Lesser Antilles* from 9-16 October 1780:<sup>143</sup>

"The evening preceding the hurricane, the 9<sup>th</sup> of October, was remarkably calm, but the sky surprisingly red and fiery; during the night much rain fell. On the morning of the 10<sup>th</sup>, much rain and wind from N.W. By ten o'clock it increased very much; by one, the ships in the bay drove; by four o'clock, the *Albemarle* frigate (the only man-of-war here) parted her anchors and went to sea, as did all the other vessels, about twenty-five in number. Soon after, by six o'clock, the wind had torn up and blown many trees, and foreboded a most violent tempest. At the government-house, every precaution was taken to guard against what might happen: the doors and windows were barricaded up, but it availed little. By ten o'clock, the wind forced itself a passage through the house from the N.N.W., and the tempest increasing every minute, the family took to the centre of the building, imagining, from the prodigious strength of the walls, they being three feet thick, and from its circular form, it would have withstood the wind's utmost rage: however, by half after eleven o'clock they were obliged to retreat to the cellar, the wind having forced its way into every part, and torn off most of the roof. From this asylum they were soon driven out, the water being stopped in its passage, and having found itself a course into the cellar, they knew not where to go; the water rose four feet, and the ruins were falling from all quarters. To continue in the cellar was impossible; to return to the house equally so; the only chance left was making for the fields, which at that time appeared equally dangerous; it was, however, attempted, and the family were so fortunate as to get to the ruins of the foundation of the flag-staff, which soon after giving way, every one endeavoured to find a retreat for himself. The governor and the few who remained were thrown down, and it was with great difficulty they gained a cannon, under the carriage of which they took shelter; their situation here was highly deplorable — many of the cannon were moved, and they had reason to fear that under which they sat might be dismounted, and crush them by its fall, or that some of the ruins that were flying about would put an end to their existence; and to render the scene still more dreadful, they had much to fear from the powder magazine, near which they were. The armoury was level with the ground, and the arms, &c. scattered about.

"Anxiously did they wait the break of day, flattering themselves that with the light they should see a cessation of the storm; yet when it appeared, little was the tempest abated, and the day served but to exhibit the most melancholy prospect imaginable. Nothing can compare with the terrible devastation that presented itself on all sides: not a building standing; the trees, if not torn up by the roots, deprived of their leaves and branches; and the most luxuriant spring changed, in this one night, to the dreariest winter. In vain was it to look round for shelter: houses that, from their situation, it was to have been imagined would have been in a degree protected, were all flat with the earth; and



the miserable owners, if they were so fortunate as to escape with their lives, were left without a covering for themselves and family. General Vaughan was early obliged to evacuate his house; in escaping he was much bruised; his secretary was so unfortunate as to break his thigh.

"Nothing has ever happened that has caused such universal desolation. No one house in the island is exempt from danger. Very few buildings are left standing on the estates. The depopulation of the Negroes and cattle, particularly of the horned kind, is very great, which must, more especially in these times, be a cause of great distress to the planters. It is as yet impossible to make any accurate calculation of the number of souls who have perished in this dreadful calamity. Whites and Blacks together, it is imagined to exceed some thousands, but fortunately few people of consequence are among the number. Many are buried in the ruins of the houses and buildings — many fell victims to the violence of the storm and inclemency of the weather; and great numbers were driven into the sea, and there perished. The troops have suffered inconsiderably, though both the barracks and hospital were early blown down. Alarming consequences were dreaded from the number of dead bodies that lay uninterred, and from the quantity the sea threw up, which, however, are happily subsided. What few public buildings there were, are fallen in the general wreck. The fortifications have suffered very considerably. The buildings were all demolished; for so violent was the storm here, when assisted by the sea, that a twelve-pounder gun was carried from the south to the north battery, a distance of 140 yards. The loss to this country is immense — many years will be required to retrieve it."

Letters from Admiral Hood, dated at sea [in the *Atlantic Ocean* on 4 January 1781], advise, that he, with the squadron under his command, and his convoy, went on very well till the 10<sup>th</sup> of December [1780], when it blew a violent storm, which, however, was but of short continuance. At daylight, the fleet and convoy were much shattered, and one of the men of war, which proved the *Minorca*, was seen far to leeward dismasted. She has since arrived at Plymouth; and the fleet and convoy have proceeded with a fair wind.<sup>270</sup>

During 17-21 October 1780, a great hurricane struck eastern *Gulf of Mexico* causing approximately 2,000 deaths.<sup>107, 141</sup>

On 10 October 1780, a violent storm did much damage near London, *England*.<sup>270</sup>

On 15 October 1780, there was great damage done to Hammersmith church in a borough of London, *England* by a kind of whirlwind, or tornado, accompanied by thunder and lightening.<sup>128</sup>

A storm struck Roehampton (Wandsworth) near London, *England* on October 17.<sup>40, 41</sup>

In 1780, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 5 April and 3 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ing-yüan.

— During the period between 3 June and 1 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at I-ch'un; Hupeh (now Hubei province) in central *China* at Chiang-ling, Chung-hsiang, Mien-yang, and Ch'ien-chiang; and Chekiang province at I-wu.

— During the period 2-30 July, floods struck Shantung (now Shandong province) on the east coast of *China* at T'êng; Hopei (now Hebei province) in northern *China* at Fang-shan and Wu-ch'ing; and Chekiang province at Ch'ang-shan. At Ch'ang-shan, many houses were damaged by the floodwaters.

— During the period between 28 September and 27 October, floods struck Chekiang province at Chin-hua and Ch'ing-yüan.

In 1780 during the period between 3 June and 1 July, a drought engulfed Hupeh (now Hubei province) in central *China* at Ying-ch'êng.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:



April 15<sup>th</sup> – moderate spring-like weather. May 1<sup>st</sup> – no warm weather yet. May 10<sup>th</sup> – morning summer-like weather, quite reviving. May 11<sup>th</sup> – cold and windy. May 18<sup>th</sup> – a cold, backward spring. May 24<sup>th</sup> – a little taste of summer. May 27<sup>th</sup> – thundershowers, quite needful, it being a dry time. May 30<sup>th</sup> – no grass yet. June 30<sup>th</sup> – a wonder of a winter the past, and a spring, and a summer thus far, so cold and till now dry. July 1<sup>st</sup> – the grass grows to the admiration of all. July 4<sup>th</sup> – very hot. July 18<sup>th</sup> – plenty of rain. July 28<sup>th</sup> – extremely hot. August 2<sup>nd</sup> – a blessed rain. August 7<sup>th</sup> to 16<sup>th</sup> – sultry hot. August 18<sup>th</sup> – a wonderful change from very hot to very cold. August 22<sup>nd</sup> – a fine season for vegetation. August 24<sup>th</sup> – a memorable hot night. August 27<sup>th</sup> – extremely hot. August 29<sup>th</sup> – intensely hot day and night. August 31<sup>st</sup> – a great rain; very cold. September 1<sup>st</sup> – cold still. September 3<sup>rd</sup> – heavy showers. September 21<sup>st</sup> – calm hot summer's day.<sup>78</sup>

*Also refer to the section 1780 A.D. – 1784 A.D. for information on the drought and famine in Bangladesh, Pakistan, and India during that timeframe.*

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**Winter of 1780 / 1781 A.D.** In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1780 on November 1<sup>st</sup> – a great snowstorm. November 30<sup>th</sup> – the whole month generally cold and stormy. December 1<sup>st</sup> and 2<sup>nd</sup> – severely cold. December 9<sup>th</sup> – moderate all the week. December 18<sup>th</sup> – no snow on the ground. December 23<sup>rd</sup> – snowed about five-inches (13 centimeters). December 26<sup>th</sup> – snow knee deep. December 28<sup>th</sup> – the roads all blocked up [impassable]. In 1781 on January 6 – fine sledding. January 9<sup>th</sup> – extreme cold. January 23<sup>rd</sup> – a great snowstorm. January 28<sup>th</sup> – rain and a thaw. February 1<sup>st</sup> – snow again, but turned to rain. February 5<sup>th</sup> – severely cold snowstorm. February 9<sup>th</sup> – extreme cold. February 17<sup>th</sup> – great snowstorm. February 20<sup>th</sup> – blustering and very cold. February 22<sup>nd</sup> and 24<sup>th</sup> – the street is brim full of snow; we are buried. March 10<sup>th</sup> – cold month thus far; fine sledding. March 15<sup>th</sup> – a beautiful spring. March 18<sup>th</sup> – rain and snow. March 23<sup>rd</sup> – it snowed all day. March 28<sup>th</sup> – very cold and windy. April 3<sup>rd</sup> – a great snowstorm. April 11<sup>th</sup> – a heavy rain. April 19<sup>th</sup> – snow again.<sup>78</sup>

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**1781 A.D.** Lewes in Sussex, *England* reported that it appears more shipping was wrecked on the coast on 26 January 1781, than was ever before known in the memory of man. At Bears-Hide a vessel, supposed to be a victualling sloop, was dashed to pieces, and every person on board perished. Opposite New Haven Mill a salt vessel shared the same fate, and every person on board perished. At Cuckmere the *Syren* frigate and *Race Horse* schooner both went to pieces, but the crew were saved. A vessel at Crow Link and another at Berling were wrecked, the crews mostly perished. The *Syren* was a fine frigate, built about a year and a half ago at Newcastle upon Tyne, and was sheathed with copper; she carried 170 men, mounted 32 guns, and sailed with the schooner as convoy to a small fleet from Spithead to the Downs; but most of the merchantmen perceiving their danger before the Commodore, they racked and stretched off. The frigate struck about two o'clock, and immediately fired several guns as signals of distress to the *Race Horse*; but the wind blowing a hurricane, they struck themselves between three and four in the afternoon. The *Sprightly* cutter and a Dutch prize that were in company are missing.<sup>270</sup>

Aldborough in Sussex, *England* reported on 12 February 1781, that a violent storm of wind which for three days raged with greater fury than ever were remembered. “Our coasts, says the letter writer, is covered with pieces of wrecks of ships, and every tide throws up dead bodies. Guns from ships of distress are continually discharging, but the wind blows so hard, that we cannot venture to their assistance.”<sup>270</sup>

A Spanish fleet left Havana, *Cuba* on 23 February 1781. During the night of the 25<sup>th</sup>, it blew a hurricane. On the 26<sup>th</sup>, it blew much harder, with thunder, lightning and heavy rain. The following ships were either foundered or missing and all their men supposed lost: *El S. Fr. De Assissa* (70 guns), *El San Augustino* (70 guns), *El Francisco De Pablo* (70 guns), and *El Astuto* (64 guns). The following ships lost their masts: *El San Louis* flagship (80 guns, lost mainmast), *El San Nicolas* (80 guns, lost all three masts), *El San Guerero* (70 guns, lost foremast) and *St. Maria* frigate (26 guns, lost all three masts). The surviving remnant of this fleet returned back to Havana. As a result of the hurricane, they lost 4 captains, 26 lieutenants, 110 inferior officers, 1600 seamen and 440 soldiers, totaling 2,180 individuals.<sup>270</sup>

In 1781, a great Atlantic hurricane struck off the coast of Florida causing approximately 2,000 deaths.<sup>107, 141</sup>

On 27 February 1781, a most violent storm of wind broke from west-northwest and did considerable damage to the shipping. It was severely felt at Spithead, *England*, where the *Portland* of 50 guns lost her mizenmast; the *Prothée* of 64 guns, and *Latham* outward-bound Indiamen, drove ashore, but got off. Several other ships received considerable damage, and some were lost along the coast. At Blundworth, in Hampshire, the violence of the storm was dreadful. In less than three hours scarce a house but what was stript [stripped] of its [roof] tiles and thatch; three houses were blown down, and not a tree of any size left standing in the neighborhood. For ten miles [16 kilometers] round scarce a house escaped without damage, more or less. By this storm the *French* suffered considerably in their shipping; The *Mentor* of 64 guns was lost 6 or 7 leagues [18-21 miles] south-southwest of the Dauvette.<sup>270</sup>

On 3 March 1781, reports were received by Flanders mail that great devastation was caused by hurricanes and inundations in *France*, Flanders [now *Belgium*], and Holland [now *the Netherlands*]; particularly in the latter country, where several dykes [dikes or levees] were borne down, houses washed away, numbers of cattle perished and many people drowned.<sup>270</sup>

On 20 June 1781, a most violent storm of thunder and lightning struck Salisbury, *England* than has been known there for many years. A ball of fire fell upon a barn at Shrowton [Shrewton], set it on fire, and consumed it along with another barn, with their contents, to ashes. A large oak tree in Longleat Park, the seat of Lord Weymouth, was shivered in pieces by the lightning, and scattered in every direction to the distance of 130 yards [119 meters], one splinter weighed 150 pounds [68 kilograms].<sup>270</sup>

On 20 June 1781, the *Pheasant* cutter, Lieutenant Matthews, commander, in his passage from Jersey to Portsmouth, *England*, was unfortunately crossed by a whirlwind [waterspout?], which in a moment split every sail, the vessel broached too, filled and sunk, and every soul, except the pilot, the master, and two boys perished.<sup>270</sup>

The summer of 1781 was very warm in northern and southern *France*. The summer in Paris was characterized by:

Hot days	54 days
Very hot days	5 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The months of June and July were very hot. The high temperatures observed during the summer were:<sup>62</sup>

Metz, <i>France</i>	(100.6° F, 38.1° C)
Liège, <i>Belgium</i>	( 99.5° F, 37.5° C) on 26 July and 2 September
Montpellier, <i>France</i>	( 97.3° F, 36.3° C)
Troyes, <i>France</i>	( 97.3° F, 36.3° C)
Poitiers, <i>France</i>	( 96.8° F, 36.0° C)
Paris, <i>France</i>	( 93.9° F, 34.4° C) on 31 July
Denainvilliers, <i>France</i>	( 93.9° F, 34.4° C) on 31 July
Bordeaux, <i>France</i>	( 93.2° F, 34.0° C)
Dax, <i>France</i>	( 92.8° F, 33.8° C)
Mulhouse, <i>France</i>	( 92.1° F, 33.4° C) on 3 September
Stockholm, <i>Sweden</i>	( 90.5° F, 32.5° C)
Amsterdam, <i>the Netherlands</i>	( 84.9° F, 29.4° C)
London, <i>England</i>	( 84.0° F, 28.9° C) on 31 July

The summer of 1781 in northern *France* was very hot.<sup>79</sup>

The drought of 1781 in northern *France* prevailed especially in spring and summer. The drought lasted longer than six months. The drought began after a furious storm, which occurred on February 27. The drought persisted, except for some short rains until mid-September. The drought, accompanied by heat, made the harvest very early and very fertile. The year produced only 14.5 inches (367 millimeters) of rainfall compared to a typical yearly average of 20.9 inches (530 millimeters). The annual number of rainy days in Paris and northern *France* raised only to 91 instead of [the typical level of] 150.<sup>79</sup>

During the summer of 1781, the temperature peaked at 89.6° F (32° C) at Marseille and 96.8° F (36° C) at Montpellier, *France*.<sup>79</sup>

The drought in northern *France* was great. In Paris the rainfall for the entire year was only 362 millimeters (14.3 inches). In the south, downpours of rain in June caused the harvest to be very mediocre. In Burgundy, the grape harvest began on 10 September. The grain harvest was sufficient in central and northern *France*.<sup>62</sup>

A letter from Beaumaris, *Wales* of 1 July 1781, describes the tempestuous weather that lately struck their coast, which had been such that no man living remembers the like, by which the shipping suffered much.<sup>270</sup>

On 1 August 1781, a hurricane struck *Jamaica*.<sup>124</sup>

In August, a hurricane struck *Jamaica*.<sup>40, 41, 42</sup>

In August 1871 another hurricane, scarcely less violent than the 1870 hurricane struck *Jamaica*. Over a hundred ships were driven ashore, including a number of men-o-war, and again all the newly-planted provision grounds were destroyed.<sup>152</sup>

On 1 August 1781, a powerful hurricane struck *Jamaica*. The hurricane drove over 120 vessels ashore destroying a great number of them. Amongst the 120 ships were 30 British men-of-war. Many lives were lost on these ships. More than twenty bodies were recovered. There were more losses on shore.<sup>141</sup>

On 1 August 1781, *Jamaica* was desolated by a hurricane. Seventy-three light vessels were driven on shore, two loaded ships sunk, twenty-four ran on shore, between the Salt Ponds and Mosquito Point. His Majesty's Ship *Ulysses* was dismasted. His Majesty's ship *Southampton* was dismasted and driven to Wreck Reef, to leeward of Port Royal. Many houses and piazzas were blown down. His Majesty's ship *Thunderer*, seventy-four guns, was lost with all her crew. The *Stirling Castle*, sixty-four guns, was lost on the *Silver Keys*, and only fifty of her crew was saved. The *Deal Castle*, twenty-four guns, was lost in *Puerto Rico*. The *Endeavour* brig, fourteen guns, was lost on *Jamaica*. On 2 August 1781, His Majesty's ship *Pelican*, commanded by Captain Collingwood, was wrecked upon the Morant Quays [*Morant Cays*], in a violent gale of wind. All the crew except 4 were saved.<sup>143</sup> [*Morant Cays* is an offshore island group 51 kilometers SSE of Morant Point, *Jamaica*.]

On 20 August 1781, the *Sophia Albertina*, a Swedish man of war of 72 guns, Johan Gustaaf Schiold, commander, convoy to a fleet of 7 merchantmen bound to Cadiz, was wrecked on the Haaks on the coast of Holland [*the Netherlands*], and of 554 men, of whom the crew consisted, only 26 were saved on pieces of the wreck. The violence of the storm in which this ship perished was irresistible, and several Portuguese ships, as well as those of Holland [now *the Netherlands*] and other nations, which happened to be on the coast at the same time, shared the same fate.<sup>270</sup>

On 23 August 1781, a hurricane desolated Louisiana in the *United States*; Mississippi Delta entirely inundated.<sup>117</sup>

On 29 October 1781, a hurricane struck the *Atlantic Ocean*. The ship *Peach and Plenty* from Cork traveling to the West Indies was overset [overturned] by a hard gale of wind and all the crew perished except one.<sup>141</sup>

A letter from Bade in *Hungary* dated 1 September 1781 reported that the grapes are already ripe in their vineyards, and the vintage so superabundant that a ton full of wine it offered for two casks of equal measure.<sup>270</sup>

On 4 September 1781 at Carlisle, *England* and its neighborhood, “there fell the heaviest rain that has been known in the memory of man, by which many fields of corn [grain] were overflowed, the rivulets rose to an alarming height, and great damage has been sustained by many individuals.”<sup>270</sup>

In 1781 during the period between 24 April and 22 May, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hsüan-p’ing. During the period between 21 July and 18 August, a drought engulfed Chekiang province at Chin-hua and Hsin-têng.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: April 22<sup>nd</sup> – cold and windy. April 29<sup>th</sup> – moderate. May 1<sup>st</sup> – pleasant day, quite reviving. May 9<sup>th</sup> – cold and windy. May 15<sup>th</sup> – warm. May 20<sup>th</sup> and 21<sup>st</sup> – summer days. May 30<sup>th</sup> – hot summer weather. June 11<sup>th</sup> – a fine growing season. June 19<sup>th</sup> – heavy shower, with thunder and lightning, and great hail. June 27<sup>th</sup> – a deluge of rain. June 30<sup>th</sup> – no summer except for three days. July 5<sup>th</sup> – a hot day and night. July 8<sup>th</sup> – extremely hot. July 15<sup>th</sup> – very hot. July 24<sup>th</sup> – small showers; a very dry time. July 30<sup>th</sup> – a merciful shower. August 6<sup>th</sup> – a grievous drought. August 13<sup>th</sup> – a plentiful rain. August 20<sup>th</sup> – a deluge of rain. September 12<sup>th</sup> – hot weather. September 20<sup>th</sup> – fine weather. September 24<sup>th</sup> – a summer’s day. October 8<sup>th</sup> – horrid cold. October 10<sup>th</sup> – a very hot summer’s day. October 11<sup>th</sup> – hotter (like this day 59 years.) October 22<sup>nd</sup> – it froze last night. October 31<sup>st</sup> – a moderate fall, thus far. November 2<sup>nd</sup> – a great storm, and a deluge of rain. November 11<sup>th</sup> – a moderate day. November 18<sup>th</sup> – rainy.<sup>78</sup>

*Also refer to the section 1780 A.D. – 1784 A.D. for information on the drought and famine in Bangladesh, Pakistan, and India during that timeframe.*

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**Winter of 1781 / 1782 A.D.** In Plymouth [*United Kingdom*] on 16 February 1782, “The most intense frost almost ever known. . . . The grass, which on Friday was as green and flourishing as if it had been midsummer, on Sunday morning seemed to be entirely killed. This is mentioned by our correspondent as very unusual in that part of the country; and the snow lay on the ground in many places.”<sup>47, 93</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: In 1781 on November 23<sup>rd</sup> – blustering and cold. November 25<sup>th</sup> – snowstorm. November 30<sup>th</sup> – a tedious, cold, stormy month. December 7<sup>th</sup> – snow. December 11<sup>th</sup> – good sledding. December 28<sup>th</sup> – storm of fine snow. December 31<sup>st</sup> – another great snowstorm. In 1782 on January 1<sup>st</sup> to 7<sup>th</sup> – thaws. January 11<sup>th</sup> – snow. January 13<sup>th</sup> – a great snowstorm. January 16<sup>th</sup> and 17<sup>th</sup> – severe cold. January 28<sup>th</sup> – colder. January 29<sup>th</sup> – very blustery and cold dismal winter. January 30<sup>th</sup> – the harbor has been frozen up a fortnight [for 14 days]. January 31<sup>st</sup> – cold still. February 3<sup>rd</sup> – still cold and snowy. February 12<sup>th</sup> – colder than any day yet. February 26<sup>th</sup> – the harbor down to the islands remains shut up. February 28<sup>th</sup> – a long, close [overcast], stormy and severe winter as perhaps ever was known.<sup>78</sup>

The winter of 1781 in Philadelphia, Pennsylvania in the *United States* was very mild but spring was cold and backwards.<sup>1</sup>

In Selborne, *England*, in November and December 1781, the weather was warm and rainy and this weather prevailed until 4 February 1782. Then followed eighteen days of hard frost, after which to the end of March, the weather was cold and windy, with frost, snow, and rain.<sup>70</sup>

On 3 January 1782, *France* reported the winter weather was unhealthy. The weather was as warm as spring; and sickness so prevalent that all the physicians and apothecaries were making fortunes. Accounts from the southern provinces say the rains have been incessant for 15 days.<sup>269</sup>

On 10 February 1782, “a dreadful hurricane arose at Corunna [A Coruña] in *Spain*, by which more than 30 vessels perished. The sea swelled to a tremendous height, and many houses, warehouses, &c. were washed away.”<sup>269</sup>

On 16 February 1782 at Plymouth, *England*, there “was the most intense frost almost ever known; some water in a bedroom (wherein was kept a constant fire) just poured out was, whilst the family went to break fast [breakfast], covered with ice; and the grass, which on Friday was as green and flourishing as if it had been midsummer, on Saturday morning seemed to be entirely killed. This is mentioned by our correspondent as a thing very uncommon in that part of the country; and the snow lay on the ground in many places.”<sup>269</sup>

On 11 March 1782, “the river Clyde rose higher than has ever been known in the memory of man. In Glasgow [*Scotland*] the waters reached half way up the Salt Market.”<sup>269</sup>

On 1 May 1782, “the weather was uncommonly severe, not in *England* only, but almost all over *Europe*. At Vienna [*Austria*] the frost continued so rigorous that the vines were thought to be materially hurt. In *Italy* such a fall of snow as has never been remembered. In *Russia* many thousands have perished of a sickness owing to the rigour of the season. In *Sweden* men and cattle have perished for want of food. In the Highlands of *Scotland* cattle die, or are killed for want of fodder. In short, the severity of the weather has been generally felt.”<sup>269</sup>

On 1 May 1782, the severity of winter continued longer that year in all parts of *Europe* than was ever known.<sup>128</sup>

**1782 A.D.** In *England*, there were great floods in Northumberland; Hexham and other bridges thrown down.<sup>47</sup>

Inundations in the north of *England* in March 1782, caused the Hexham Bridge and Ridley-Hall Bridge and others to be thrown down.<sup>40, 41, 43</sup>

On 18 March 1782, lightning struck an ammunition storage magazine at Fort Marlborough, Sumatra [in western *Indonesia*], which contained 400 barrels of powder and blew it up. It destroyed [the munitions] stores and killed several men.<sup>226</sup>

On 3 April 1782, reports were received of an inundation in the north of *England*. The bridges of Hexham and Ridley Hall were destroyed.<sup>128</sup>

On 22 April 1782, a storm at Surat in western *India* destroyed 7,000 of the inhabitants.<sup>128</sup>

In *India* on the 22<sup>nd</sup> of April, there was a great storm at Surat; about 7,000 inhabitants destroyed.<sup>41, 43, 57, 90</sup>

In *India*, “At Surat, a Dutch settlement lately taken by the English, a most dreadful hurricane arose, which carried all before it; neither man, horses, nor sheep could be saved. The storm began from the southeast

and ended northwest with the same fury. The whirlwind swept into the sea more than 3,000 inhabitants, who in the first moments had taken refuge between Surat and Domus.”<sup>57, 253</sup>

A storm struck Dieupole, Moravia (*Czech Republic*) on May 30, 1782; which totally destroyed the place.<sup>41</sup>

From January to May 1782, the amount of rain that fell in Suffolk, *England* was 13.45 inches [34.16 centimeters].<sup>269</sup>

In *France* on the 17<sup>th</sup> of June, hailstorm; stones weighed 8 ounces.<sup>41, 43, 56, 57, 93</sup>

On 18 June 1782, a most severe storm of thunder and lightning struck London, *England* and a waterspout struck near Clapham Common. A thunderstorm also struck Thornbury in Gloucestershire and its neighborhood. A ball of fire fell upon the church, broke down one of the pinnacles, and covered the pavement within with mortar and shattered stones. At Pilton near Wells, the same storm very much damaged the church, killed a poor man that was tolling the bell, and two oxen that were grazing in an adjacent field.<sup>269</sup>

On 23 June 1782, a tornado struck New England in the *United States*. It first appeared at Dalton, Massachusetts (also known as Ashuelot-Equivalent). It leveled two large houses and uprooted trees. Then it swept through Manchester, Vermont, doing great damage to the crops and buildings. The storm then passed onward to Royalton, Vermont. The storm caused hailstones of extreme size to fall. Some of the individual hailstones were 6-inches [15 centimeters] in diameter and weighed a pound. It also caused flash flooding. The water was knee deep in many houses and buildings. The tornado, which cut a half-mile [0.8 kilometers] wide path of destruction, passed through Weathersfield, and then crossed the Connecticut River into New Hampshire, where it proceeded through Claremont and Croydon. The tornado left a scene of desolation along its entire path.<sup>199</sup>

On 28 June 1782, at the village of Venisy and its neighborhood in the district of Senonois [*France*], after some severe claps of thunder and a rumbling noise like the flourish of a thousand drums, there fell a storm of hail, the stones of which were as large as an ordinary apple, with a hard substance in the middle crystallized by which several persons were dangerously wounded, and all the game and fruits of the earth destroyed. This was succeeded by so dreadful a fall of rain, that in less than two hours the inhabitants were obliged to take refuge on the tops of their houses, while the torrent below carried everything before it. Most of the cattle perished, and the country laid waste.<sup>269</sup>

On 16 July 1782, “one of the most terrible storms that has been known in the memory of man alarmed the whole neighbourhood of Padstow [*England*]. The thunder and lightning began about one in the morning, and continued till nine, when the wind rose in squalls, and the rain fell in torrents. Several vessels were cast away on the western coast. In the neighbourhood of London the storm was no less severe; and, what is uncommon, after the thunder and lightning had ceased, it rained incessantly for more than 12 hours. The heavy corn suffered much; and it is feared the farina, which had just begun to shew [show] itself on the wheat, was not a little hurt.”<sup>269</sup>

On 17 July 1782, a storm of hail in *France*; some of the hailstones weighed eight ounces.<sup>128</sup>

On 22 July 1782, a hailstorm at Madrid, *Spain* destroyed glass to the value of 6,000*l*.<sup>128</sup>

In Madrid, *Spain*, a violent hailstorm struck on July 26. “Some of the stones weighed a pound.” £6,000 damage to glass windows.<sup>40, 41, 43, 56, 57, 93</sup>



In northern *France* following two months of very mild temperatures, cold weather suddenly materialized in the middle of February 1782. This occurred after several days of strong winds and extraordinary changes in the barometer. The following months, especially May and August, were still very cold and very wet. Intense short burst of heat were felt in July. There was no fall. A cold winter suddenly took hold beginning in the middle of October.<sup>79</sup>

The summer of 1782 produced many rainfalls in northern *France*. Nevertheless, very high temperatures were observed in various places.<sup>62</sup>

Haguenau, <i>France</i>	(102.9° F, 39.4° C)
Manosque, <i>France</i>	(101.8° F, 38.8° C)
Paris, <i>France</i>	(101.7° F, 38.7° C) on 16 July
Nancy, <i>France</i>	( 99.7° F, 37.6° C) on 26 July
Mulhouse, <i>France</i>	( 97.9° F, 36.6° C) on 26 July
Bruyères, <i>France</i>	( 97.2° F, 36.2° C)
Meaux, <i>France</i>	( 97.2° F, 36.2° C) on 16 July
Bordeaux, <i>France</i>	( 95.5° F, 35.3° C)
Grenoble, <i>France</i>	( 95.0° F, 35.0° C)
Chartres, <i>France</i>	( 95.0° F, 35.0° C)
Chinon, <i>France</i>	( 95.0° F, 35.0° C)
Les Sables-d'Olonne, <i>France</i>	( 91.6° F, 33.1° C)
Brussels, <i>Belgium</i>	( 87.1° F, 30.6° C) on 16 July
Mont-Louis, <i>France</i>	( 81.5° F, 27.5° C)
Saint-Gotthard, <i>Switzerland</i>	( 66.9° F, 19.4° C)

In Burgundy, *France*, the grape harvest began on 30 September. In the south [of *France*], a drought struck without interruption from June until October. This caused the loss of maize and vegetables. In the north, the harvest was poor.<sup>62</sup>

On 16 August 1782, “about two in the morning the most dreadful fall of rain began at Dublin [*Ireland*] and its neighbourhood, that was ever remembered in that country. It continued for fourteen hours, with a violence that was truly alarming. The distress of the inhabitants in different parts of Dublin are beyond description. Rings-end bridge was borne down by the flood.”<sup>269</sup>

Letters from Holland [now *the Netherlands*] dated 18 August 1782 brought a melancholy account of the effects of the cold and wet weather, which destroyed the hopes of a plentiful harvest all along the coasts of the Rhine.<sup>269</sup>

On 24 August 1782, “the heaviest rain fell in the neighbourhood of Elgin [*Scotland*], about 20 miles [32 kilometers] to the north of Aberdeen, that ever had been known in the memory of man. The floods swelled the river Lossie to such a degree, that it bore down the mills and every thing before it. The road going into Elgin from the east was so torn by the river as to be impassible. The river Findhern rose and overflowed its banks, laying the fine, fertile, and most beautiful vale between its usual bed and the burn [creek] that runs by Fenre into one continued sheet of water. The ferryman’s house was carried away, and the river now runs where the road was that led to the ferry. The Burn of Delvey carried away the bridge of that name and the adjoining houses along with it. At Nairn the fine new bridge at the east end of the town was born down by the flood, as was also the Highland bridge, a few miles above the town, by the same river. In the flat road between Nairn and Inverness the water lay so high as to float the chaises [carriages] that were passing that way. At Sligo in *Ireland* the inundation was still greater. The water rose ten feet [3 meters] above high water mark; and the Mardyke being broken down, the flood reached as far as Ballyade, and carried all before it.”<sup>269</sup>

In August-September 1782, a hurricane struck the *Atlantic Ocean*. The corsair, *St. Juan Nepomuzeno*, sailed from St. Andero [Spain] bound for Havana, Cuba on 15 August, and foundered in a violent storm the same day in sight of the port. The crew and passengers all drowned.<sup>141</sup>

On 16-17 September 1782, a great Atlantic hurricane struck the *central Atlantic* causing approximately 3,000 deaths.<sup>107</sup>

On 16-17 September 1782, a hurricane struck the central *Atlantic Ocean* causing more than 3,000 deaths. [Ellms (1860) locates the disaster at 48° 33' N 43° 20' W, placing in doubt the tropical character of the storm. *Lloyd's List* (Oct 1782), however, has accounts of storm from the Jamaica Fleet at 43° N 48° W, and at 43° N 44° W. At the latter location, in a gale of wind from east-southeast on the 16<sup>th</sup> in the evening, when on the morning of the 17<sup>th</sup> the wind came out in an instant to northwest. The storm lasted for two hours. A very similar account from an officer on the *Ramilies* at 42.3° N and 48.9° W is reprinted in Redfield (1836).]<sup>141</sup>

On 16 September 1782, a hurricane destroyed many English ships, belonging to the fleet of ninety sails [sailing vessels] that were heading in the *Atlantic Ocean* from the banks of Newfoundland, Canada to Jamaica. The *Ramillies*, the *Centaur*, *L'Hector*, the *Ville de Paris*, and many other ships, the spoils of Rodney's victory [Battle of the Saintes] in the West Indies, all perished.<sup>204</sup>

A fleet of 150 merchantman sailing ships under convoy with 7 men-of-war set out from Jamaica on 26 July for different ports. On 16 ult. [16 September 1782] at latitude 45° N., longitude 48° W. [off the Grand Banks near Newfoundland, *Canada*] ran into a severe gale. Several ships were damaged in the storm. The *Ramillies* commanded by Admiral Graves lost its main and mizzenmasts. The *Centaur* lost all her masts along with her bowsprit, head, and rudder. The *Canada* lost her mizzen and main topmasts. The *Glorieux* lost her bowsprit and foremasts. The *Ville de Paris* lost her main sail. The *Alexander* of Glasgow lost her mizzenmast and rudder. The *Salt River* lost her mizzenmast and her sails were ripped to pieces. The *Minerva* lost her bowsprit and foretopmast. The *Good Hope* and the *Druid* lost their main sails. Many other ships lost their masts and bowsprits. The morning after the storm, the ocean was littered with puncheons [barrels], bags of cotton, logs of mahogany, masts, spars, etc.<sup>269</sup>

On 23 September 1782 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>

On 23 September 1782, a hailstorm struck London, *England*. The hailstones were unusually large and broke many windows.<sup>269</sup>

On 5 October 1782, reports were received of the fleet from Jamaica which suffered much by a gale of wind off the banks of Newfoundland, *Canada*. The *Ville de Paris* of 110 guns, one of the Admiral Rodney's prizes; and the *Glorieux*, *Centaur*, and *Ramilies* were all lost.<sup>128</sup>

The convoy ran into a violent Atlantic storm, which sent the *Ville de Paris* and another vessel *Le Glorieux*, to the bottom with the loss of 1,200 men.<sup>152</sup>

On 5 October 1782, the first news of the tremendous gale, which the Jamaica fleet with their convoy met with off *Newfoundland*, was received at the Admiralty office.<sup>269</sup>  
— “Capt. Cornwallis of the *Canada* man of war of 74 guns, who arrived at Portsmouth [England] the day before, brought the account of the return of the *Ardent* of 64 guns, one of the convoy, to Port Royal in Jamaica, having sprung a leak in Blue Fields; that the *Glorieux*, with five merchantmen, joined the convoy off the Grand Carnarias [Gran Canaria]; and that off the Havanah [Havana, Cuba] they fell in with Adm. Pigo, who was cruising in order to intercept Don Solano's fleet from Cape Francois; and who had

taken a nest of American privateers waiting for the fleet, and had destroyed a fort in Matansa-bay [Matanzas Bay, Florida], that harboured them.”

— “Capt. Moulton, of the *Truelove* Jamaica man, who arrived at Portsmouth [England] about the same time, gave a still more deplorable account of the effects of the above gale, which continued three days, and in which the *Rodney* was seen to perish; the *Truelove* had seven feet [2 meters] water in her hold, and was saved only by the lightness of her cargo, chiefly spirits. The gale came on the 16<sup>th</sup> of September. On the 17<sup>th</sup>, 35 sail [sailing ships] were seen most of them dismasted or water-logged. On the 24<sup>th</sup> the *Parnassas*, Capt. Carr, was seen captured by an American privateer, but has since been retaken. *Ville de Paris*, 104 guns, her mainsail carried away. *Glorieux*, 74 [guns], lost her foremasts, bowsprit, and misen [mizzen] top-mast. *Centaur*, 74 [gun], lost all her masts. *Ramelies*, 74 [guns], after losing her mizzen-mast, main-mast, and fore top-mast, went to the bottom; most of the crew saved. *Canada*, 74 [guns], lost her mizzen-mast. *Caton*, 64 [guns], went to America in distress before the gale, and the *Palas* to attend her. *Ardent*, 64 [guns], so leaky that she was obligated to put back to Port Royal, from Bluefields. *Jason*, 64 [guns], left watering at Bluefields, when the fleet sailed, and was seen some time after near the Canaries.”

On 17 October 1782, it was reported that Admiral Graves was on board the *Ramelies* when she foundered in the gale off *Newfoundland* [of 16 September] but was taken up by the *Belle* and landed safely at Waterford in Ireland.<sup>269</sup>

On 8 October 1782, a hurricane struck Surat in state of Gujarat, *India* killing 3,000 inhabitants and destroying much shipping.<sup>242</sup>

On 15 October 1782, there was a most violent storm that struck Madras [Madras now Chennai, *India*] and immense damage was done to the shipping. One hundred coasting vessels were lost.<sup>241, 242</sup>

A letter was received from Madras [the southeastern coastal region of *India* now referred to as Chennai] dated 17 October 1782. “This coast has been visited by as severe a gale of wind as ever was known by the oldest inhabitant of Madras. About noon, on the 15<sup>th</sup>, it began to blow, and before night it was a perfect hurricane. The surf was so high, that it was impossible for any boat could either got off or come on shore. Very fortunately Sir Edward Hughes had anchored in 15 fathom water, and finding the gale increase he put to sea in the afternoon. He had an entertainment on board the *Superbe*, and was obligated to take his company to sea with him. In the night, *the Hertford*, *the Free Trade*, *the Shannon*, *the Nancy*, *the Essex*, and a Moorman’s ship, were all drove on shore. *The Free Mason* foundered at her anchors, and near 100 snows [merchant sailing ships] and donies were entirely lost. The beach for some miles were strewed with wrecks and dead bodies. *The Neckar* lost her main-mast, and the *True Briton* was entirely dismasted.”<sup>253</sup>

On 28 October 1782, a letter was received from Glasgow, *Scotland*, “that they have had for many days a continual fall of snow, rain, and hail, such as have not been remembered by the oldest man living, which has laid every thing under water, and the corn [grain] which was left upon the ground is much damaged, so that every necessary of life is grown so dear [scarce] that the poor in that part of *Scotland* are in the greatest distress.”<sup>269</sup>

On 30 October 1782, a strong gale from the northwest (mistral) broke out in Provence, *France*. Acting on a surface of 33 square centimeters, a weight of nearly seven kilograms. Nothing could resist this extraordinary violence, if it had only been sustained a few minutes. During the hurricane, the barometer sank 8 millimeters below the average height. It was then and still is now the strongest Mistral known.<sup>79</sup>

In October-November 1782, a hurricane struck the *Atlantic Ocean*. A ship foundered in its passage from Haiti to Europe.<sup>141</sup>

The proportion of rainfall in 1782 was greater at high latitudes in *France*. In Metz and Montmorency, the annual rainfall surpassed the average by about 2.1 inches (54 millimeters). Metz had twelve more rainy days than normal. Montmorency had thirty-two more rainy days than normal.<sup>79</sup>

Letters received from Lisbon, *Portugal* give a lamentable account of the [grape] vintage in that country; and the state of the harvest, which has almost failed throughout Portugal, owing to the uncommon wetness of the season. At the beginning of December [1782], fruit was hanging on the trees as green as four months before.<sup>253</sup>

On 4 December 1782, it was reported that “The inhabitants of Birmingham and Hinckley [in *England*] have shewn [shown] a laudable spirit on this occasional dearth, and have raised a subscription to buy bread at the present advanced [high] price, and to resell it to the poor at a reduced price.”<sup>269</sup>

On 21 December 1782, Derbyshire, *England* reported that some of the northern counties are full of distress of the poor [due to scarcity/famine] and the southern counties seem to have suffered less.<sup>269</sup>

A great famine appears to have occurred in *Hungary* in 1782 from the following account. “There have been already put to death in *Hungary* 45 cannibals; 150 more are still in prison, among whom, we are assured, are fathers who have had the barbarity to cut the throats of their wives when pregnant, and devour children in the womb; and sons who have massacred, roasted, and eaten their fathers and mothers. The Emperor, who cannot be persuaded that there are such ferocious characters in the world, has just written to the judges of *Hungary* to suspend all further execution of these horrid wretches, till his Imperial Majesty can send to the spot a commission to examine the proceedings against them.”<sup>253</sup>

[Towards the end of 1782] accounts from Philadelphia [Pennsylvania in the *United States*] indicate that the harvest was remarkably plentiful in the middle provinces. And as a result, wheat sold at New York from 15 to 13 shillings per quarter [quarter ton].<sup>253</sup>

In Yarle in Denbighshire County in northeast *Wales*, the distresses of the poor, from the badness of last year’s harvest [harvest of 1782] is truly pitiable. Great part of the corn rotted on the ground, and what was got in was fit only for the hogs.<sup>253</sup>

In 1782, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 14 January and 11 February, floods struck Hupeh (now Hubei province) in central *China* at I-ch’êng and Chiang-ling; and Shantung (now Shandong province) on the east coast of *China* at Shou-kuang and Po-hsing.

— During the period between 10 July and 8 August, floods struck Hupeh province at Wuchang, An-lu, Ao-ch’êng, Huang-p’o and Hanyang; Kiangsi (now Jiangxi province) in southern *China* at Tê-an; Chekiang (now Zhejiang province) on the east coast of *China* at Shui-an; and Szechwan (now Sichuan province) in southwest *China* at San-t’ai, Shih-hung, Sui-ning [possible misprint, “Sui-an”], P’êng-ch’i, Chung-chiang, and Yen-t’ing. In Szechwan province within the areas named, almost all the houses and fields were destroyed by the floodwaters.

In 1782 during the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Wên-têng. During the period between 11 June and 9 July, a drought engulfed Shantung province at Huang. During the period between 10 July and 8 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Lo-t’ien. During the period between 8 August and 8 November, a drought engulfed Shensi (now Shaanxi province) in central *China* at Sui-tê.<sup>153</sup>

In 1782 during the 6<sup>th</sup> moon on the 18<sup>th</sup> day, there was a storm in the vicinity of Shanghai, *China*. The

storm produced great wind and rain. It tore up trees, capsized boats and threw down houses. Seawater was carried into the canals, making them briny for two weeks.<sup>166</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 1<sup>st</sup> – moderate. March 6<sup>th</sup> – rainy. March 14<sup>th</sup> – a fine day. March 18<sup>th</sup> – a deluge of rain. March 23<sup>rd</sup> – lion-like March. March 26<sup>th</sup> – high winds and cold. April 2<sup>nd</sup> – a delightful day. April 7<sup>th</sup> – a heavy rain. April 14<sup>th</sup> – a pleasant day. April 16<sup>th</sup> – the spring is moderate and forward. April 28<sup>th</sup> and 29<sup>th</sup> – pleasant. April 30<sup>th</sup> – the spring is thought to be remarkably forward. May – a cloudy, wet month containing a few fair days, but not any hot ones. June 30<sup>th</sup> – a wonder of a season; the Indian corn, that was backward, revived and flourishes. August 31<sup>st</sup> – a memorable summer, with but few hot days. September 4<sup>th</sup> – a horrid cold day. September 16<sup>th</sup> – very cold. September 17<sup>th</sup> – pleasant summer’s day; a wonder! September 24<sup>th</sup> – plentiful rain. September 30<sup>th</sup> – a delightful day. October 5<sup>th</sup> – a week of pleasant weather. October 14<sup>th</sup> – a dry time. October 17<sup>th</sup> – a grand rain. October 23<sup>rd</sup> – a delightfully warm day. October 25<sup>th</sup> – another. October 31<sup>st</sup> – it snowed most of the day. November 2<sup>nd</sup> – very cold. November 9<sup>th</sup> – moderate. November 28<sup>th</sup> – horrid cold and windy. December – a cold month.<sup>78</sup>

*Also refer to the section 1780 A.D. – 1784 A.D. for information on the drought and famine in Bangladesh, Pakistan, and India during that timeframe.*

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### **Taiwan Mega-Tsunami**

In a letter published in the Chinese State Paper from the Governor of the province of Fourkein to the Emperor. “Theheu, Governor General of the province of Fourkein, and Tehe-Kiung-ya, Viceroy of Fourkien [Fourkein], and other officers, make known to your Majesty the disaster which has lately befallen the island of Tay-Ocan (by us called Formosa [now *Taiwan*]) Mou-ha-lan, and the other officers of that island, informed us by letter, that on the 22nd day of the 4th moon (22nd of May, 1782) [This date conversion is wrong. It should read 2 June 1782 in the Gregorian calendar.<sup>219</sup>] a most furious whirlwind, accompanied with a very heavy rain, &c. an higher tide than was ever observed in the memory of man, struck the inhabitants with an apprehension of being swallowed up by the sea, or buried alive in the earth. From the hour *yn* (Chinese hours are double to our own; *yn* begins at three and ends at five in the morning) to the hour *oeici* (begins at three, and ends at five, P.M.) the dreadful storm seemed to break out from the four corners of the earth, and lasted all that space of time with unabated fury. The buildings, where usually sit the courts judicature, public granaries, barracks, warehouses, and folines, were levelled to the ground, and nothing could be saved out of them; the shops of the tradesmen and artists, as well as the dwelling houses of the inhabitants, are nothing now but a heap of rubbish and ruin. Of seventeen men of war, then in the harbour, two have been sunk, two more dashed to pieces, and ten are so completely battered as to be entirely unfit for future service. The same fate has attended smaller ships, above an hundred in number; eighty of the latter have been swallowed up; five of them, which had just taken in their laden of rice, amounting to 100,000 bushels, are totally lost as to the rest of the shipping, which had not yet reached their mooring, ten or twelve of the larger sort were sunk; the lighter vessels, and a great number of small craft have disappeared, and left no traces behind them: as the whole island was under water, the produce of its soil is either carried off, or so far spoiled, as to endanger the lives of those who might dare to make use of them; and as for the crop, it is entirely ruined. This, however, is only an [a] hasty sketch of the dreadful calamity. When we are better informed, we shall make it our business to transmit to your Majesty a more circumstantial account.”<sup>248, 252</sup> [This account was published in the September 1783 edition of *The Political Magazine and Parliamentary, Naval, Military and Literary Journal* and the September 1783 edition of *The Scot Magazine*.]

In December 1782, a great part of the isle of Formosa in China [now *Taiwan*] was destroyed by an inundation of the sea, occasioned by an earthquake, wherein 40,000 souls were lost.<sup>241, 242</sup> [This account was published in the February 1784 edition of *The Hibernian Magazine, or, Compendium of Entertaining*



*Knowledge* and the January 1784 edition of *The European Magazine and London Review*. In both editions, the original account according to the entry was received {in Great Britain?} on 12 August 1783.]

[Suspecting these two accounts might refer to the same event, I asked Robert Juhl in the Far East to see what he might dig up. This is what he uncovered:]

— One secondary Chinese source quotes an entry in what looks like a local gazette: "22<sup>nd</sup> day of the 4<sup>th</sup> lunar month (2 June 1782), Taiwan was suddenly struck by a typhoon. The sea tides rose suddenly, and official buildings, fields, and the local inhabitants suffered great damage. The emperor instructed [local officials to] sympathize with and give relief to the disaster victims."

— "Between the 4<sup>th</sup> and 5<sup>th</sup> months (24 April - 21 June 1781), at a time when the weather was fair and clear, the sea suddenly roared like thunder and welled up into the sky, with water rising several zhang [A "zhang" is a traditional Chinese unit of length equal to 9.8-12.1 feet, 3.0-3.7 meters] (at then Jiateng harbor in Fengshan county at latitude 22.62°N, longitude 120.34°E, on the southwest coast of Taiwan). The people in nearby villages were submerged and climbed into trees, thinking they were certain to die. After some time (45 min to an hour or more), the water retreated in a violent rush."

— A separate report of what may be the same event quoted in a secondary source [Seismological Bureau of Shantou] gives the date as 22 May 1781, saying: "An area about 120 km. long on Taiwan's SW [southwest] coast was first hit by a destructive earthquake, followed by a tsunami. The destruction lasted 8 hours. Nothing but debris was left of [today's] Tainan City, 3 towns, and 20 villages. 40,000 people died. Innumerable boats were damaged or sunk. Promontories and coastlines were washed away, replaced by coves and cliffs."

[Now things are getting interesting! If these accounts describe the same event, then we are looking at a strange mega-tsunami. Immediately before the event, "the weather was fair and clear". There was an earthquake. Then the sea "suddenly roared like thunder". There was a "most furious whirlwind". The sea "welled up in the sky". A mega-tsunami struck and the inhabitants had "the apprehension of being swallowed up by the sea". The "whole island was under water." The mega-tsunami caused great devastation along 120 kilometers [75 miles] of the southwest coast of Taiwan. Then the area was struck by heavy rains and a dreadful storm that broke out from "the four corners of the earth", and lasted several hours "with unabated fury". As a result, there was almost total devastation and 40,000 casualties. "Promontories and coastlines were washed away, replaced by coves and cliffs."

An asteroid/comet impact off the coast of Taiwan would produce effects very similar to those described above. The impact event would generate a ground shock wave that might be described as an earthquake. It would create an atmospheric blast wave that might be described as a sudden roar and a most furious whirlwind. It would generate a devastating water compression wave, a mega-tsunami if the impact was near the coastline. An ocean impact would eject massive amounts of ocean water into the atmosphere. This might look like the sea "welled {rose} up in the sky". This debris, primarily ocean water, would fall back to the Earth and the effects might appear as an extremely heavy rainstorm.]

A little more research turned up the following article published in *The Gentleman's Magazine: and Historical Chronicle* of August 1783 describing the dreadful catastrophe which happened to the island of Formosa [now *Taiwan*] in the Chinese seas: "About the beginning of December last new volcanos appeared, with dreadful craters upon the mountains which divide the isle of Formosa, East and West, situated in the Chinese ocean, in the middle of the province of Fokein [Fourkein], north of Japan, south of the peninsula of Corea [Korea], and east of the Philippines. The explosion of these volcanos was accompanied with a hurricane, attended with a subterraneous motion of the isle, which being moved from East to West, and having its bounds overflowed by waves of the sea, sunk and disappeared under a deluge of water, so that nothing but the tops of the mountains were to be seen. This convulsion of nature lasted more than eight hours with the same motion. The three principal towns Tai-Ovan-Fou, Jong-Khan-Hien, and Tehu-Lo-Hien, with 20 boroughs, or little towns, were entirely buried, and the ruins of them washed



away by the agitation of the waters. Upwards of 40,000 inhabitants have been drowned, and all the parts of the earth which projected into the sea have been broken off and sunk. The islands of Pongzhou and several others, the forts of Zelande, of Ngan, and Pingt-Chingi have disappeared, as well as the little hills upon which they stood. History nowhere records a disaster more terrible. *Later advices speak only of a few towns being overflowed.*"<sup>253</sup> [Tai-Ouan-Fou, Fong-Chan-Hien and Tchu-Lo-Hein were at the time inhabited by the Chinese and were the 3 Governmental Capitals dividing up Taiwan. The capital city called Tai-Ouan-Fou was very populous, a place of great commerce and equal to the greatest cities of China at that time. The islands of Pongzhou might refer to the islands of Pong-Hou, the chief island of the Pescadores. Fort Zeelandia was built by the Dutch and was a fort in the town of Anping (Tainan), Taiwan. The Fort Ngan-Ping-Tching was located at the Foot of the Castle of Zeland.]

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**Winter of 1782 / 1783 A.D.** In *France*, "On the night of the 11<sup>th</sup> November 1882, it froze so hard at St. Pons, a district in [southern] *France*, during a heavy shower of rain [freezing rain], so as to form a glazing as clear as crystal, and at the same time of the density of the most compact ice, and so thick that the tenderest twigs were in many places an inch thick. Hardly any trees were able to support the weight. Beech, ash, chestnuts, and oaks fell under it. Large branches were torn off, and some broke close to the roots. The most dismal prospect of desolation presented itself in the woods; and the most lamentable apprehensions of famine spread consternation throughout the province. The potatoes were frozen in the ground, and the vines blasted in the vineyards. The hills in the diocese of St. Pons, Castres, and Lavour, have been most exposed to its rigour. The valleys and plains have suffered little, being covered with a very deep snow."<sup>47, 93, 253</sup>

The rigid winter in Venice, *Italy* in 1782, harassed the city. It is said that the North travelled to the South bring forth the piercing cold of that season.<sup>81</sup>

In Selborne, *England*, in November 1782, there was a hard frost; which continued throughout with alternating periods of frost and thaw. During the first part of December it was frosty. But during the later half of December and the first 16 days of January, the weather was mild, with much rain and wind. Then came a week of hard frost, followed by stormy dripping weather to the end of February. Then until 9 May, cold harsh winds prevailed. On 5 May, there was thick ice.<sup>70</sup>

The winter of 1782 was very cold in the *United States*. The Delaware River in Philadelphia, Pennsylvania froze over in one night.<sup>1</sup>

In January 1783, Colonel Willet, with about 600 men, and a great number of sleighs, loaded with ammunition, provisions, forage, etc. set out from Albany, New York in the *United States* on an expedition up the Mohawk River, with the intent of surprising and attacking the British post at Fort Oswego in New York. After enduring incredible fatigue and hardships, they arrived within a mile of that place, and sent an Indian, who was their guide, as a spy into the fort. The garrison received and liberally entertained him and then permitted him to return to his employers, whom he conducted into a swamp, six miles [10 kilometers] beyond the fort. They remained there during the night and eight of the party froze to death and the greatest part of the survivors were miserably frost bitten. The next morning, finding themselves deceived by their Indian guide, they began their retreat to Albany retracing their original paths. Many of those fortunate enough to reach Albany died in consequence of the severity of the weather. Others had lost their legs or hands, and a great number became real objects of compassion.<sup>253</sup>

Rome, *Italy* reported that on the 14<sup>th</sup> past [14 February 1783] a very heavy rain began to fall, which continued 24 hours; when it abated, a gentle wind melted all the snow upon the mountains; and the waters having swelled those of the Tiber [River], its banks were overflowed on Sunday morning, laying all the lower parts of this capital under water, from which the inhabitants sustained great damage: Those

especially in the country, where the waters extended, suffered very considerably; a great number of cattle, effects, etc. were swept away, and many persons lost their lives by this accident.<sup>253</sup>

Lincoln, *England* reported on the 5<sup>th</sup> instant [5 March 1783], that they have lately had so much rain and snow in that neighborhood, that the fens are covered with water for many miles round; that the lower part of the houses are overflowed with water, that the inhabitants live up one pair of stairs, and that they are forced to have boats fastened to their windows, in order to preserve the communications. On the same date, Yorkshire, *England* reported that they have had such falls of snow in many parts, that the roads are absolutely unpassable.<sup>253</sup>

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## 1783 Fractured Comet Impact Hypothesis

### Introduction

A number of strange disasters and anomalies occurred in 1783-1785. These anomalies accounted for the death of over 13 million people worldwide. After reviewing various accounts, I feel that these anomalies are interconnected and can be explained by a single core event.

***Hypothesis: Shortly before noon (Italian time) on 5 February 1783, a small comet broke up in Earth's atmosphere. One comet fragment impacted Earth in the deep ocean. The impact triggered the Calabria earthquakes in Italy and the rare deep magma Lakagigar volcanic eruption in Iceland.***

### Calabria Earthquake

An ocean impact is similar to an underwater nuclear explosion. The earth's crust is thinnest in the deep ocean. In an ocean impact, most of the impact energy will be expended as a focused ground shock wave that will travel through the molten lava and pass to the opposite side of the globe. If the asteroid or comet is sufficiently large, this shock wave will produce earthquakes and trigger volcanic activity on the opposite side of the earth. The impact ground shock wave will travel through the earth at speeds similar to a primary earthquake ground shock wave – between 13,500 mph and 29,000 mph. So in less than a half a minute from the time of impact, the damage could be felt on the other side of the globe as a major earthquake. It can also create rupture in the earth's crust that allows very deep magma to penetrate slowly to the earth's surface (relatively rare: flood basalt eruption). Generally, these ruptures take place at the seam of the continental crust and the ocean crust.<sup>223</sup>

An example of this process can be seen on the planet Mercury. A massive (comet/meteor) impact formed the Caloris Basin. The shock wave from this impact traveled through the planet and produced a jumbled terrain on the opposite side of the planet Mercury called the Chaotic Terrain.

Sir William Hamilton reported to the Royal Society at Naples, *Italy* on 23 May 1783 and provided a very detailed description of the earthquake of 5 February 1783 at Calabria in *Italy*. Because of its length, I have moved this detailed account to the end of the hypothesis. Some of the important findings detailed in the account are:<sup>248</sup>

- The first earthquake, which occurred at noon on 5 February 1783, the one that caused the greatest damage, consisted of a strong vertical thrust.
- Many rivers in the region went dry during this initial earthquake and then later the water returned and overflowed. This water was salty.
- Generally large earthquakes are preceded by a very low frequency growl several seconds before the ground motion begins. The initial earthquake of 5 February struck without this warning.
- As a result of the primary earthquake of 5 February and its subsequent aftershocks, immense tracts of land moved vast distances. These tracts were numerous. Some of these dislodged tracts of land were a mile long and a half-mile wide. Some of these tracts moved a distance of 4 miles. Contributing factors included: geological strata, proximity to deep ravines, previous rainfall and elevation.
- These dislodged tracts of land sealed off rivers and as a result caused new lakes to form.
- At Scilla, a mountain slid into the sea and generated a tsunami that killed 2,473 inhabitants.

### Lakagigar Volcano

The Laki or Lakagígur [Grímsvötn] volcanic eruption in *Iceland* took place over an 8-month period during 1783-1784 beginning in 8 June 1783. The eruption produced 14.7 cubic kilometers (3.5 cubic miles) of basalt. Flood volcanic events are different from typical volcanic events in two important areas. First, they generally do not include extreme explosions and as a result do not score high on the Volcanic Explosivity Index (VEI) scale. The Earth's crust cracks and a large fissure forms, magma oozes out of the ground rather than released through massive explosions. (The Laki eruption scored only a 4+ on the VEI scale.) Secondly, the magma comes from very deep inside the Earth and generally releases a richer mixture of gases at the Earth's surface. It is believed that the release of basalt lava and clouds of poisonous hydrofluoric acid/sulfur-dioxide compounds killed over 50% of Iceland's livestock population, leading to famine which killed approximately 25% of the population of *Iceland*.

The initial signs of volcanic activity began around the time of the Calabria earthquakes. According to an article in the *Morning Herald and Daily Advertiser* of 18 July 1783, a letter from Copenhagen reports, "A Dane bound to *Iceland*, at about seven leagues [21 miles, 34 kilometers] distance from the place of his destination observed an unknown land which sent forth smoke in abundance, he was then in ten fathom [60 feet, 18 meters] water and found sticking to the lead a quantity of pumice-stone and charcoal; having sailed round the island in search of anchorage, he found it scarce a mile in circumference; he was informed on his arrival in port, that this smoking island had issued from the sea about the time of the late earthquakes, which had so cruelly ravaged Messina and Calabria." His Danish Majesty has since taken possession of it as a fief of the Crown of Denmark.<sup>255</sup>

In August 1783, a published account of the discovery of an island just risen out of the ocean near Iceland in the North Seas reports, "This uncommon phenomenon was first observed by a Norway trader on his return from *Iceland* to Drentheim [Trondheim, *Norway*], whose crew were so terrified that they stood away from it with the utmost precipitation. Soon after a Dane from the Sound fell in with it, and at first mistook it for the continent of *Iceland*. The master, however, did not approach nearer than a league [3 miles, 5 kilometers], but stood on for Skalholt, the capital of *Iceland*, where he made a report of his discovery to the Danish Governor. It was at first supposed that he had fallen in with a monstrous body of ice; but, on his persevering in his account, some officers of the garrison, with several of the most skilful seamen of Iceland, went in quest of it; and in about three hours after their departure from Skalholt, came so near it that a boat was hoisted out, and the island taken possession of in his Danish Majesty's name. It is said there is not the least appearance of soil, but that the surface is of a marly [gnarly?] nature, with crannies running through it filled with pumice stone, which are supposed to be thrown out by the different volcanoes in the island, of which it is thought there are three. The volumes of smoke that have been seen rise from one of the craters are very considerable, but no flame has yet issued from any of them. Its position is said to be at eight miles [13 kilometers] distance from the rocks des Viseaux, and its soundings about 44 fathoms [264 feet, 80 meters]. This singular production, which is supposed to have been formed in the spring of the present year, will no doubt induce such of the learned as are curious to visit it. It is conjectured by many to have taken its rise at the time of Sicily [*Italy*] suffered so much by the late eruptions of Mount *Ætna* [in *Italy*]; but those who consider its neighbourhood with Hecla [Mount Hekla, *Iceland*], the second volcano in the world, will rather attribute it to some intestine commotions of that mountain."<sup>254</sup>

"Several vessels lately returned to Copenhagen from *Iceland*, bring the most deplorable accounts of the melancholy situation to which the inhabitants are reduced. The disaster that country has undergone, are such, that all hopes of an [a] harvest are entirely at an end. The extremities of famine and distress are equally felt by the men and cattle, and a great number of both have fallen victims to their complicated miseries. The fires which broke out in several places, rage as violently as ever; and the new island which had lately emerged from the sea has totally disappeared. The following is the substance of the several

accounts received from that island: ‘The subterraneous fire which broke out on June 7<sup>th</sup> last year [1783] in the western part of Skaptfield’s Syssel, (the district of Skaptfield) on the mountain Skaptan Gluver, spread so wide, that marks of its devastation are visible at the distance of 20 leagues [60 miles, 97 kilometers] to the south-southwest. The conflagration extended to four leagues [12 miles, 19 kilometers] in breadth, and continued till the month of May this year [1784]. The fourth part of the burnt soil consisted of a very old lava and marshes. The burnt earth resembles a heap of calcined stones of the colour of vitriol. The great river of Skaptage which was from seven to eight fathoms [42–48 feet, 13–15 meters] deep, is entirely dried up. On the east side, the fire broke out much about the same time in the channel of the Huervissiodt nearly of the same depth with the Skaptage, but here its breadth was not above a league [3 miles, 5 kilometers]. The whole extent of ground from which the flames issued, is about ten leagues [30 miles, 48 kilometers]. At first the flames darted perpendicularly upwards, and seemed to issue from a great depth, but afterwards they rolled along the surface in waves resembling those of the sea; and when they approached the frozen mountains, whose bowels are impregnated with sulphur and nitre, they raged with such fury as to sweep away in a moment cattle, houses, and every thing in their way, even the soil. Seventeen districts have been entirely ruined. The hay harvest failed, and the inhabitants were obligated to kill great part of their young store about the end of autumn, for want of provender [food for livestock]. What little they got in was of so bad a quality, that it produced an epidemical distemper among the cattle, by which, and the severity of the winter, five sixths of the cattle and three fourths of the sheep have perished. The inhabitants were obligated to house them in the beginning of September, and from Oct. 15. [1783] to April 27 [1784] there was a continued frost, and the ground covered with snow. Many of the peasants having lost their whole [live] stock, have been obliged to give up house and land. To add to their calamities, the fishery has been very unsuccessful. In short, nothing can equal the distress of the inhabitants, especially those of the interior parts, who, even if they have wherewithal to purchase the necessaries of life from the trading towns on the coast, cannot carry them home for want of horses.’ ”<sup>249</sup>

On 17 July 1784, Copenhagen reported news from *Iceland*. The mortality caused by want of provision has caused the death of a number of persons and many cattle. Provision sent to the relief of the island has hit a snag. Horses were difficult to obtain in order to transport these supplies from the coast into the interior of the island. Instead of 4 rxdollars [rigsdaler?], the usual price of a horse, they are now paying 50. The subterraneous fire continues burning. The inflamed island, which lately arose from the bottom of the sea, has disappeared again.<sup>247, 250</sup>

It is my opinion that massive flood volcanic events are associated with (are caused by) massive impact events.<sup>218</sup> This was observed in the Emeishan & Siberian Traps in the end Permian extinction event and the Deccan Traps in the K-T (Cretaceous-Tertiary) extinction event. Therefore, it is reasoned that smaller flood basalt eruptions could be triggered by smaller impact events. As a consequence, flood basalt eruptions might represent a unique signature for impact events. The Laki eruption was the largest basaltic lava flow in recorded historical times. The Laki eruption produced a 25-kilometer (16-mile) long fissure that generated 14.7 cubic kilometers (3.5 cubic miles) of lava, filling two deep river valleys and covering an area greater than 500 square kilometers (190 square miles).

### **Tsunami**

It was originally feared that an ocean impact would generate a far-reaching mega-tsunami but later research indicates that the tsunami impact threat is exaggerated. The waves generated from an impact are highly dissipative (decays rapidly) and very turbulent. An early Office of Naval Research Report studying the tsunami hazard from nuclear explosions showed the wave structure had shorter wavelengths (with a periods of 20 to 100 seconds) than earthquake or landslide generated tsunami (with a period of 100 seconds to 1 hour). Due to the “Van Dorn effect”, these shorter wavelength impact waves are

expected to break on the outer continental shelf minimizing damage onshore.<sup>223</sup>

A mega-tsunami would only form very near the original site of the impact.

According to the World Tsunami Database, a tsunami struck Kashima, *Japan* and another struck the *Fuji Islands* on 5 February 1783.<sup>213</sup> If that was the case, then these may have been impact generated tsunamis. But I have not been able to confirm the accuracy of these accounts. So therefore, I have currently excluded them from this hypothesis. But should these accounts become substantiated, they might provide important clues as to the location of the impact site.

And whether this event is related to the unusual Taiwan mega-tsunami, I cannot say at this time. The various accounts do not adequately define the date of this event. It is currently detailed in the main chronology in the year 1782 in December. There is enough overlap in the various accounts to interpret this tsunami as a single event rather than multiple events. Generally when the information from the various accounts is combined, they describe an impact event very near the site of the impact. [The impact event would generate a ground shock wave that might be described as a “destructive earthquake”. It would create an atmospheric blast wave that might be described as a “sudden roar” and a “most furious whirlwind”. It would generate a devastating water compression wave, a mega-tsunami if the impact was near the coastline. The “whole island was under water.” An ocean impact would eject massive amounts of ocean water into the atmosphere. This might look like the sea “welled {rose} up in the sky”. This debris, primarily ocean water, would fall back to the Earth and the effects might appear as an extremely heavy rainstorm from “the four corners of the earth”. And it would cause massive destruction to the island and its inhabitants.] Well it does beg the following question: Is it too great a stretch of the imagination that a mega-tsunami of this magnitude could have occurred on 5 February 1783 in the Gregorian calendar [4 January 1783 in the Lunisolar calendar] and the initial reports first reached England over land or sea approximately 6 months later?

### **Other Earthquakes and Volcanoes**

A large ocean impact event can generate a ground shock that will pass through the earth and reach the other side of the globe. This ground shock would ring the planet for several weeks. This shock wave can trigger major earthquakes.<sup>223</sup> In the days and months following 5 February 1783, numerous earthquakes were observed at Calabria, *Italy*, other regions of *Italy*, *Spain*, *England*, *France*, *Germany*, *Iceland*, *Sweden*, *Denmark*, *Austria*, *Hungary*, *Romania*, *Greece*, *Turkey*, *Russia*, *Syria*, *Lebanon*, *Indonesia*, *Japan*, *Haiti*, *the Dominican Republic*, *Guatemala*, *China* and the *United States*.

It also can trigger volcanic eruptions. Several volcanic eruptions took place during 1783. Three of *Italy*'s volcanoes erupted in 1783. Mount Etna erupted on 17 February 1783 and Stromboli [a small island in the Tyrrhenian Sea off the coast of Sicily, *Italy*] a few days later.<sup>238</sup> Mount Vesuvius erupted on 18 August.<sup>214</sup> The Mount Iwaki volcano in Japan erupted on 13 April 1783 Gregorian calendar (March 12 in the Lunisolar calendar). The Mount Asama volcano erupted on 3 August 1783 (6 July in the Lunisolar calendar).<sup>256</sup>

***The impact ground shock wave may have been a contributing factor on the increase in earthquake activity [secondary effects] especially in the region near Calabria [the European theater] until the Earth returned to an equilibrium state.***

The year 1783 produced several earthquakes. This included the 5 strong earthquakes at Calabria in Southern *Italy* on 5, 6, 7 February and 1 & 28 March 1783 in which more than 100,000 people perished and many cities were left in ruins. On 13 February 1783, an earthquake struck Neustadt in *Hungary*.



During the middle of February, an earthquake struck the Island of Amboyna [Ambon Island in *Indonesia*] and shook the whole island. On 18, 25 February, 25 March and 12 April, earthquakes struck Selb in Upper Saxony [in central *Germany*]. On 28 February, an earthquake struck Palermo in Sicily, *Italy*. On 5 March, an earthquake struck Paris, *France*. On 6 March, an earthquake struck in the Angoumois, *France*. On 6 March, there was an earthquake at Irkutsk, *Russia* and along the Altai chain from Lake Baikal to the Altai Kolywan. On 9 March, a mountain fell at Ardes in Auvergne, *France*. On 18 March, an earthquake struck Padua in northern *Italy*. On 25 & 26 March, an earthquake was felt at Malemort [Mallemort] in Province, *France*. On 26 March, an earthquake was felt at Venice and Padua [in *Italy*] and at St. Maura, Zante, and Cephalonia [Ionian Islands of *Greece*]. On 5 April, an earthquake struck Mannheim, *Germany*. On 8 April, an earthquake struck Vienna, *Austria* and Comorn [Komárom], *Hungary* along with other towns of *Hungary*. On 13 April, an earthquake struck Lisbon and St. Jago in Galicia, *Spain*. On 22 April, there was a very violent earthquake at Comorn [Komárom], along the Danube River at Pesth [Pest], Buda [Budapest], Odimburg, and Estherhaz [Esterhazy] in *Hungary* and Vienna, *Austria*. Comorn was almost completely destroyed. Between 12 and 31 May, nineteen more shocks struck Comorn, *Hungary*. The last shock was more violent than the earthquake that struck on 22 April. On 23 April, an earthquake struck Colebrook Dale [Coalbrookdale] in *England*. On 5 May, an earthquake struck Grenoble in *France*. On 1 June, an earthquake struck Constantinople [now Istanbul, *Turkey*]. From 1-10 June, there were numerous and violent earthquakes at Skaptarfiall, *Iceland*. [These are likely associated with the Lakagigar volcanic eruption]. On 15 June, an earthquake struck Godgard in Ost Gothland, *Sweden*. On 20 & 22 June, there were earthquakes at Florence, *Italy*. On 6 July, an earthquake struck Dijon, Verdun, Seurre, St. Jean-de-Leone [Saint-Jean-de-Losne], *France* and a line passing through Langres, Châtillon, Aignay-le-Duc & Montbard; extending into the Rhône [region] and felt at Besançon. On 20 July, an earthquake struck Tripolis in *Syria* [Tripoli, *Lebanon*?] and part of the mountains of *Lebanon*. During the end of July, earthquakes struck the main island of Nippon [now Honshū], *Japan*. It was felt over a region of 20-30 leagues [60-90 miles, 97-145 kilometers] and lasted for 4 or 5 days. Great clefts opened in the earth, rivers became dry, and many villages with their inhabitants were destroyed. On 9 August, there was an earthquake at Launceston in Cornwall, *England*. On 30 August, an earthquake struck Messina in Sicily, *Italy*. On 7 September, an earthquake struck La Rochelle, *France*. On 26 October, an earthquake struck Kapnik, *Transylvania* [now Cavnic, *Romania*]. On 17 November, an earthquake struck Bolsena, *Italy*. On 29 and 30 November, earthquakes struck New York [New Jersey] in the *United States*. [The earthquake was felt from New Hampshire to Pennsylvania. This is the largest earthquake ever recorded for New Jersey.] On the end of November, a violent earthquake struck Thessalonica [Thessaloniki, *Greece*]. On 8 December, an earthquake struck Pistoia, *Italy*. On 14 December, an earthquake struck Aleppo, *Syria*. During the night between December 17 & 18, an earthquake struck the *Danish Island* of Christian near Bornholm. Towards the end of 1783 and the beginning of 1784, a major earthquake struck *Guatemala*.<sup>214</sup>

Other accounts document additional earthquakes that occurred during this timeframe. On 11 and 12 February 1783, earthquakes struck Santiago de los Caballeros, *Dominican Republic*. There was serious damage to churches and houses made of brick. It also struck Port-au-Prince, *Haiti*. There were 3 quakes of which 2 were quite strong.<sup>215</sup> Several earthquakes struck China in 1783. One earthquake struck in Yunnan Province of *China* near the coordinates of 25.6 North and 103.8 East.<sup>217</sup> In another account, this earthquake struck Zhanyizhou in Yunnan [now Xuanwei, Qujing, Yunnan in China. There was great damage to the city wall and people's dwellings. A second earthquake struck in Xunyang, Shaanxi [now Ankang, Shaanxi]. Another struck in the 5<sup>th</sup> month [31 May-29 June 1783] at Zhenhai, Ningbo, Zhejiang. Another earthquake struck on 19 November 1783 at Kunshan, Suzhou, Jiangsu. Another struck during the autumn of 1783 at Jishan, Yuncheng, Shanxi. There was also a possible earthquake during the summer of 1783 at Guanghua, Hubei [now Laohekou]. The text said "The earth at Guanghua spread apart."<sup>219</sup> On 8 May 1783, an earthquake in the Adriatic Sea, destroyed the Island of St. Maria [Santa Maria della Grazia? An island in the Venice lagoon, *Italy*].<sup>241, 242</sup> On the 13<sup>th</sup> and 16<sup>th</sup> of November 1783, several shocks of an earthquake were felt in the Pouille [Apulia, *Italy*], which did great damage, and so

terrified the inhabitants, that they left their habitations, and passed both the nights in the fields.<sup>242, 247, 250</sup>

The Asama volcano in *Japan* began to erupt on 1 August 1783 [in the Gregorian calendar (4 July in the Lunisolar calendar)]. It began with a rumbling like very loud thunder, which gradually increased in violence during the next 4 days. On 2 August, it rained down sand and ash. On 3 August, immense quantities of stones fell. Some of these stones were so large that two men could not move them. Twenty-seven villages were swallowed up. On 4 August, the volcano exploded with torrents of flames and balls of fire; the earth shook in a frightful manner; and the whole country was enveloped in darkness. The inhabitants at the base of the mountain fled, but large chasms opened in the ground and prevented their escape and great numbers died. The eruptions were visible for a distance of 20-30 [French] leagues [between 40-87 miles, 65-140 kilometers]. The water of the rivers Yoko-gawa [Yokogawa] and Karousawa [Karuizawagawa] appeared to boil. On 5 August, large trees and the timber of houses were seen floating on the River Yedo [Edogawa], which were soon afterwards completely covered with the mangled carcasses of men and beast. In the countryside of Zinzou [possibly a subdistrict called Shinmachi], the devastation extended over a tract of thirty [French] leagues [around 75 miles, 120 kilometers]. It was impossible to determine the number of dead and the devastation was incalculable.<sup>216</sup>

### Atmospheric Effects

In 1783, an extraordinary dry fog extended intermittently over the whole of *Europe* and part of *Asia*. The remarkable thing about this fog was that it was phosphorescent and at nighttime, the light it yielded was sufficient to read by. The fog in some places permitted only less than one mile visibility. It also allowed people to look directly at the sun without being dazzled. It was first observed on 9 May at Copenhagen, *Sweden*; on 6 June at La Rochelle, *France*; on 14 June at Dijon, *France*; on 16 June at Manheim [now Mannheim], *Germany* and at Rome, *Italy*; on 19 June in *the Netherlands*; on 22 June in *Norway*; on 23 June on Saint Gothard [St. Gotthard, *Switzerland*] and in *Hungary*; towards the end of June in *Syria*; and by 1 July on the tops of the Altai Mountains [a mountain range located where *Russia*, *China*, *Mongolia* and *Kazakhstan* come together]. [Several hypotheses were put forward to explain this dry fog. It might be related to the Laki volcanic eruption in *Iceland* that began on 8 June 1783. Or it might be related to the earthquakes at Calabria in Southern *Italy*. The problem with these two hypotheses is that the strange fog first appeared a month before the Laki volcano erupted and that earthquakes are not known to eject debris into the upper atmosphere. Another hypothesis put forward by Benjamin Franklin, and really the most interesting one, is that this phenomenon was the result of an asteroid/comet impact.]<sup>205</sup>

Benjamin Franklin recorded his observations of the extraordinary dry fog in a lecture on 22 December 1784: “During several of the summer months of the year 1783, when the effect of the sun's rays to heat the earth in these northern regions should have been greater, there existed a constant fog over all *Europe*, and a great part of *North America*. This fog was of a permanent nature; it was dry, and the rays of the sun seemed to have little effect towards dissipating it, as they easily do a moist fog, arising from water. They were indeed rendered so faint in passing through it, that when collected in the focus of a burning glass they would scarce kindle brown paper. Of course, their summer effect in heating the Earth was exceedingly diminished. Hence the surface was early frozen. Hence the first snows remained on it unmelted, and received continual additions. Hence the air was more chilled, and the winds more severely cold. Hence perhaps the winter of 1783-84, was more severe, than any that had happened for many years.” He then went on to suggest that the cause of the dry fog was an asteroid/comet impact on Earth. “The cause of this universal fog is not yet ascertained. Whether it was adventitious to this earth, and merely a smoke, proceeding from the consumption by fire of some of those great burning balls or globes which we happen to meet with in our rapid course round the sun, and which are sometimes seen to kindle and be destroyed in passing our atmosphere, and whose smoke might be attracted and retained by our earth...”<sup>211</sup>

Over a hundred years later in 1908, a similar “phosphorescent fog” phenomenon was observed. On 30 June 1908 near the Podkamennaya Tunguska River in what is now Krasnoyarsk Krai, Siberia, *Russia*, there was a massive explosion caused by the impact of a small asteroid or comet. The impact was believed to be a bolide air burst rather than a surface impact since no crater was found. In 1930, the British astronomer, F.J.W. Whipple suggested the Tunguska body was a small comet. The comet hypothesis was further supported by the glowing skies (or “skyglows” or “bright nights”) observed across Europe for several evenings after the impact, possibly explained by dust and ice that had been dispersed from the comet’s tail across the upper atmosphere.<sup>265</sup> In London, England, people could read newspapers and play cricket outdoors at midnight. Today we might refer to this effect as associated with the formation of “noctilucent clouds”. These clouds are the highest clouds in Earth’s atmosphere around the altitudes of 47-53 miles [76-85 kilometers] above the Earth’s surface. They are visible in deep twilight. They are composed of microscopic ice crystals of water ice, up to 100 nm [.0000001 meters] across.<sup>266</sup> These ice crystals are commonly referred to as “diamond dust”.

According to Tom Slemen: “The first reports of a strange glow in the sky [from the Tunguska event] came from across Europe. Shortly after midnight on 1 July 1908, Londoners were intrigued to see a pink phosphorescent night sky over the capital. People who had retired awoke confused as the strange pink glow shone into their bedrooms. The same ruddy luminescence was reported over Belgium. The skies over Germany were curiously said to be bright green, while the heavens over Scotland were of an incredible intense whiteness which tricked the wildlife into believing it was dawn. Birdsong started and cocks crowed - at two o'clock in the morning. The skies over Moscow were so bright; photographs were taken of the streets without using a magnesium flash. A captain on a ship on the River Volga said he could see vessels on the river two miles away by the uncanny astral light. One golf game in England almost went on until four in the morning under the nocturnal glow, and in the following week The Times of London was inundated with letters from readers from all over the United Kingdom to report the curious 'false dawn'. A woman in Huntingdon wrote that she had been able to read a book in her bedroom solely by the peculiar rosy light.”<sup>267</sup>

There are 3 components of water vapor released in a comet ocean impact event. These are the water ice of the comet, the ocean saltwater ejected from the impact event, and the water contained in flood basalt volcanic eruptions triggered by the ground shock of the impact event.

The nucleus of a comet has been described as a dirty snowball. The nucleus is primarily composed of water ice. But the nucleus also contains other frozen substances including methane, ammonia and carbon dioxide and small amounts of solids such as dust grains and hydrocarbons. Comets that pass into Earth’s outer atmosphere travel at speed of 20 to 50 kilometers/second (45,000 to 10,000 miles per hour). The frictional heating as a comet encounters Earth’s outer atmosphere can melt the water ice and aerosolize the resulting liquid. This effect is amplified for comets that break up and disintegrate in Earth’s upper atmosphere. In the cold outer atmosphere this water will refreeze into microscopic ice particles.

An ocean impact will eject vast amounts of salt water into Earth’s upper atmosphere where they can freeze into microscopic ice crystals.

A flood basalt volcanic eruption, which brings up deep magma, releases a rich mixture of several gases including water vapor, carbon dioxide, sulfur dioxide, hydrogen sulfide, hydrogen, hydrogen chloride, carbon monoxide, hydrogen fluoride and helium. Of these gases, the water vapor component is approximately 37%.<sup>218</sup> Some of this water vapor will rise into the Earth’s outer atmosphere where it will freeze into microscopic ice crystals.

There are three main forms of diamond dust ice crystals. These are microscopic *hexagon plates*, *hexagon*

*columns* and *long prisms*. Thin *hexagon plates* can act like miniature mirrors that can reflect sunlight. They can produce atmospheric optical effects like light pillars. These crystals can be observed in a clear sky when they produce brief flashes of light as they tumble through the air. This glittering effect gave the ice crystals their name “diamond dust” because they appear to be diamonds flashing in the sky. *Hexagon columns* can refract sunlight like a prism and can produce atmospheric optical phenomena including (22° and 46°) halos, sundogs, moondogs, and parhelion. The third form of diamond dust is *long prisms*, which are sometimes referred to as Shimizu crystals. These Shimizu crystals can be very long. Some were observed that were 1,000 μm long by only 10 μm in width. Diamond dust ice crystals can produce the “phosphorescent fog” effect through refraction and reflection of sunlight. Dense falls of diamond dust can be very dangerous because it can cause serious lung damage to individuals that breath it resulting in their death. [Refer to the account in this chronology in the year “Winter of 1897/1898” about a diamond dust fall called by the American Indian name “pogonip” which translate to “white death”.]

Diamond dusts ice crystals are approximately the width of a human hair. Thick clouds of diamond dust diffuse sunlight, which would allow individuals to look directly at the sun without being dazzled. Clouds of diamond dust at the edges of space can reflect and refract sunlight, giving the cloud phosphorescent qualities at nighttime and provide a level of light sufficient for those on the planet’s surface to read a newspaper at midnight without the aid of any artificial light.

The 1783 comet impact event ejected significant amounts of water into Earth’s upper atmosphere where it was reformulated into “diamond dust” ice crystals. This limited visibility for several years thereafter. The Koreans officially reported sightings of the planet Venus in daylight on 8, 12, 18, 25 and 26 January 1783 and then there was a 2-year gap in reported sightings. The next official sighting was observed on 24 April 1785.<sup>219</sup> So the transparency of the atmosphere appears to have been diminished for approximately two years.

***The impact event produced a strange dry fog that reduced the intensity of sunlight so individuals could gaze directly at the sun and not be blinded and at night this high altitude fog provided reflected sunlight that allowed individuals to see in what would normally be the dark of night. These observed effects were caused by the creation of “diamond dust” ice crystals in the upper atmosphere resulting from a deep ocean comet impact event.***

### Dust Falls

During this time the impact debris would slowly begin falling back to Earth from the upper atmosphere. The Chinese reported an unusual cluster of falls of dirt within a three-year time span [1783-1786], led by one on 15 April 1783 at Ningshan, *China*. Given the time of year, this initial fall could have been the usual dust from the Gobi, but in that case it would not have been so localized nor would the histories have paid any attention to it.<sup>219</sup>

### Subsequent Impact Events: Moon & Earth

If a fragment of a comet impacted the Earth’s surface, it may have been part of a stream of fragments or a ruptured comet, which were captured by Earth’s gravitational field, which then subsequently impacted the moon and Earth. The German astronomer Johann Elert Bode reported that an unnamed observer with a 5-foot [1.5 meter] telescope on 16 March 1873 saw "sparks outside of the moon around the middle of the east edge of the moon. They moved in a semicircle and fell back on the moon, and were about [the magnitude of] a 6<sup>th</sup> and 7<sup>th</sup> size stars. Some were bigger but didn't rise so high. The phenomenon lasted 10-11:40 pm." <sup>219</sup> [Sir Frederick William] Herschel observed bright volcanoes [bright lights] on the [dark

part of the] moon on 4 May 1783.<sup>219</sup> He compared it to the brightness of a star of the 4<sup>th</sup> magnitude.<sup>240</sup>

According to a letter by J.H. DeMagellan, “It was on the 13<sup>th</sup> following of the same month [13 May 1783], the Mr. Herschel discovered two small conical mountains [impact craters] in the very same spot where he had observed, on the 4<sup>th</sup> of the same month, that volcanos [asteroid/comet impact events] these are situated in the Mons Porphyrites of Hevelius, just by a third mountain, much larger, which Mr. Herschel had often observed before; but these two small ones were never before perceived in that place, nor were they represented in the drawing which he had made of that spot of the Moon before that observation. This particularity I have received in a letter with which I was favoured from Mr. Herschel himself, dated May 8, 1784.”<sup>249</sup>

On 18 August 1783, a great meteor was observed traveling 1,000 miles through Earth’s upper atmosphere from beyond *Scotland* to beyond *France*. This great meteor entered the Earth’s atmosphere over the North Sea, before passing over the east coast of *Scotland* and *England* and the *English Channel*; it finally broke up, after a passage within the atmosphere of around a thousand miles (1610 km), over southwestern *France* or northern *Italy*. The meteor passed over Shetland and the northern parts of *Scotland*; Essex [in *England*]; the *Straits of Dover*; Ostend and Brussels [in *Belgium*]; and Dunkirk, Calais, Paris, and [Côte de] Nuits in Burgundy [in *France*]. During its course, it gave off a prodigious light, which illuminated all objects. Over Brussels, from several observations, the elevation of the meteor was estimated at 50 miles [80 kilometers] above the surface of the Earth [0.0002 LD]. The size of the meteor was estimated at ½ mile across. The tail of the meteor was 10 or 12 times longer than the body. It was traveling at speeds greater than 20 miles per second [32 kilometers per second] and passed over the whole island of *Great Britain* in less than a half a minute. As it traveled, it exploded into a number of balls [fragments] each carrying a tail. The meteor [explosions] gave off a sound similar to the discharge of one or more cannons at a distance. The sound was loudest at Lincolnshire and the adjacent counties, and also in the eastern part of Kent.<sup>191</sup> Another account reports that this meteor was observed over Rome, Italy.<sup>220</sup> Figure B depicts the meteor’s oblong shape before it acquired a tail. Figure D depicts the meteor after it separated into several bodies each with a tail.



The 18 August 1783 Meteor before and after it broke up – drawing by T. Cavallo.<sup>221</sup>

There were an unusually high number of fireballs observed over Great Britain in the weeks following the Great Meteor of 18 August 1783. They occurred on 26 September and 4, 19 and 29 October.<sup>222</sup> On 4 October, there were two separate meteors observed. One occurred at 6:43 p.m. and the other about 3 a.m.<sup>220</sup>

Another curious event occurred on 10 September 1783 in the evening. There was a total eclipse of the moon. In *England*, this eclipse began at 9:38 p.m. The period of total lunar darkness began at 10:38 and ended at 12:22. This eclipse was visible not only in Europe and Africa, but also to a great part of Asia and America. During the eclipse, a body of light, equal and similar to what is called Saturn’s Rings, was seen round the moon, at first only with glasses, but afterwards with the naked eye; a phenomenon equally curious and uncommon.<sup>254</sup>



This comet may have fractured as it passed through Earth's atmosphere with part of the comet driving into the deep ocean and another large part escaped back into space but was captured by Earth's gravity and reappeared almost 6 months later on 18 August 1783. Other smaller fragments of this comet may have struck the moon on 16 March and 4 May of 1783. Most of the comet fragments disintegrated in Earth's upper atmosphere over a period of a couple years. It would also follow that the observed ring around the moon may be lunar impact debris.

### Effect on Weather

***The impact event affected the climate. It caused the Earth to cool dramatically in 1783 and resulted in an extremely cold and snowy winter in Europe in 1783-84. When the snow melted, it resulted in massive spring floods. It also altered the jet stream, which caused drought conditions across the globe that led to great famines. These climatic conditions from the impact carried on into the years 1784 and 1785.***

Refer to the main chronology for details on the cold summer of 1783, the severe winter of 1783-84, the massive spring floods caused by the thaw, and the great droughts and famines caused by the altered jet stream.

The impact event produced adverse weather effects due to a lowering of temperatures (global cooling) and the deflection of the jet stream winds. These effects produced devastating droughts and/or great famines across the globe. The regions affected included: *Iceland, Finland, Sweden, Scotland, Ireland, England, France, Italy, Spain, Tunisia, Libya, Egypt, Syria, Bangladesh, Pakistan, India, Turkestan, Korea, China, Japan* and *Mexico*.

— In 1783, a famine in *Iceland* killed 1/5<sup>th</sup> the population.<sup>258</sup>

— There were major crop failures in *Finland* between the years 1783-1785.<sup>264</sup>

— In 1783, Scania, the southmost part of *Sweden* and also known as “the granary of Sweden”, experience a famine.<sup>263</sup>

— In 1784-1785, there was a severe drought in *England, France, Italy* and *Spain*. Accounts are detailed in the main chronology.

— In 1784 or 1785, the entire potato crop of the Lothians [region of the *Scottish Lowlands*] was devastated. In 1784 the intense frost injured the potato crop in *Ireland*.<sup>260</sup>

— In 1784-1785, a famine in *Tunisia*, in North Africa killed up to 1/5<sup>th</sup> of its population.<sup>258</sup> Tripoli, *Libya* in North Africa experienced famine in 1784.<sup>259</sup>

— In 1784-1785, there was a severe drought (insufficient Nile River inundation) and great famine in *Egypt*. Accounts are detailed in the main chronology. Egypt lost 1/6<sup>th</sup> of its population.<sup>259</sup> The population of Egypt at that time was around 2.5 million; therefore the famine claimed around 420,000 lives.

— In 1784, a famine struck *Syria*.<sup>261</sup>

— A severe drought and great famine took place in *Bangladesh, Pakistan* and *India* in the years 1780-1784. Accounts are detailed in the main chronology. The famine in *North India* called the Chalisa famine of 1783-84 and the one a year earlier in *South India* killed approximately 11 million people.<sup>268</sup>

— In 1785 in the region of the Duab Mountains in *Turkestan*, there was a great famine. “Whole bodies have been eaten by dogs and vultures.”<sup>246</sup>

— A famine also struck *Korea*. In 1784, around 500,000 people died in *Korea* from famine.<sup>257</sup> In reviewing the Korean annuals there were 13 reports concerning famine or famine relief or court comments about famine in 1782; 18 reports in 1783; and 16 in 1784.<sup>219</sup>

— In 1784-1785, there were severe droughts in *China*. It is detailed in the main chronology by year.

— The Great Tenmei famine took place in *Japan* from 1782-1788. It was the deadliest famine in the early modern period of *Japan*. The population decreased by 920,000 people across Japan due to the



famine and the plague epidemic that accompanied it between the years 1780 & 1786. The population of *Japan* was 26.01 million in 1780, 25.09 million in 1786 and 24.89 million in 1792. The damage was particularly severe in Mutsu Province.<sup>256</sup>

— In 1785-1786, there was a severe drought and famine in *Mexico*. This famine was caused by 2 years of drought combined with severe frosts in the summer of 1785. The famine killed nearly 15% of the Bajío's population.<sup>262</sup> [The Bajío is the lowland region of Central Mexico.]

Even though some of these famines began before 5 February 1783, many appeared to intensify during the years 1783-1785.

Diamond dust can reflect and refract sunlight. One type of diamond dust, the "hexagonal plates" can reflect sunlight like miniature mirrors. When this type falls through the atmosphere, it travels like a Frisbee and can stay aloft on the winds for an extended time. Diamond dust injected into the upper atmosphere could stay aloft for many months before it returns to the surface. These ice crystals can reflect sunlight back into deep space. Water in the form of diamond dust ice crystals is very efficient per unit weight as a planetary cooling mechanism. In Polar Regions where they are generally encountered, falls of diamond dust (commonly referred to as clear sky precipitation) are associated with significant falls of temperature.

The area beneath these clouds of diamond dust ice crystals are significantly cooled. The molecules of air are constricted and become more dense. In meteorological terms, high-pressure areas are formed. If these cold dense regions become large enough they can deflect or block jet stream winds.

The clouds of high altitude diamond dust formed by the water injected into the upper atmosphere robbed the Northern Hemisphere of heat and altered the jet stream. This affected the rain patterns (annual Nile River floods, India monsoons, rainfall in China). And anomalies in rainfall then contributed to the severity of these famines.

### **Comet Parent**

Comets are very fragile, with little internal strength and a very low mass density. Comets have been described as similar to huge dirty snowballs. Comets are composed of various ices, including water ice, clay and organic matter, including hydrocarbons in the form of an oil-like tar. When a comet comes within 400 million kilometers of the Sun (a little bit beyond the orbit of Mars); the sunlight is strong enough to start evaporating the ice in large quantities. Ammonia, methane, nitrogen, carbon monoxide and carbon dioxide ice change from a solid to vapors. Since the ice and rock are intimately mixed, the warming and evaporating ice produces great thermal and physical stresses on the surface of the comet nucleus. Vapor and tiny dust grains fly off the surface of the nucleus and form a comet tail. The comet travels on a long elliptical orbit around the sun. The dust tail generated in the comet tail also follows this same orbit. Over many orbits, this elliptical orbit becomes saturated with these dust grains. Sometimes the circular orbit of Earth will cross the elliptical orbit of the comet. When this happens, the Earth will be bombarded by some of these grains of dust, which will produce shooting stars in the night's sky. Generally, these meteorite showers are an annual event that occurs on approximately the same day each year. But also imbedded in this stream of meteorites is the parent comet. Therefore the date of a meteorite storm can provide clues about the parent comet. The hypothetical impact event occurred on or about 5 February 1783. If the impactor was of comet origin, it should line up with a meteorite shower. The February Eta Draconids meteor shower occurred on 4 February. It is a faint shower and was first detected in the year 2011. The parent comet of the February Eta Draconids may have had an extremely close encounter with earth in February 1783. The fact that it is faint shower might indicate that the parent comet was relatively small (by comet standards) and/or the number of orbits this comet made

around the sun was very limited in quantity. The parent comet associated with the February Eta Draconids has yet to be discovered. If this parent comet was the comet associated with this impact event, it might help to explain why this annual meteorite shower is faint and why the parent comet is currently “unknown”.

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#### Detailed Account of the Calabria Earthquake

The following is the account by Sir William Hamilton [the English Minister at the Court of Naples] to the Royal Society at Naples, *Italy* on 23 May 1783 describing the earthquake of 5 February 1783 at Calabria in *Italy*.<sup>248</sup>

— “The earthquakes (which began the 5<sup>th</sup> of February last, and continue to be sensibly, though less violently, felt to this day) in the two Calabrias, at Messina, and in the parts of Sicily nearest to the continent. From the most authentic reports and accounts received at the office of his Sicilian Majesty’s secretary of state, we gathered in general, that the part of Calabria which has been the most affected by this heavy calamity is that which is comprehended between the 38<sup>th</sup> and 39<sup>th</sup> degrees; that the greatest force of the earthquakes seemed to have exerted itself from the foot of those mountains the Appennines [Apennine Mountains] called the Monte Dejo, Mount Sacro, and Monte Caulone, extending westward to the Tyrrhene [Tyrrhenian] Sea; that the towns, villages, and farm-houses, nearest these mountains, situated either on the hills, or on the plain, were totally ruined by the first shock of the 5<sup>th</sup> of February about noon, and that the greatest mortality was there; that in proportion as the towns and villages were at a greater distance from this centre [center], the damage they received was less considerable; but that even those more distant towns had been greatly damaged by the subsequent shocks of the earthquake, and especially by those of the 7<sup>th</sup>, the 16<sup>th</sup>, and the 28<sup>th</sup> of February, and that of the 1<sup>st</sup> of March: that from the first shock, on the 5<sup>th</sup> of February, the earth continued to be in a continual tremor, more or less; and that the shocks were more sensibly felt at times in some parts of the afflicted provinces than in others; that the motion of the earth had been various, and, according to the Italian denomination, *vorticoso*, *orizoniale*, and *oscillatorio*, either whirling like a vortex horizontal, or by pulsations, or beating from the bottom upwards; that this variety of motion had increased the apprehensions of the unfortunate inhabitants of those parts, who expected every moment that the earth would open under their feet, and swallow them up; that the rains had been continual and violent, often accompanied with lightning, and irregular and furious gusts of wind: that from all these causes the face of the earth of that part of Calabria, comprehended, as above-mentioned, between the 38<sup>th</sup> and 39<sup>th</sup> degrees [latitude], was entirely altered, particularly on the westward side of the mountains above-named; that many openings and cracks had been made in those parts; that some hills had been lowered, and others quite leveled; that in the plains deep chasms had been made, by which many roads were rendered impassible; that huge mountains had been split asunder, and parts of them driven to a considerable distance; that deep vallies [valleys] had been filled up, by the mountains which formed those vallies [valleys] having been detached by the violence of the earthquakes, and joined together; that the course of some rivers had been altered; that many springs of water had appeared in places that were perfectly dry before; and that, in other parts, springs that had been constant had totally disappeared; that near Laureana, in Calabria Ultra, a singular phenomenon had been produced, that the surface of two whole tenements, with large olive and mulberry trees thereon, situated in a valley perfectly level, had been detached by the earthquake, and transplanted, the trees still remaining in their places, to the distance of about a mile from their first situation; and that from the spot on which they formerly stood, hot water had sprung up to a considerable height, mixed with sand of a ferruginous nature [ferruginous - resembling iron rust in appearance and color, brownish red, or yellow red]; that near this place also some countrymen and shepherds had been swallowed up, with their teams of oxen, and flocks of goats and sheep: in short, that beginning from the city of Amantea, situated on the coast of the Tyrrhene [Tyrrhenian] Sea, in Calabria Citra, and going along the westward coast to Cape Spartivento, in Calabria Ultra, and then up the eastern coast as far as the Cape d’Alice, (a part of Calabria Citra on the

Ionian Sea) there is not a town or village, either on the coast or land, but what is either totally destroyed, or has suffered more or less, amounting in all to near four hundred what are called here *paeses*. (A village containing less than an hundred inhabitants is not counted as a *paese*. [In other words, a *paese* is a village containing more than 100 inhabitants.]”

— “The greatest mortality fell upon those towns and countries situated in the plain, on the western side of the mountains Dejo, Sacro, and Caulone. At Casal Nuovo [Casalnuovo], the Princess Grace, and upwards of 4000 of the inhabitants, lost their lives; at Bagnara, the number of dead amounts to 3017; Radicina and Palma count their loss at about 3000 each; Terra Nuova [now Gela] about 1400; and Seminari still more. The sum total of the mortality in both Calabrias, and in Sicily, by the earthquakes alone, according to the returns in the Secretary of State’s office, at Naples, is 33,367; but I have good reason to believe, that, including strangers, the number of lives lost must have been considerably greater; 40,000 at least may be allowed, and, I believe, without exaggeration.”

— “From the same office intelligence we likewise heard, that the inhabitants of Scilla, on the first shock of the earthquake, on the 5<sup>th</sup> of February, had escaped from their houses on the rock, and following the example of their prince, taken shelter on the sea-shore; but that in the night-time the same shock which had raised and agitated the sea so violently, and done so much damage on the point of the Faro of Messina, had acted with still greater violence there, for that the wave (which was represented to have been boiling hot, and that many people had been scalded by its rising to a great height) went furiously three miles inland, and swept off in its return 2473 of the inhabitants of Scilla, with the prince at their head, who were at that time either on the Scilla strand, or in boats near the shore.”

— “All accounts agreed, that of the number of shocks which have been felt since the beginning of this formidable earthquake, amounting to some hundreds, the most violent, and of the longest duration, were those of the 5<sup>th</sup> of February, at 19½ (according to the Italian way of counting the hours); of the 6<sup>th</sup> of February, at seven hours in the night; of the 27<sup>th</sup> of February, at 11¼ in the morning; of the 1<sup>st</sup> of March, at 8½ in the night; and that of the 28<sup>th</sup> of March, at 11½ in the night. It was this last shock that affected most the upper part of Calabria Ultra, and the lower part of the Citra, an authentic description of which you will see hereafter, in a letter which I received from the Marquis Ippolito, an accurate observer, residing at Catanzaro, in the Upper Calabria. The first and the last shocks must have been tremendous indeed, and only these two were sensibly felt in this capital.”

— “The accounts which this government has received from the province of Cosenza, are less melancholy than those from the provinces of Calabria Ultra. From Cape Suvero to the Cape of Cetraro, on the western coast, the inland countries, as well as those on the coast, are said to have suffered more or less, in proportion to their proximity to the supposed centre [center] of the earthquake; and it has been constantly observed, that its greatest violence has been exerted, and still continues to be so, on the western side of the Apennines, precisely the celebrated Sila [La Sila] of the ancient Brutii [Bruttii], and that all those countries situated to the eastward of the Sila had felt the shocks of the earthquake, but without having received any damage from them. In the province of Cosenza, there does not appear to be above 100 lives lost. In the last accounts from the most afflicted part of Calabria Ultra, two singular phænomena, are mentioned: at about the distance of three miles from the ruined city of Oppido, there was a hill (the soil of which is a sandy clay) about 500 palmos high, and 1300 in circumference [the length of a palm in Naples, Italy at this time was approximately 8 7/12 inches. Therefore the hill was approximately 358 feet high and 930 feet in circumference.] at its basis; it was said that this hill, by the shock of the 5<sup>th</sup> of February, jumped to the distance of about four miles from the spot where it stood, into a plain called the Campo di Baffano [Bassano?]. At the same time the hill on which the town of Oppido stood, which extended about three miles, divided into two, and as its situation was between two rivers, its ruins filled up the valley and stopped the course of those rivers; two great lakes are already formed, and are daily encreasing [increasing], which lakes, if means are not found to drain them, and give the rivers their due course, in a short time must infect the air greatly.”

— “From Sicily the accounts of the most serious nature were those of the destruction of the greatest part of the noble city of Messina, by the shock of the 5<sup>th</sup> of February, and of the remaining parts by the subsequent ones; that the quay in the port had sunk considerably, and was in some places a palm and a

half underwater; that the superb building, called the Palazzata [La Palazzata di Simone Gulli], which gave the port a more magnificent appearance than any port in Europe can boast of, had been entirely ruined; that the lazaret [hospital] had been greatly damaged, but that the citadel had suffered little; that the mother-church had fallen: in short, that Messina was no more; that the tower at the point of the entrance of Faro was half destroyed; and that the same hot wave that had done such mischief at Scilla, had passed over the point of land at the Faro, and carried off about 24 people. The Viceroy of Sicily likewise gave an account of some damage done by the earthquakes, but nothing considerable, at Melazzo [Milazzo], Patti, Terra di Santa, Lucia, Castro Reale [Castroreale], and in the island of Lipari.”

— “This, Sir, was the intelligence I was possessed of at the end of the month: but as I am particularly curious, as you know, on the subject of volcanoes, and was persuaded in my own mind (from the present earthquakes being confined to one spot) that some great chemical operation of nature of the volcanic sort was the real cause of them; in order to clear up many points, and to come at truths, which you also well know, Sir, is exceedingly difficult, I took the sudden resolve on to employ about twenty days (which was as much as I could allow, and have time to be out of Italy, in my way home, before the heats [hot weather] set in) in making the tour of such parts of Calabria Ultra and Sicily as had been, and were still, most affected by the earthquakes, and examining with my own eyes the phænomena above mentioned. I accordingly hired for that purpose a Maltese speronara [a type of small Mediterranean sailing boat] for myself, and a Neapolitan felucca [small sailing vessel] for my servants, and left Naples on the 2<sup>nd</sup> of May. I was furnished, by command of his Sicilian Majesty, with ample passports, and orders to the commanding officers of the different provinces to give me every assistance and protection in the pursuit of my object. I had a pleasant voyage in my Maltese speronara (which are excellent boats, and the boatmen very skilful [skillful]) along the coast of the Principato Citra and Calabria Citra, after having passed the Gulph [Gulf] of Policastro. At Cedraro, I found the first symptoms of the earthquake, some of the principal inhabitants of that city having quitted their houses, and living in new-erected barracks, though not a house in the whole town, as I could see, had suffered. At St. Lucido, I perceived that the baron’s palace, and the church-steeple had suffered, and the most of the inhabitants were in barracks. The barracks are just such sort of buildings, as the booths of our country fairs, though indeed many I have seen are more like our pig-styes [pigsties]. As my object was to get as fast as possible to the centre [center] of the mischief [damage], having little time, and much to see, I contented myself with a distant view of Maida, Nicastro, and Santo Eusemia, and pushed on to the town of Pizzo [Pizzo Calabro], in Calabria Ultra, where I landed on the evening of the 6<sup>th</sup> of May. This town, situated on the sea, and on a volcanic cussa [former volcanic activity] had been greatly damaged by the earthquake of the 5<sup>th</sup> of February, but was completely ruined by that of the 28<sup>th</sup> of March. As the inhabitants of this town (amounting to about 5000) had sufficient warning, and had left their houses, and taken to barracks on the first shock, the 5<sup>th</sup> of February, the mortality on the 28<sup>th</sup> of March was inconsiderable; but, from the barracks having been ill constructed, and many situated in a very confined unwholesome spot, an epidemical disorder had taken place, and carried off many, and was still in fatal force whilst I was there, in spite of the wise endeavours [endeavors] of government to stop its progress. I fear, as the heats [hot weather] increase, the same misfortune will attend many parts of the unfortunate Calabria, as also the city of Messina. The inhabitants of Pizzo seem to me to have habituated themselves already to their present inconvenient manner of living, and shops of every kind were opened in the streets of the barracks, which, except some few, are but poorly constructed. I was assured here, that the volcano of Stromboli, which is opposite, and in full view of this town, and at the distance of about fifty miles, had smoked less, and thrown up a less quantity of inflamed matter during the earthquake than it had done for some years past; that slight shocks continued to be felt daily; and the night I slept here, on board the speronara drawn on shore, I was awakened with a smart one, which seemed to lift up the bottom of the boat, but it was not attended with any subterraneous noise. My servants in the other boat, felt the same. The next day, I ordered my boats to proceed to Reggio, and I went on horseback to Monteleone [now Vibo Valentia], about six miles from Pizzo, up hill, on a road of loose stones and clay scarcely passable in this season, but through the most beautiful and fertile country I ever beheld; a perfect garden of olive-trees, mulberry-trees, fruit-trees, and vines; and under these trees the richest crops of corn or lupins, beans, or other

vegetables, which seemed to thrive perfectly, though under a thick shade. This is the stile [style] of the whole plain of Monteleone [now Vibo Valentia], except that here and there are vast woods of oak and olive trees mixed, and there olive trees are of such a size as I could never have conceived, being half as big as the oaks themselves, which are fine timber-trees, and more than treble the size of the olive trees of the Charapagna Felice. The olive woods, in some parts of the plain, are regularly planted in lines, and in others grow irregularly. Though the object of my present journey was merely to take a hasty view of the spots which had suffered so much by the calamity, my attention was continually called away, and I was lost in the admiration of the fertility and beauty of this rich province, exceeding by many degrees (as to the first point) every country I have yet seen. Besides the two rich products of silk and oil, in which this province surpasses every other, perhaps in the whole world, it abounds with corn, wine, cotton, liquorice; fruit and vegetables of every kind; and if its population and industry kept pace with its fertility, the revenue of Calabria Ultra might surely be more than doubled in a short time. I saw whole groves of mulberry-trees, the owners of which told me did not let for more than five shillings an acre, when every acre would be worth at least five pounds, had they hands to gather the leaves and attend the silk worms. The town of Monteleone, anciently Vibo Valentia, is beautifully situated on a hill, overlooking the sea, and the rich plains above-mentioned, bounded by the Appenines [Apennine Mountains], and crowned by Aspromonte, the highest of them all, interspersed with towns and villages, which alas! are no more than heaps of ruins. The town of Monteleone [now Vibo Valentia] suffered little by the first shocks of the earthquake; but was greatly damaged by that of the 28<sup>th</sup> of March, (though only twelve lives were lost) and all the inhabitants are reduced to live in barracks, many of which are well constructed with either planks or reeds, covered with plaster on the outside. As this country has ever been subject to earthquakes, the baron had [constructed] a barrack near their palace, to retire to on the least alarm of an earthquake. I inhabited here a magnificent one, consisting of many rooms well furnished, which was built by the present Duke of Monteleone's grandfather. I owe the safety and expedition of the very interesting journey which I have taken through this province, to this duke's goodness as he was pleased, at Naples, to furnish me with a letter to his agent; in consequence of which, I was not only most hospitably and elegantly treated in his barrack, and supplied with excellent surefooted horses for myself and servant, but also with two of his horse guards, well acquainted with the cross-roads of the country, without which it would have been impossible, with any degree of safety, to have visited every curious spot between Monteleone [now Vibo Valentia] and Reggio, as I did, in four days. No one, that has not had the experience, can conceive the horrid state of the roads in Calabria, even in this season, nor the superior excellence of the horses of the country. All agreed here, that every shock of the earthquake seemed to come with a rumbling noise from the westward, beginning usually with the horizontal motion, and ending with the vorticose [swirling], which is the motion that has ruined most of the buildings in this province. The same observation I found to be a general one throughout this province. I found it a general observation also, that before a shock of an earthquake, the clouds seemed to be fixed and motionless; and that, immediately after a heavy shower of rain, a shock quickly followed. I spoke with many here, and elsewhere, who were thrown down by the violence of some of the shocks; and several peasants in the country told me, that the motion of the earth was so violent that the heads of the largest trees almost touched the ground from side to side; that, during a shock, oxen and horses extended their legs wide asunder, not to be thrown down; and that they gave evident signs of being sensible of the approach of each shock. I myself observed that in the parts that have suffered most by the earthquakes, the braying of an ass, the neighing of a horse, or the cackling of a goose, always drove people out of their barracks, and was the occasion of many Paternosters and Ave-Marias being repeated in expectation of a shock. From Monteleone [now Vibo Valentia]: I descended into the plain, having passed through many towns and villages which had been more or less ruined, according to their vicinity to the plain. The town of Mileto, situated in the bottom, I saw was totally destroyed, and not a house standing. At some distance I saw Soranio and the noble Dominican Convent a heap of ruins: but, as my object was not to visit ruins, but, the greater phænomena produced by earthquakes, I went on to Rosarno. I must, however, first mention the most remarkable instance I met with of animals being able to live long without food, of which there have been many examples during these present earthquakes. At Soriano two fattened hogs, that had



remained buried under a heap of ruins, were taken out alive the forty-second day; they were lean and weak, but soon recovered. One of his Sicilian Majesty's engineers, who was present at the taking them out, gave me this information. It was evident to me, in this day's journey that all habitations situated on high grounds, the soil of which is a gritty sand-stone, somewhat like a granite, but without the consistence, had suffered less than those situated on the plain, which are universally levelled to the ground. The soil of the plain is a sandy clay, white, red, or brown; but the white prevails most, and is full of marine shells, particularly scollop [scallop] shells. This valley of clay is intersected in many places by rivers and torrents coming from the mountains, which have produced wide and deep ravines all over the country. Soon after we had passed through the ruined town of St. Pietro, we had a distant view of Sicily, and the summit of Mount Ætna, which smoked considerably. Just before we arrived at Rosarno, near a ford of the River Mamella, we passed over a swampy plain, in many parts of which I was shewn [shown] some hollows in the earth, of the shape of an inverted cone; they were covered with sand, as was the soil near them. I was told that, during the earthquake of the 5<sup>th</sup> of February, from each of these spots a fountain of water mixed with sand had been driven up to considerable height [sand/water geyser]. I spoke to a peasant here, who was present, and was covered with the water and sand; but he assured me it was not hot, as had been represented. Before this appearance, he said, the river was dry, but soon after returned and overflowed its banks. I afterwards found, that the same phænomenon had been constant with respect to all the other rivers in the plain during the formidable shock of the 5<sup>th</sup> of February. I think this phænomenon is easily explained, by supposing the first impulse of the earthquake to have come from the bottom upwards, which all the inhabitants of the plain attest to be fact; the surface of the plain suddenly arising, the rivers, which are not deep, would naturally disappear, and the plain, returning with violence to its former level, the rivers must naturally have returned, and overflowed at the same time that the sudden depression of the boggy grounds would as naturally force out the water that lay hid under their surface. I observed in the other parts where this phænomenon had been exhibited, that the ground was always low and rushy. Between this place and Rosarno we passed the river Messano, or Metauro, (which is near the town above mentioned) on a strong timber bridge, 700 palms long, which had been lately built by the Duke of Monteleone. From the cracks made on the banks and in the bed of the rivers by the earthquake, it was quite [?] in one part, and the level on which the piers were placed having been variously altered, the bridge has taken an undulated form, and the rail on each side is curiously scolloped; but the parts that were separated having been joined again, it is now passable: the duke's bridgeman told me also, that at the moment of the earthquake this great river was perfectly dry for some seconds, and then returned with violence and overflowed, and that the bridge undulated in a most extraordinary manner. When I mention the earthquake in the plain, it must be always understood the first shock on the 5<sup>th</sup> of February, which was by far the most terrible, and was the one that did the whole mischief [damage] in the plain, without having given any previous notice [warning]. The town of Rosarno, with the Duke of Monteleone's palace there, was entirely ruined; but the walls remained about six feet high, and are now sitting up as barracks. The mortality here did not much exceed 200 out of near 3000. It had been remarked at Rosarno, (and the same remark has been constantly repeated to me in every ruined town that I have visited) that the male dead were generally found under the ruins in the attitude of struggling against the danger; but that the female attitude was usually with hands clasped over their heads, as giving themselves up to despair, unless they had children near them, in which case they always were found clasping the children in their arms, or in some attitude which indicated their anxious care to protect them— a strong instance of the maternal tenderness of the sex! The only building that remained unhurt at Rosarno was a strong built town goal [jail], in which were three notorious villains, who would probably have lost their lives had they been at liberty. After having dined in a barrack, the owner of which had lost five of his family by the earthquake, I proceeded to Laureana, often crossing the wide extended bed of the river Metauro."

— "The environs [neighborhood] of Laureana, which stands on an elevation, is the Garden of Eden itself; nothing I ever saw can be compared to it. The town is considerable; but as the earthquake did not come on suddenly, as in the plain, not a life was lost there; but from a sickness occasioned by hardships and fright, 52 have since died. I lodged in the barracks of a sensible gentleman of Mileto, Don Domenico



Acquanetta, who is a principal proprietor of this town. He attended me the next day to the two tenements, called the Macini and Vaticano, mentioned in the former part of this letter, and which were said to have changed their situation by the earthquake. The fact is true, and easily accounted for. These tenements were situated in a valley surrounded by high grounds; and the surface of the earth, which has been removed, had been probably long undermined by little rivulets [a very small stream] which came from the mountains, and now are in full view on the bare spot the tenements had deserted. These rivulets have a sufficiently rapid course down the valley, to prove it's not being a perfect level, as was represented. I suppose the earthquake to have opened some depositories of rain water in the clay hills which surround the valley, which water, mixed with the loose soil, taking it's course suddenly through the undermined surface lifting it up with the large olive and mulberry trees, and a thatched cottage, floated the entire piece of ground, with all it's vegetation, about a mile down the valley, where it now stands, with most of the trees erect. These two tenements may be about a mile long, and half a mile broad. I was shewn [shown] several deep cracks in this neighborhood, not one above a foot in breadth; but which, I was credibly assured, had opened wide during the earthquake, and swallowed up an ox, and near an [a] hundred goats, but no countrymen, as was reported. In the valley above mentioned I saw the same sort of hollows in the form of inverted cones, out of which, I was assured, that hot-water and sand had been emitted with violence during the earthquakes, as at Rosarno; but I could not find any one who could positively affirm that the water had been really hot, although the reports which government received affirm it. Some of the sand thrown out here with the water has a ferrugineous [ferruginous] appearance and seems to have been acted upon by fire. I was told that it had also, when fresh, a strong smell of sulphur [sulfur], but, I could not perceive it."

— "From hence I went through the same delightful country to the town of Polistene. To pass through so rich a country, and not see a single house standing on it, is most melancholy indeed! Wherever a house stood, there you see a heap of ruins, and a poor barrack, with two or three miserable mourning figures sitting at the door, and here and there a maimed man, woman, or child, crawling upon crutches. Instead of a town, you see a confused heap of ruins, and round about them numbers of poor huts or barracks, and a larger one to serve as a church with the church-bells hanging upon a sort of low gibbet; every inhabitant with a doleful countenance, and wearing some token of having lost a parent."

— "I travelled four days in the plain, in the midst of such misery as cannot be described. The force of the earthquake was so great there, that all the inhabitants of the towns were buried either alive or dead under the ruins of their houses in an instant. The town of Polistene was large, but ill situated between two rivers, subject to overflow. 2100 out of about 6000 [people] lost their lives here the fatal 5<sup>th</sup> of February. The Marquis St. Giorgio, the baron of this country, whom I found here, was well employed in assisting his tenants. He had caused the streets of his ruined town to be cleared of rubbish, and had erected barracks on a healthy spot near it, for the remainder of his subjects, and on a good plan. He had also constructed barracks of a larger size for the silk worms, which I found already at work in them. This prince's activity and generosity is most praise-worthy; and, as far as I have seen hitherto, he is without a rival. I observed, that the town of St. Giorgio, on a hill about two miles from Polistene, though rendered uninhabitable, was by no means levelled like the towns on the plain. There was a nunnery at Polistene: being curious to see the nuns that had escaped, I asked the Marquis to shew [show] me their barracks; but, it seems only one out of twenty-three had been dug out of her cell alive, and she was four score [80] years of age. After having dined with the Marquis in his humble barrack, near the ruins of his very magnificent palace, I went through a fine wood of olive, and another of chestnut-trees, to Casal Nuovo [Casalnuovo], and was shewn [shown] the spot on which stood the house of my unfortunate friend the Princess Grace Grimaldi; who, with more than four thousand of her subjects, lost her life by the sudden explosion of the 5<sup>th</sup> of February, (for so it appears to have been) that reduced this town to atoms. I was told by some here, who had been dug out of the ruins, that they felt their houses fairly lifted up, without having had the least previous notice [warning]. In other towns some walls and parts of houses are standing: but here you neither distinguish street nor houses; all lie in one confused heap of ruins. An inhabitant of Casal Nuovo [Casalnuovo] told me he was on a hill at the moment of the earthquake, overlooking the plain; when, feeling the shock, and turning towards the plain, instead of the town, he saw in the place of it a thick

cloud of white dust like smoke, the natural effect of the crushing of the buildings, and the mortar flying off.”

— “From hence I went through the towns of Castellace and Milicufoo (both in the same condition as Casal Nuovo [Casalnuovo]) to Terra Nuova [now Gela], situated in the same lovely plain, between two rivers, which with the torrents from the mountains, have, in the course of ages, cut deep and wide chasms in the soft sandy clay soil, of which the whole plain is composed. At Terra Nuova [now Gela] the ravine or chasm is not less than 500 feet deep, and three quarters of a mile broad. What causes a confusion in all the accounts of the phænomena produced by this earthquake in the plain, is the not having sufficiently explained the nature of the soil and situation. They tell you, that a town has been thrown a mile from the place where it stood, without mentioning a word of a ravine; that woods and corn-fields have been removed in the same manner: when, in truth, it is but upon a large scale, what we see every day upon a smaller, when pieces of the sides of hallow ways [ravines], having been undermined by rain-waters, are detached into the bottom by their own weight. Here, from the great depth of the ravine, and the violent motion of the earth, two huge portions of the earth, on which a great part of the town stood, consisting of some hundreds of houses, were detached into the ravine, and nearly across it, about half a mile from the place where they [once] stood; and, what is most extraordinary, several of the inhabitants of these houses, who had taken this singular leap in them, were nevertheless dug out alive, and some unhurt. I spoke to one myself who had taken this extraordinary journey in his house, with his wife and a maid-servant: neither he nor his maid-servant were hurt; but he told me his wife had been a little hurt, but was now nearly recovered. I happened to ask him, what hurt his wife had received: his answer, though of a very serious nature, will nevertheless I am sure, make you smile, Sir, as it did me. He said, she had both her legs and one arm broken; and that she had a fracture on her skull, so that the brain was visible. It appears to me, that the Calibrosi have more firmness [toughness] than the Neapolitans; and they really seem to bear their present excessive misfortune with a true philosophic patience. Of 1600 inhabitants at Terra Nuova [now Gela], only 400 escaped alive. My guide there, who was a priest and physician, had been shut up in the ruins of his house by the first shock of the earthquake, and was blown out of it, and delivered by the succeeding shock, which followed the first immediately. There are many well-attested instances of the same having happened elsewhere in Calabria. In other parts of the plain, situated near the ravine, and near the town of Terra Nuova [now Gela], I saw many acres of land with trees and cornfields that had been detached into the ravine, and often without having been overturned, so that the trees and crops were growing as well as if they had been planted there. Other such pieces were lying in the bottom, in an inclined situation, and others again that had been quite overturned. In one place, two as these immense pieces of land having been detached opposite to one another, had filled the valley, and stopped the course of the river, the waters of which were forming a great lake; and this is the true state of what the accounts mention of mountains that had walked, and joined together, stopped the course of the river, and formed a lake. At the moment of the earthquake the river disappeared here as at Rosarno; and, returning soon after, overflowed the bottom of the ravine about three feet in depth, so that the poor people who had been thrown with their houses into the ravine from the top of it, and had escaped with broken bones, were now in danger of being drowned. I was assured that the water was salt, like that of the sea, but this circumstance seems to want confirmation. The same reason I have given for the sudden disappearing of the River Metauro at Rosarno, will account for the like phænomenon here, and in every part of the country where the rivers dried up at the moment of the earthquake. The whole town of Mollochi di Sotto, near Terra Nuova [now Gela], was likewise detached into the ravine, and a vineyard of many acres near it lies in the bottom of the ravine, as I saw, in perfect order, but in an inclined situation: there is a foot-path through this vineyard, which has a singular effect, considering it's present impracticable situation. Some watermills, that were on the river, having been jammed between two such detached pieces as above described, were lifted up by them, and are now seen on an elevated situation, many feet above the level of the river. Without the proper explanations, it is no wonder that such facts should appear miraculous. I observed in several parts of the plain, that the soil, with timber trees and crops of corn, consisting of many acres, had sunk eight and ten feet below the level of the plain; and in others again I perceived it had risen as many. It is necessary to remember, that the soil of the plain is a clay mixed with sand, which is easily

moulded [molded] into any shape. In the plain, near the spots from whence the above-mentioned pieces had been detached into the ravines, there were several parallel cracks; so that had the violence of the shocks of the earthquake continued, these pieces also would probably have followed. I remarked constantly, in all my journey, that near every ravine, or hollow-way, the parts of the plain adjoining were full of large parallel cracks. The earth rocking with violence from side to side, and having a support on one side only, accounts well for this circumstance.”

— “From Terra Nuova [now Gela] I went to Oppido. This city is situated on a mountain of a ferruginous [ferruginous – containing iron] sort of gritty stone, unlike the clay soil of its neighbourhood [neighborhood], and is surrounded by two rivers in a ravine deeper and broader than that of Terra Nuova [now Gela]. Instead of the mountain on which Oppido was situated having split in two, and by its fall on the rivers stopped their course, and formed great lakes, as we are told, it was (as at Terra Nuova [now Gela]) huge pieces of the plain on the edge of the ravine, that had been detached into it, nearly filled it up, and stopped the course of the rivers, the waters of which are now forming two great lakes. It is true, that part of the rock on which Oppido stood, was detached with several houses into the ravine, but that is a trifling circumstance, in comparison of the very great tracts of land, with large plantations of vines and olive trees, which have been detached from one side of the ravine clear over to the other, though the distance is more than half a mile. It is well attested, that a countryman, who was ploughing his field in this neighborhood with a pair of oxen was transported with his field and team, clear from one side of the ravine to the other, and that neither he nor his oxen were hurt. After what I have seen, I verily believe this may have happened. A large volume might be composed of the curious facts and accidents of this kind, produced by the earthquake in the valley; and, I suppose, many will be recorded in the account of the late formidable earthquakes, which the Academy of Naples intends to publish, the president having already sent into Calabria fifteen members, with draftsmen in preparation, to collect the facts, and make drawings for the sole purpose of giving a satisfactory and ample account of the late calamity to the public: but, unless they attend, as I did, to the peculiar nature of the soil where those accidents happened, their reports will generally meet with little credit, except from those who are professed dilettanti [a dabbler in the art] of miracles, and many such do certainly exist in this country. I met with a remarkable instance here of the degree of immediate distress to which the unfortunate inhabitants of the destroyed towns were reduced. Don Mascillo Grillo, a gentleman of fortune, and of great landed property, having escaped from his house at Oppido, which was destroyed by the earthquake, and his money (no less than twelve thousand pieces of gold) having been buried under the ruins of it, remained several days without food or shelter during heavy rains, and was obliged to a hermit in the neighborhood for the loan of a clean shirt. Having walked over the ruins of Oppido, I descended into the ravine, and examined carefully the whole of it. Here I saw, indeed, the wonderful force of the earthquake, which has produced exactly the same effects as I have described in the ravine of Terra Nuova [now Gela], but on a scale infinitely greater. The enormous masses of the plain, detached from each side of the ravine, lie sometimes in confused heaps, forming real mountains, and having stopped the course of two rivers, (one of which is very considerable) great lakes are already formed, and, if not afforded by nature or art, so as to give the rivers their due course, must insatiably be the cause of a general infection in the neighbourhood [neighborhood]. Sometimes I met with a detached piece of the surface of the plain, (of many acres in extent) with the large oaks and olive trees, with [lupins?] or corn under them, growing as well, and in as good order, at the bottom of the ravine, as their companions from whom, they were separated, do on their native soil in the plain, at least 500 feet higher, and at the distance of about three quarters of a mile. I met with whole vineyards in the same order in the bottom, that had likewise taken the same journey. As the banks of the ravine, from whence these pieces came, are now bare and perpendicular, I perceived that the upper soil was a reddish earth, and the under one a sandy white clay, very compact, and like a soft stone; the impulse these huge masses received, either from the violent motion of the earth alone, or that assisted with the additional one of the volcanic exhalations let at liberty, seems to have acted with greater force on the lower and more compact stratum, than on the upper cultivated crust: for I constantly observed, where these cultivated islands lay, (for so they appeared on the barren bottom of the ravine) the under stratum of compact clay had been driven some hundred yards farther, and lay in confused blocks; and, as I observed, many of

those blocks were of a cubical form. The under soil having had a greater impulse, and leaving the upper in its flight, naturally accounts for the order in which the trees, vineyards, and vegetation, fell, and remain at present in the bottom of the ravine. This curious fact, I thought, deserved to be recorded, but is not easily described by words. When the drawings and plans of the Academy are published, this account (imperfect as it is) may, perhaps, have its utility; had my time permitted, I would certainly have taken a draftsman with me into Calabria. In another part of the bottom of the ravine there is a mountain composed of the same clay soil, and which was probably a piece of the plain detached by an earthquake at some former period; it is about 250 feet high, and about 400 feet diameter at its base: this mountain, as is well attested, has travelled down the ravine near four miles, having been put in motion by the earthquake of the 5<sup>th</sup> of February. The abundance of rain which fell at that time, the great weight of the fresh detached pieces of the plain, which I saw heaped up at the back of it, the nature of the soil of which it is composed, and particularly its situation on a declivity [a downward slope], accounts well for this phænomenon; whereas the reports which came to Naples, of a mountain, in a perfect plain, having leaped four miles, had rather the appearance of a miracle. I found some single timber trees also, with a lump of their native soil at the roots, standing upright in the bottom of the ravine, and which had been detached from the plain above-mentioned. I observed also, that many confused heaps of the loose soil, detached by the earthquake from the plains on each side of the ravine, had actually run like a volcanic lava, (having probably been assisted by the heavy rain) and produced many effects greatly resembling those of lava during their course down a great part of the ravine. At Santa Christina, in the neighbourhood [neighborhood] of Oppido, the like phænomena have been exhibited, and the great force of the earthquake of the 5<sup>th</sup> of February seems to have been exerted on these parts, and at Casal Nuovo [Casalnuovo] and Terra Nuova [now Gela]. The phænomena exhibited by the earthquakes in other parts of the plains of Calabria Ultra, are of the same nature; but trifling in comparison of those I have been describing. The barracks erected for the remaining inhabitants of the ancient city of Oppido, now in ruins, are on a healthy spot, at about the distance of a mile from the old town, where I found the baron of this country, the Prince of Cariati, usefully employed in the assistance of his unfortunate subjects. He shewed [showed] me two girls, one about sixteen years of age, who had remained eleven days without food under the ruins of a house at Oppido: she had a child of five or six months old in her arms, which died the fourth day. The girl gave me a clear account of her sufferings: having light through a small opening, she had kept an exact account of the number of days she had been buried. She did not seem to be in bad health, drinks, freely, but has yet a difficulty in swallowing anything solid. The other girl was about eleven years of age: she remained under the ruins six days only; but in so very confined and distressful a posture, that one of her hands pressing against her cheek, had nearly worn a hole through it.”

— “From Oppido I proceeded through the same beautiful country and ruined towns and villages to Seminara and Palmi. The houses of the former were not quite in such a ruined condition as those of the latter, whose situation is lower, and nearer the sea. One thousand four hundred lives were lost at Palmi, and all the dead bodies have not been removed and burnt, as in most other parts I visited; for I myself saw two taken up whilst I was there; and I shall ever remember a melancholy figure of a woman in mourning, sitting upon the ruins of her house, her head reclined upon her hand and knee, and following with an anxious eager eye every stroke of the pickaxe of the labourers [laborers] employed to clear away the rubbish, in hopes of recovering the corpse of a favourite [favorite] child. This town was a great market for oil, of which there were upwards of 4000 barrels in the town at the time of its destruction; so that the barrels and jars being broken, a river of oil ran into the sea from it for many hours. The spilt oil mixed with the corn of the granaries; and the corrupted bodies have had a sensible effect on the air. This, I fear, as the heats [hot weather] increase, may prove fatal to the unfortunate remainder of the inhabitants of Palmi, who live in barracks near the ruined town. My guide told me, that he had been buried in the ruins of his house here by the first shock; and that, after the second, which followed immediately, he found himself sitting astride a beam at least sixteen feet in the air. I heard of many such extraordinary escapes in all parts of the plain, where the earthquake had exerted its greatest force.”

— “From Palmi I proceeded through the beautiful woody mountains of Bagnara and Solano; noble timber oak-trees on high rocks, narrow vallies [valleys] with torrents in their bottoms, the road dangerous



both on account of robbers and precipices. My two guards instead of leading the way, as they had hitherto done, now separated, and formed an advanced and a rear guard. The narrow road was often interrupted by the fallen rocks and trees during the earthquakes, and obliged us to seek a new and still more dangerous road; but the Calabrese horses are really as sure footed as goats. In the midst of one of these passes we felt a very smart shock of an earthquake, accompanied by a loud explosion, like that of springing a mine; fortunately for us, it did not, as I expected, detach any rocks or trees from the high mountains that hung over our heads. After having passed the woods of Bagnara, Sinopoli, and Solano, I went through rich corn fields and lawns, beautifully bounded with woods and scattered trees, like our finest parks, and which continue varying for some miles, till you come upon the top of an open plain on a hill, commanding the whole Faro of Messina, the coast of Sicily as far as Catania, with Mount Ætna rising proudly behind it, which altogether composed the finest view imaginable. From thence I descended a horrid rocky road to the Torre del Pezzolo, where there is a country seat and a village belonging to the Princess of Bagnara. There I found that an epidemical disorder had already manifested itself, as it probably will in many other parts of this glorious but unhappy country, in proportion as the heats [hot weather] increase, owing to the hardships suffered, and the air having been spoiled by new formed lakes. Several fishermen assured me, that, during the earthquake of the 5<sup>th</sup> of February at night, the sand near the sea was hot, and that they saw fire issue from the earth in many parts. This circumstance has been often repeated to me in the plain; and my idea is, that the exhalations which issued during the violent commotions of the earth, were full of electrical fire, just as the smoke of volcanoes is constantly observed to be during violent eruptions: for I saw no mark in any part of my journey of any volcanic matter having issued from the fissures of the earth; and I am convinced that the whole damage has been done by exhalations and vapours [vapors] only. The first shock felt at this place, as I was assured, was lateral, and then vorticose, and exceedingly violent; but what they call violent here must have been nothing in comparison of what was felt in the plain of Casal Nuovo [Casalnuovo], Polistene Palmi, Terra Nuova [now Gela], Oppido, etc. etc. where all agreed in assuring me, that the violence of the fatal shock of the 5<sup>th</sup> of February was instantaneous, without warning, and from the bottom upwards; and, indeed, in those places where the mortality has been so great, and where nothing is to be seen but a confused heap of ruins, without distinction of either streets or houses, the violence of that shock is sufficiently confirmed. From this place to Reggio the road on each side is covered with villas and orange-groves. I saw not one house levelled to the ground; but perceived that all had been damaged, and were abandoned; and that the inhabitants were universally retired to barracks in these beautiful groves of orange, mulberry, and fig-trees, of which there are many in the environs of Reggio. One that I visited, and which is reckoned the richer in all this part of Magna Graecia, is about 2 mile and a half from the town of Reggio; and, what is remarkable, belongs to a gentleman whose christian name is Agamemnon. The beauty of the argrume [agrume - citrus] (the general name of all kind of orange, lemon, codsate, and bergamot trees) is not to be described; the soil being sandy, the exposition warm, and great command of water, a clear rivulet being introduced at pleasure in little channels to the foot of each tree, are the reasons of the wonderful luxuriance of those trees. Don Agamemnon assured me it was a bad year when he did not gather from his garden (which is of no great extent) 170,000 lemons, 200,000 oranges, (which I found as excellent at those of Malta) and bergamots enough to produce 200 quarts of the essence from their rinds. There is another singularity in these gardens, as I was assured, every fig-tree affords two crops of fruit annually; the first in June, the second in August.”

— “But to return to my subject, from which my attention was frequently called away by the extraordinary and uncommon beauty and fertility of this rich province; I arrived about sunset at Reggio, which I found less damaged than I expected, though not a house in it is habitable or inhabited, and all the people live in barracks or tents: but, after having been several days in the plain, where every building is leveled to the ground, a house with a roof, and a church with a steeple, was to me a new and refreshing object. The inhabitants of the whole country that has been so severely afflicted with earthquakes, seem, however, to have so great a dread of going into a house, that when the earthquakes shall have ceased, I am persuaded the greater part of them will still continue to live in barracks. The barracks here (except some few that are even elegant) are ill constructed, as are in general throughout the country all barracks of

towns that have been so little damaged as to allow the inhabitants to flatter themselves with a hope of being able to return to, and occupy, their houses again, when the present calamity is at an end. Reggio has been roughly handled by the earthquakes, but is by no mean destroyed. The archbishop, a sensible, active, and humane prelate, has distinguished himself from the beginning of the earthquakes to this day, having immediately disposed of all the superfluous ornaments of the churches, and of his own horses and furniture, for the sole relief of his distressed flock, with whom he cheerfully bears an equal share of every inconvenience and distress which such a calamity has naturally occasioned. Except in this instance, and very few others, indeed, I observed throughout my whole journey a prevailing indolence, inactivity, and want of spirit, which is unfortunate, as such a heavy and general calamity can only be repaired by a disposition directly contrary to that which prevails: but as this government is indefatigable in its endeavours [endeavors] at remedying every present evil, and preventing such as may naturally be expected, it is to be hoped that the generous and wise dispositions lately made, will restore the energy that is wanting; and without which one of the richest provinces in Europe is in danger of utter ruin. Silk and essence of bergamot [bergamot oil], oranges and lemons, are the great articles of trade at Reggio. I am assured, that no less than 100,000 quarts of this essence are annually exported. The fruit, after the rind is taken off, is given to the cows and oxen; and the inhabitants of this town assure me that the beef, at that season, has a strong and disagreeable flavour [flavor] of bergamot. The worthy archbishop gave me an account of the earthquakes here in 1770 and 1780, which obliged the inhabitants (in number 16,400) to encamp or remain in barracks several months, without, however, having done any considerable damage to the town. I was assured here, (where they have had such a long experience of earthquakes) that all animals and birds are in a greater or less degree much more sensible of an approaching shock of an earthquake than any human being; but that geese, above all, seem to be the soonest and most alarmed at the approach of a shock; if in the water, they quit it immediately, and there are no means of driving them into the water for some time after.”

— “The mortality here, by the late earthquake of the 5<sup>th</sup> of February, corresponds with the apparent degree of damage done to the town, and does not exceed 126 [people]. As it happened about noon, and came on gently, the people of Reggio had time to escape: whereas, as I have often remarked, the shock in the unhappy plain was as instantaneous as it was violent and destructive. Every building was levelled to the ground, and the mortality was general, and in proportion to the apparent destruction of the buildings. Reggio was destroyed by an earthquake before the Marsian war, and having been rebuilt by Julius Cæsar, was called Reggio Julio. Part of the wall still remains, and is called the Julian Tower; it is built of huge masses of stone without cement. Near St. Peruto, between Reggio and Cape Spartivento, there are the remains of a foundry [foundry]; his present Catholic Majesty, when King of Naples, having worked silver mines in that neighbourhood [neighborhood], which were soon abandoned, the profit not having answered the expence [expense]. There are some towns in the neighbourhood [neighborhood] of Reggio that still retain the Greek language. About fifteen years ago, when I made the tour of Sicily, I landed at Spartivento in Calabria Ultra, and went to Bova, where I found that Greek was the only language in use in that district. On the 14<sup>th</sup> of May I left Reggio, and was obliged (the wind being contrary) to have my boats towed by oxen to the Punta del Pezzolo, opposite Messina, from whence the current wafted us with great expedition indeed into the port of Messina. The port and the town; in its half ruined state, by moonlight, was strikingly picturesque. Certain it is, that the force of the earthquake (though very violent) was nothing at Messina and Reggio to what it was in the plain. I visited the town of Messina the next morning, and found that all the beautiful front of what is called the Palazzata, which extended in very lofty uniform buildings, in the shape of a crescent, had been in some parts totally ruined, in others less; and that there were cracks in the earth of the quay, a part of which had sunk above a foot below the level of the sea. These cracks were probably occasioned by the horizontal motion of the earth, in the same manner as the pieces of the plain were detached into the ravines at Oppido and Terra Nuova [now Gela]; for the sea at the edge of the quay is so very deep, that the largest ships can lie along side; consequently the earth, in its violent commotion, wanting support on the side next the sea, began to crack and separate; and as where there is one crack there are generally others less considerable in parallel lines to the first, I suppose the great damage done to the houses nearest the quay has been owing to such cracks under their



foundations. Many houses are still standing, and some little damaged, even in the lower part of Messina; but in the upper and more elevated situations, the earthquakes seem to have had scarcely any effect, as I particularly remarked. A strong instance of the force of the earthquake having been many degrees less here than in the plain of Calabria, is, that the convent of Sante Barbara, and that called the Noviziato de Gesuiti, both on an elevated situation, have not a crack in them, and that the clock of the latter has not been deranged in the least, by the earthquakes that have afflicted this country for four months past, and which still continue in some degree. Besides, the mortality at Messina does not exceed 700 out of upwards of 30,000, the supposed population of this city at the time of the first earthquake, which circumstance is conclusive. I found that some houses, nay a street or two, at Messina were inhabited, and some shops open in them; but the generality of the inhabitants are in tents and barracks, which, having been placed in three or four different quarters, in fields and open spots near the town, but at a great distance one from the other, must be very inconvenient for a mercantile town; and unless great care is taken to keep the streets of the barracks, and the barracks themselves, clean, I fear that the unfortunate Messina will be doomed to suffer a fresh calamity from epidemical disorders during the heat of summer. Indeed, many parts of the plain of Calabria seem to be in the same alarming situation, particularly owing to the lakes which are forming from the course of rivers having been stopped, some of which, as I saw myself, were already green, and tended to putrefaction. I could not help remarking here, that the nuns, who likewise live in barracks, were constantly walking about, under the tuition of their confessor, and seemed gay, and to enjoy the liberty the earthquake had afforded them, and I made the same observation with respect to school-boys at Reggio; so that in my journal, which I wrote in haste, and from whence I have as hastily transcribed the imperfect account I send you, the remark stands thus: 'Earthquakes particularly pleasing to nuns and school-boys.' Out of the cracks of the quay, it is said, that during the earthquakes, fire had been seen to issue, (as many I spoke with attested;) but there are no visible signs of it, and I am persuaded it was no more than, as in Calabria, a vapour [vapor] charged with electrical fire, or a kind of inflammable air. A curious circumstance happened here also to prove that animals can remain long alive without food: two mules belonging to the Duke of Belviso remained under a heap of ruins, one of them twenty-two, and the other twenty-three days: they would not eat for some days, but drank water plentifully, and are now quite recovered. There are numberless instances of dogs remaining many days in the same situation; and a hen belonging to the British vice-consul at Messina, that had been closely shut up under the ruins of his house, was taken out the twenty-second day, and is now recovered; she did not eat for some days, but drank freely; she was emaciated, and shewed [showed] little signs of life at first. From these instances, from those related before of the girls at Oppido, and the hogs at Soriano, and from several others of the same kind that have been related to me, but which, being less remarkable, I omit, one may conclude that long fasting is always attended with great thirst, and total loss of appetite. From every enquiry I found that the great shock of the 5<sup>th</sup> of February was from the bottom upwards, and not like the subsequent ones which in general have been horizontal and vorticose. A circumstance worth remarking (and which was the same on the whole coast of that part of Calabria that had been most affected by the earthquake) is, that a small fish called cicirelli, resembling what we call in England white-bait, but of a greater size and which usually lie at the bottom of the sea, buried in the sand, have been ever since the commencement of the earthquakes, and continue still to be, and in such abundance as to be the common food of the poorest sort of people; whereas, before the earthquakes, this fish was rare, and reckoned amongst the greatest delicacies. All fish in general have been taken in greater abundance, and with much greater facility, in those parts, since they have been afflicted by earthquakes than before. I constantly asked every fisherman I met with on the coast of Sicily and Calabria, if this circumstance was true, and was constantly answered in the affirmative; but with such emphasis, that it must have been very extraordinary. I suppose, that either the sand at the bottom of the sea may have been heated by the volcanic fire under it, or that the continual tremor of the earth has driven the fish out of their strong holds, just as an angler, when he wants a bait, obliges the worms to come out of the turf on a riverside by trampling on it with his feet, which motion never fails in its effect, as I have experienced very often myself. I found the citadel here had not received any material damage, but was in the same state, as I had left it fifteen years ago. The lazaret has some cracks in it like those on the quay, and from a like

cause. The port has not received any damage from the earthquakes. The officer who commanded in the citadel, and who was there during the earthquake, assured me, that on the fatal 5<sup>th</sup> of February, and the three following days, the sea, about a quarter of a mile from that fortress, rose and boiled in a most extraordinary manner, and with a most horrid and alarming noise, the water in the other parts of the Faro being perfectly calm. This seems to point out exhalations of eruptions from cracks at the bottom of the sea, which may very probably have happened during the violence of the earthquakes; all of which, I am convinced, have been a volcanic origin.”

— “On the 17<sup>th</sup> of May I left Messina, where I had been kindly and hospitably treated, and proceeded in my speronara along the Sicilian coast to the point of the entrance of the Faro, where I went ashore, and found a priest who had been there the night between the 5<sup>th</sup> and 6<sup>th</sup> of February, when the great wave passed over that point, carried off boats and above twenty-four unhappy people, tearing up trees, and leaving some hundred weight of fish it had brought with it on the dry land. He told me he had been himself covered with the wave, and with difficulty saved his life. He at first said the water was hot; but, as I was curious to come at the truth of this fact, which would have concluded much, I asked him if he was sure of it: and, being pressed, it came to be no more than the water having been as warm as it usually is in summer. He said the wave rose to a great height, and came on with noise, and such rapidity, that it was impossible to escape. The tower on the point was half destroyed, and a poor priest that was in it lost his life. From, hence I crossed over to Scilla. Having met with my friend the Padre Minasi, a Dominican friar, a worthy man, and an able naturalist, who is a native of Scilla, and is actually employed by the Academy of Naples to give a description of the phænomena that have attended the earthquake in these parts, with his assistance on the spot I perfectly understood the nature of the formidable wave that was said to have been boiling-hot, and had certainly proved fatal to the baron of the country, the Prince of Scilla, who was swept off the shore into the sea by this wave, with 2473 of his unfortunate subjects. The following is the fact: the Prince of Scilla having remarked, that during the first horrid shock, (which happened about noon the 5<sup>th</sup> of February) part of a rock near Scilla had been detached into the sea, and fearing that the rock of Scilla, on which his castle and town is situated, might also be detached, thought it safer to prepare boats, and retire to a little port or beach surrounded by rocks at the foot of the rock. The second shock of the earthquake, after midnight, detached a whole mountain, (much higher than that of Scilla, and partly calcareous, and partly cretaceous) situated between the Torre del Cavallo, and the rock of Scilla. This having fallen with violence into the sea, (at that time perfectly calm) raised the fatal wave, which I have above described to have broken upon the neck of land, called the Punta del Faro, and in the island of Scilla, with such fury, which returning with great noise and celerity [swiftness] directly upon the beach, where the prince and the unfortunate inhabitants of Scilla had taken refuge, either dashed them with their boats and richest effects against the rocks, or whirled them into the sea; those who had escaped the first and greatest wave were carried off by a second and third, which were less considerable, and immediately followed the first. I spoke to several men, women, and children, here, who had been cruelly maimed, and some of whom had been carried into the sea by this unforeseen accident. ‘Here,’ said one, ‘my head was forced through the door of the cellar,’ which he shewed [showed] me was broken. ‘There,’ said another, ‘was I drove into a barrel.’ Then a woman would shew [show] me her child, all over deep wounds from the stones and timber, etc. that were mixed with the water, and dashing about in this narrow port; but all assured me they had not perceived the least symptom of heat in the water, though I dare say, Sir, you will read many well-attested accounts of this water having been hot; of many dead bodies thrown up, which appeared to have been parboiled by it; and of many living persons who had evidently been scalded by this hot wave; so difficult it is to arrive at truth. Had I been satisfied with the first answer of the priest at the Punta del Faro, and set it down in my Journal, who could have doubted but that this wave had been of hot water? Now that we are well acquainted with the cause of this fatal wave, we know it could not have been hot; but the testimony of so many unfortunate sufferers from it is decisive. A fact which I was told, and which was attested by many here, is very extraordinary indeed: a woman of Scilla, four months gone with child, was swept into the sea by the wave, and was taken up alive, floating on her back at some distance, nine hours after. She did not even miscarry, and is now perfectly well; and, had she not been gone up into the country, they would have shewn her to me. They told me she had been used

to swim, as do most of the women in this part of Calabria. Her anxiety and sufferings, however, had arrived at so great a pitch, that, just at the time that the boat which took her up appeared, she was trying to force her head under water, to put a period [end] to her miserable existence. The Padre Minasi told me another curious circumstance that happened in this neighbourhood [neighborhood], which to his knowledge was strictly true: a girl about 18 years of age was buried under the ruins of a house six days, having had her foot, at the ancle [ankle], almost cut off by the edge of a barrel that fell upon it; the dust and mortar stopped the blood; she never had the assistance of a surgeon; but the foot of itself dropped off, and the wound is perfectly healed without any other assistance but that of nature. If of such extraordinary circumstances, and of hair-breadth escapes, an account was to be taken in all the destroyed towns of Calabria Ultra and Sicily, they would, as I said before, compose a large volume. I have only recorded a few of the most extraordinary, and such as I had from the most undoubted authority. In my way back to Naples, (where I arrived the 23<sup>rd</sup> of May) along the coast of the two Calabrias and the Principato Citra, I only went on shore at Tropea, Paula, and in the Bay of Palinurus. I found Tropea (beautifully situated on a rock overhanging [overhanging] the sea) but little damaged; however, all the inhabitants were in barracks. At Paula the same. The fishermen here told me they continued to take a great abundance of fish, as they had done ever since the commencement of the present calamity. At Tropea, the 15<sup>th</sup> of May, there was a severe shock of an earthquake, but of a very short duration. There were five shocks during my stay in Calabria and Sicily; three of them rather alarming; and at Messina, in the night-time, I constantly felt a little tremor of the earth, which has been observed by many of the Messinese. I am really ashamed, Sir, of sending such an unconnected, hasty extract of my journal; but when I reflect, that unless I send it off directly, the Royal Society will be broken up for the summer season, and the subject will become stale before its next meeting: of two evils I prefer to chose the least. Such rough drafts, however, (though ever so imperfect and incorrect) have, as in paintings, the merit of a first sketch, and a kind of spirit that is often lost when the picture is correctly finished. If you consider the fatigue and hurry of the journey I have just been taking; and that, in the midst of the preparations for my other journey to England, which I propose to begin to-morrow, I have been writing this account, I shall hope then to be entitled to your indulgence for all it's imperfections. But, before I take my leave, I will just sum up the result of my observations in Calabria and Sicily, and give you my reasons for believing that the present earthquakes are occasioned by the operation of a volcano, the seat of which seems to lie deep, either under the bottom of the sea, between the island of Stromboli and the coast of Calabria, or under the parts of the plain towards Oppido and Terra Nuova [now Gela]. If on a map of *Italy*, and with your compass on the scale of Italian miles, you were to measure off 22, and then fixing your central point in the city of Oppido, (which appeared to me to be the spot on which the earthquake had exerted it's greatest force) form a circle, (the radii of which will be, as I just said, 22 miles) you will then include all the towns and villages that have been utterly ruined, and the spots where the greatest mortality has happened, and where there have been the most visible alterations on the face of the earth. Then extend your compass on the same scale to 72 miles, preserving the same centre [center], and form another circle, you will include the whole of the country that has any mark of having been affected by the earthquake. I plainly observed a gradation in the damage done to the buildings, as also in the degree of mortality, in proportion as the countries were more or less distant from this supposed centre [center] of the evil. One circumstance I particularly remarked; if two towns were situated at an equal distance from the centre [center], the one on a hill, the other on a plain, or in a bottom, the latter had always suffered greatly more by the shocks of the earthquake than the former; a sufficient proof to me of the cause coming from beneath, as this must naturally have been productive of such an effect. And I have reason to believe, that the bottom of the sea, being still nearer the volcanic cause, would be found (could it be seen) to have suffered even more than the plain itself; but, as you will find in most of the accounts of the earthquake that are in the press, and which are numerous, the philosophers, who do not easily abandon their ancient systems, make the present earthquakes to proceed from the high mountains of the Appennines [Apennine Mountains] that divide Calabria Ultra, such as Monte Dejo, Monte Caulone, and Aspromonte. I would ask them this simple question, did the Æolian or Lipari islands (all which rose undoubtedly from the bottom of the sea by volcanic explosions at different and perhaps very distant periods) owe their birth to the Appennines

[Apennine Mountains] in Calabria, or to veins of minerals in the bowels of the earth, and under the bottom of the sea? Stromboli, an active volcano, and probably the youngest of those islands, it not above 50 miles from the parts of Calabria that have been most affected by the late earthquake. The verticle [vertical] shocks, or, in other words, those whole impulse was from the bottom upwards, have been the most destructive to the unhappy towns in the plain; did they proceed from Monte Dejo, Monte Caulone, or Aspromonte? In short, the idea I have of the present local earthquakes, is, that they have been caused by the same kind of matter that gave birth to the Æolian or Lipari islands; that, perhaps, an opening may have been made at the bottom of the sea, and most probably between Stromboli and Calabria Ultra, (for from that quartar [quarter] all agree that the subterraneous noises seem to have proceeded) and that the foundation of a new island or volcano may have been laid, though it may be ages, which to nature are but moments, before it is completed [completed], and appears above the surface of the sea. Nature is ever active; but her action are, in general, carried on so very slowly, as scarcely to be perceived by mortal eye, or recorded in the very short space of what we call history, let it be ever so ancient. Perhaps, too, the whole destruction I have been describing, may have proceeded simply from the exhalations of confined vapours [vapors], generated by the fermentation of such minerals as produce volcanoes, which have escaped where they met with the least resistance, and must naturally in a greater degree have affected the plain than the high and more solid grounds around it. When the account of the Royal Academy of Naples is published, with maps, plans, and drawings, of the curious spot I have described, this rude and imperfect account will, I flatter myself, be of use; without the plans and drawings, you well know, Sir, the great difficulty there is in making one's self intelligible on such a subject."

The following was one of the earliest accounts published in England of the Calabria earthquake in *Italy*.<sup>253</sup>

— "Messina, one of the principal cities in the kingdom of Sicily Ulteriorie, situated on the border of the sea, upon the meridian of the island, forty years since was struck with a most horrible affliction of the plague, which broke out about the end of Feb. 1743, by which that city was almost desolated of inhabitants, having lost about 50,000 souls; and now, forty years after, has suffered a second more horrible punishment, of which the following is a relation:"

— "On the 5<sup>th</sup> of Feb. last there was observed, almost throughout the whole island, an horizon full of black intense fog, which indicated some unhappy event, or a presage of some sorrowful woe, and in reality, about the 19<sup>th</sup> hour (which corresponds with our noon) a shock of an earthquake was felt, which threw down several houses, and in particular that part of the cross street called the Plains of the Hospital; several persons were killed, and many much hurt and maimed by the ruins; which increased the fears of the inhabitants that some still greater misfortune might happen; and, in reality, their fears were not without reason, for on the following night, about a quarter after seven (answering to our quarter past one in the morning) a most furious shock finished, in swallowing up or throwing down the remainder of the city, and besides the shock, a whirlpool of fire issued from the earth, which finished to consume and level to the ground those noble and great edifices which were not before destroyed."

— "The morning of the 6<sup>th</sup>, the master of a barque, which brought this news to Naples, relates, that on the next day, nothing more was to be seen of Messina; the place being covered with an intense thick vapour, mixed with a thick dust, prevented the sight of that fatal catastrophe of misery and horror."

— "The day advancing, and the wind dispersing the thick vapour, Citadella (the fortification so called) was observed to be half thrown into the sea by the earthquake, and the other half destroyed by a whirlpool of fire, which was supposed to be a volcano. A King's frigate, which lay at anchor in the road, astonished at the sight of the fire, began to fire shot upon the castle, supposing it to have been maliciously set on fire; but when they perceived the fire issuing from the earth, ceased firing, not willing to add greater distress to those who had saved themselves from the dreadful chastisement."

— "The same master of the barque also relates, he saw only one priest, who was running bare-footed to the sea side, seeking a boat to take him off."

— "From further accounts and letters received, the above is confirmed; and that at the time which the earthquake happened in Messina, the same disaster happened to other cities in that island, viz. Cataneo

[Catania], Sicily, Lipari, and places adjacent in Messina; no edifice remained, except the Capuchin Convent, situated a little distance from that city.”

— "Multitudes of people must have been buried under the ruins. At the same time also the earthquake was felt in the interior and ulterior Calabria. Besides the many buildings thrown down, the cities of Reggio, in Calabria and Bagnera, suffered greatly. And respecting the number of dead, we have certain advice that the whole family of the Prince of Geraci was buried in the ruins: and calculating Messina to have contained 30,000 souls, the greater part are lost. This melancholy accident has been followed with the wisest precautions by government. A stop has been put to all public spectacles; the theatres are shut up in this kingdom, as well as in Sicily; and public prayers are offered up to appease the Supreme Disposer of the Universe, who has in his power those just chastisements which mankind merit for their sins."

— To these particulars, translated from the account published by authority at Naples, the London Gazette adds, that "it appears from the most authentic relations, the calamity has been general, and most distressful on the whole coast of Calabria Ultra, extending upwards of 150 miles. From Tropea to Squillace most of the towns and villages appear to have been either totally or in part overthrown, and many of the inhabitants buried in the ruins; but as the first shock happened in the day-time, about noon, the mortality will, it is hoped, prove much less than is generally represented. The sea rose very considerably on the Sicilian coast, and retired from that of Calabria; and it is remarkable that the houses in Sicily fell in a direction from the sea, and those in Calabria towards it.

— "At Scilla, however, no less than 2000 people, who, with the Prince of Scilla, were on the shore, having just escaped from their ruined houses, were swept off at once, and drowned by the sudden rise of the sea; but from the fright and confusion this heavy calamity occasioned on the spots where it fell, no distinct accounts have as yet been received; and the persons who have been sent from Naples with such succour as that government thought necessary, have not yet had time to make their reports. The first notice of the misfortune did not reach Naples till the 14<sup>th</sup> inst. [14 February] owing to the distance and badness of the roads; and as it must be some days before the succours could reach Calabria, it is greatly to be apprehended that many more lives will be lost from these unfortunate circumstances. It appears from several accounts, that the earth opened in many parts; that a mountain has been split in two; and that the course of a great river was stopped for some time."

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**1783 A.D.** [Around January 1783], the Oeder [Oder] River in Prussia broke through many dykes [dikes] and overflowed a vast tract of the country.<sup>253</sup> [The Oder River originates in the *Czech Republic* and flows through *Poland* and *Germany*.]

[Around 15 January 1783], the fine city of Comorra [Komárom], at the border between *Hungary* and *Slovakia* was almost destroyed by an earthquake.<sup>253</sup>

Several storms struck Great Britain from the end of January to the middle of March 1783. Ramsgate in Kent, *England* reported that on 26 January, a hard gale caused many vessels in the Downs to part anchors. A brig struck a rock off the Colborn, between the North pier-head and Broad-stairs and overset. Plymouth, *England* reported that on 29 January, a Danish East Indiaman, lying at Cat-water, went onshore at Dead Man's Bay, but was got off the next day with little damage. Greenock, near Glasgow, *Scotland* reported that on 31 January, several vessels went onshore in the Frith [Firth], owing to a heavy fall of snow, but most got off without damage. Also on 31 January, the ship *Friendship* from Jamaica after sailing through the Gulph [gulf] encountered a most tremendous gale, which continued without intermission until the 8<sup>th</sup> of February, during which many of the fleet were seen in great distress. The *Friendship* had her upper counter stove in, her lockers blown up, and was very near being lost. A frigate, the *Ardent* that also sailed in a fleet of 50 sails from Jamaica after getting through the Gulph, had 5 feet [1.5 meters] of water in her hold with 3 pumps going and it is not known what became of her. Milford Haven in Pembrokeshire, *Wales* reported that on 5 February, a large ship, thought to be a French privateer, foundered off the harbor in a violent gale and all the crew perished. Only 4 men were onboard and were in the greatest distress as the ship was sinking. It was reported that the *Graston* man-of-war was dismasted [in a storm] a hundred leagues [300 miles, 483 kilometers] southwest of Cape Finisterre on the west coast of Galicia, *Spain* sometime prior to 13 February. The *Isle of Scilly* reported that on 7 February 1783, the hull of a large ship, Dutch built, was seen on shore. The *Isle of Scilly* reported on 23 February, that the most boisterous weather had prevailed there for some days past, and then continued. That several ships had passed by that island dismasted, and that very morning a large Swedish ship the *Fredericus*, was discovered on shore. But no boats could put to sea to her relief; at length the crew hoisted out their long boat, and as many as she could stove got safe on shore. Those left behind soon perished, as the ship sunk soon afterwards. Aberdeen, *Scotland* reported that on 5 March 1783, there was a violent gale of wind, which increased to a hurricane. Three vessels came into the bay from the southward, one of which, the Ostend packet was laid on her beams ends. The other two ships *Euphane* and *Lady Grant*, ran on shore. Another ship, the *Fortune* foundered and came on shore keel uppermost. All the crew drowned. Several other vessels were cast away on the eastern coast and a great part of the pier at Peterhead demolished. Hull [Kingston upon Hull, *England*] reported that on 9 March, a large Hamburg ship was lost off the River Humber and all the crew perished. Weymouth, *England* reported that the Dutch ship, the *Young Kendrick* went ashore in a gale of wind and was totally lost. Liverpool, *England* reported that on 13 March 1783 the loss of the *Count Belgioso* East Indiaman. It was feared that all 127 persons on board perished.<sup>253</sup>

On 5 February 1783, a horrible earthquake struck Calabria and Sicily, *Italy*. This was followed by repeated hurricanes and thunderstorms.<sup>79</sup> [Calabria is located at the "toe" of the Italian peninsula.]

On 5 February 1783, a terrible earthquake destroyed Messina, and a great part of Calabria in the Kingdom of Naples [*Italy*].<sup>241, 242</sup>

On 8 March 1783, a Belgioso [Belgioioso?] Indiaman [A large merchant ship formerly used on trade routes to India] was cast away on the coast of *Ireland*, and 147 men perished in her.<sup>242</sup>

On 8 March 1783, a violent storm struck the coast of *Scotland*, much shipping lost.<sup>242</sup>



“On March 17 [1783], between the hours of three and four in the afternoon, it blew the severest squall from the N.W. ever remembered in Calcutta [*India*]. It came on so suddenly, that the people on board the ships in the river had not time to take measures for the safety of their vessels, and almost every one of them parted from their anchors. The following vessels were irrecoverably lost: The *Eagle* snow, a Bombay cruiser [cruiser], sunk abreast of the New Fort; one of her anchors gave way, and, in swinging round, she tript [tripped] upon the other, and was overset. The first lieutenant and forty-five men, many of them Europeans, were unfortunately drowned. The *Reformation*, a snow (late a privateer), was overset. She had been sold to the Portuguese the day before. The Company’s ketch, *Fly*, Capt. Tho. Forrest, drove from her anchors, and was lost abreast of the Old Fort. Many budgerows, butts, and a great number of country boats, several of them full of people, were lost. When the wind had blown about half an hour from the N.W. it suddenly shifted to the Eastward, and blew from that quarter with great violence. The damage done by this storm on land is also very considerable. The cavalry encampment at Cowgetchy was almost entirely levelled to the ground, and the cantonments at Barrackpore sustained some damage. Many large trees, in the neighbourhood of Calcutta, were torn up, and an incredible number of small straw-houses destroyed.”<sup>254</sup>

On 18 March 1783 at half past two in the morning at Bencoolen [now Bengkulu City, *Sumatra*], it being extremely stormy the evening before, the magazine and laboratory were set afire from lightning. They contained 500 barrels of [gun] powder, and every implement of artillery was totally destroyed.<sup>253</sup>

On 28 March 1783, another earthquake in Sicily destroyed the remains of Messina, *Italy* and 290 inhabitants.<sup>241, 242</sup>

On 5 April 1783 at Edinburgh, *Scotland*, for the past several days the weather was very warm, and the thermometer higher than they ever remembered at that season.<sup>253</sup>

On 6 April 1783, it was reported that the crops on the island of Barbadoes [*Barbados*] was totally destroyed by the dry season.<sup>241, 242</sup>

On 11 April 1783, the sea overflowed in Venice, *Italy* and did much damage to the city.<sup>55</sup>

On 11 April 1783, a violent hurricane struck Venice, *Italy*. The sea overflowed the city and did immense damage.<sup>128</sup>

On 12 April 1783, a fire and storm happened at Presburg, Germany [now Bratislava, *Slovakia*], which did much damage.<sup>241, 242</sup>

On 13 May 1783, Kremnitz in Hungary [now Kremnica, *Slovakia*] nearly destroyed by fire and inundation.<sup>241, 242</sup>

In *Hungary*, a most violent storm happened there on the 13<sup>th</sup> [13 May 1783], which has done very great damage to the upper part of that Kingdom. The city of Kremnitz [now Kremnica, *Slovakia*] is entirely ruined; the lightning fell in nine different parts of it, and the whole city was in flames at once, and all but seven houses burnt down; 50 persons have lost their lives, either by the fire or by the torrents of water which came from the mountains with such violence as to carry all before it.<sup>254</sup>

On 30 May 1783, it was reported in *England* that, “the thaw of the Dwina [Dvina or Daugava River] had done [sown] a great deal of damage this year in the environs [neighborhood] of Riga [in *Latvia*]. The river quitted its bed, and rose to a height which exceeded that of 1771. This inundation was the cause of great losses in cattle, and timber for building, with the latter of which the little islands on the banks of the river were covered, particularly a large quantity of masts which were collected at Boldera. Even people

were carried away by the impetuosity of the currents. The vessels which were ready laden there also suffered greatly, and several of them made so much water that they were obligated to unload.”<sup>253</sup>

On 31 May 1783, Warsaw, *Poland* reported that a few days earlier, a large part of the forest, which extends around Landhut [Landshut, now Łańcut], in Lesser Poland, suddenly disappeared.<sup>254</sup>

In June 1783 a letter from Flint in *North Wales*, said that the weather has been as severe as it was in the middle of winter. They had a great deal of snow and the frost so hard that the ice was an inch thick, which had destroyed all their early fruits and plants, and has done a great deal of damage to their corn. Another report said that from 1 June to the middle of June, the frosts were more or less every night in many parts of *England*.<sup>253</sup>

In June 1783, “Late accounts from the North of *Ireland* say, the people there are almost starving. At Carrickfergus, rotten meal is sold at 30s [shillings] the hundred weight [a unit of weight in the British Imperial System equal to 112 pounds or 50.80 kilograms].”<sup>253</sup>

[In June 1783] a most violent hurricane arose in the province of Bourbonnais in *France*. Hail of an extraordinary size, driven by an impetuous wind, and followed by incessant rain for three hours, laid all the country waste. The country seat of Count Viri was unroofed, and all the windows broke; many trees were torn up by the roots, and the harvest of ten domains entirely ruined. Ten or twelve parishes have shared the same fate.<sup>254</sup>

[In June 1783] lightning struck several ships at various locations. At Bourdeaux [Bordeaux, *France*] lightning struck a fine new ship just fitted up for the East-India trade and burnt the ship down to the water’s edge. At Cadiz, *Spain*, thunder and lightning did much damage to the shipping as well as the houses. At Flushing, *England* on June 20 in a heavy storm, a brig making into the harbor was upset and lost, by lightning striking her main mast.<sup>254</sup>

Naples, *Italy* reports, “Since the shocks of the earthquake ceased in the two Calabrias, the sea from that time has been in violent agitation, and on the 20<sup>th</sup> of June [1783] the atmosphere being loaded with thick fog, it was observed that the sea retired six palms [~62 inches] more than usual.”<sup>254</sup>

On 20 June 1783, a sudden heavy rain did much damage in London and Westminster, *England*.<sup>242</sup>

On 22 June 1783, the county of Glatz in Germany [now Klodzko, *Poland*] was visited with a dreadful storm.<sup>241, 242</sup>

On 22 June 1783, a very violent thunderstorm struck in the county of Glatz in lower *Silesia*, which was followed by so great a fall of rain that the whole country has been overflowed, and much damage occasioned. The town of Neisse in *Silesia* [now Nysa, *Poland*] has likewise suffered much from the same inundation, and great injury is done to the fortifications and [military] magazines there.<sup>254</sup>

On 23 June 1783, there was a remarkable frost at Barton [Barton-upon-Irwell in Greater Manchester, *England*]. In a shallow tub, the ice was the thickness of a crown piece. A frost on 26 May preceded this frost and the combination of these two frosts ruined the walnut crop.<sup>232</sup>

On 24 June 1783, the island of *Iceland* received great damage from eruption from Mount Ecla.<sup>241, 242</sup>

In 1783, a foggy mist covered nearly all of *Europe* for about a month.<sup>205</sup>

The summer in *Northern Europe* and in the interior of *France* was remarkable. The summer in Paris was characterized by:

Hot days	30 days
Very hot days	5 days
Extremely hot days	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The month of June was very hot. The high temperatures observed during the summer were: <sup>62</sup>

Seurre, <i>France</i>	(102.2° F, 39.0° C)
Chinon, <i>France</i>	(100.6° F, 38.1° C)
Constantinople (Istanbul), <i>Turkey</i>	(100.6° F, 38.1° C)
Cambrai, <i>France</i>	( 99.5° F, 37.5° C)
Liège, <i>Belgium</i>	( 98.6° F, 37.0° C)
Caussade, <i>France</i>	( 98.4° F, 36.9° C) on 11 July
Bordeaux, <i>France</i>	( 97.7° F, 36.5° C)
Paris, <i>France</i>	( 97.3° F, 36.3° C) on 11 July
Orléans, <i>France</i>	( 97.3° F, 36.3° C)
Oloron, <i>France</i>	( 97.3° F, 36.3° C)
Vienna, <i>Austria</i>	( 96.6° F, 35.9° C)
Arles, <i>France</i>	( 95.7° F, 35.4° C)
Arras, <i>France</i>	( 95.2° F, 35.1° C)
Lille, <i>France</i>	( 95.0° F, 35.0° C)
Mayenne, <i>France</i>	( 95.0° F, 35.0° C) on 10 July
Saint-Malo, <i>France</i>	( 95.0° F, 35.0° C)
Montdidier, <i>France</i>	( 95.0° F, 35.0° C)
La Rochelle, <i>France</i>	( 95.0° F, 35.0° C)
Mulhouse, <i>France</i>	( 94.8° F, 34.9° C)
Stockholm, <i>Sweden</i>	( 92.8° F, 33.8° C)
Brussels, <i>Belgium</i>	( 92.8° F, 33.8° C) on 2 August
Amsterdam, <i>the Netherlands</i>	( 92.1° F, 33.4° C)
Les Sables-d'Olonne, <i>France</i>	( 91.6° F, 33.1° C) on 21 July
Saint-Brieuc, <i>France</i>	( 88.3° F, 31.3° C)
Laon, <i>France</i>	( 86.5° F, 30.3° C)
Düsseldorf, <i>Germany</i>	( 86.0° F, 30.0° C)
St. Petersburg, <i>Russia</i>	( 84.7° F, 29.3° C) on 17 June

On 1 July 1783, a new island made its appearance near *Iceland*.<sup>241, 242</sup>

A letter dated 4 July 1783 described the extraordinary state of the atmosphere at Paris, *France*. “For a considerable time past the weather has been very remarkable here; a kind of hot fog obscures the atmosphere and gives the sun much of that dull red appearance which the wintry fogs sometimes produce. The fog is not peculiar to Paris; those who came lately from Rome say that it is as thick and hot in *Italy*, and that even the top of the Alps is covered with it, and travelers and letters from *Spain* affirm the same of that kingdom.”<sup>248</sup>

On 6 July 1783 in Cracow [Kraków], *Poland*, there was a storm of thunder and lightning that was the most awful ever known in that country. Some people counted 200 claps of thunder with almost incessant flashes of lightning, by which 12 houses were set on fire, and several churches, with the Starost’s [mayor’s] palace, much damaged. The next day some people were found dead in the streets.<sup>254</sup>

The thunder has been more alarming and the lightning more fatal, during the course of the present month [July 1783], than has been known for many years in *England*.<sup>254</sup>

— On 2 July at Fen-Stanton in Cambridgeshire, a fireball struck a barn setting it on fire.

— A violent flood of rain overflowed the town of Stilton [in Cambridgeshire].

- A woman in Huntingdonshire and another young woman at Hilton and a lad at Needingworth were struck dead by lightning.
- At Whitney in Oxfordshire, a man and a woman were struck dead from lightning in a field at a distance from each other.
- At Cockfield in Suffolk, a house was set on fire and entirely consumed, and most of the family were severely hurt. Several cows and horses that were in the fields were struck dead by lightning.
- At Sherrington in Wiltshire, near Warminster, 18 sheep were struck dead from lightning.
- At Walsford [Wansford] in Huntingdonshire, a ball of fire fell on a schoolhouse killing 3 children.
- At Wetherington [Witherington in Wiltshire], a cow standing under an oak was killed.
- At Ledbury [in Herefordshire], a team of 5 horses were struck by lightning; 4 fatally. In the same neighborhood 2 oxen and 10 sheep that had taken shelter under oak trees were killed.
- Two horses grazing on the Downs near Lincoln heath were struck dead.
- On 10 [July] at Leicester in the east Midlands experienced an extremely black cloud with vivid lightning. Two cows were struck dead and a hayrick set on fire at Knighton. At Blaby, the hail broke the windows on the southwest throughout the entire town. At Hinckley, the storm raged dreadfully tearing off the roof of a house.
- At Iddelsleigh [Iddesleigh in Devonshire], the mills on the river Okemouth near Exeter, were nearly burnt to the ground by lightning.
- In Portsmouth harbor, lightning struck the foretopmast and a part of the foremast of a Belisarius storeship.
- Near Lynn in Norfolk, lightning struck dead several horses and over 40 sheep, grazing in the fields.
- Near Monymeal [Monimail], *Scotland*, a shepherd lost a son and a daughter in one flash.
- On 10 [July], an extremely violent storm struck Lincoln. Several days before the storm, a thick hot vapor filled the valley between the hills on which the upper town stands. The sun and the moon appeared through the fog like heated brickbats. When the storm struck the lightning assumed various shapes, sometimes in sheets and at other times like the mouth of a cannon.
- On 20 July, a storm struck near Hatfield and set the stables on fire and at Wavley [Waverley?] Common it struck a house.
- The roof of an old house in Shoreditch [in Middlesex] was beat in by the lightning, by which a poor man, his wife, and one child perished.
- On 20 July, a vessel off Languard Fort [Landguard Fort] was struck by lightning and all onboard perished except two.
- On Hounslow-Heath outside London, seven sheep were found dead by lightning.

On 14 July 1783, a violent storm struck *England* near Birmingham, Leeds, etc. which did much mischief [damage]. On the same date a storm struck *France*.<sup>242</sup>

On 18 July 1783, a ball of fire, or meteor, was seen in the greatest part of *England*, and at Ostend, [*Belgium*] at the same time.<sup>241, 242</sup>

On 22 July 1783, Dover, *England* reported that the oldest man living can scarce remember any fog of so long continuance as the present, not being able to descry [catch sight of] the opposite shore for almost three weeks.<sup>254</sup>

Lausanne, *Switzerland* reported in a letter dated 23 July 1783 that, “The harvest was very promising, but a furious hurricane, attended with hail, has, with these few days, destroyed all our hopes, especially in the district of 15 villages, among which are St. Saphorin [Saint-Saphorin], Cossonais [Cossonay], Chavrenais [Chavornay], le Creuz [le Creux], Bavoy [Bavois], Pentaras, and the town of Yverdum [Yverdon]. The storms are continual in these parts. At Geneva the lightning had killed 15 persons in a church.”<sup>254</sup>

On 24 July 1783, a violent storm struck in different parts of *England* as well as *Switzerland*.<sup>242</sup>

On 29 July 1783, in Tripoli, Syria [now Tripoli, *Lebanon*] was visited by a dreadful earthquake.<sup>241, 242</sup>

On 30 July 1783, New York in the *United States* reported, “The late excessive hot weather has occasioned much sickness in the neighbouring State of New Jersey.”<sup>254</sup>

On 30 July 1783, Tripoli in Syria [*Lebanon*] reported that, “On the 20<sup>th</sup> of this month two shocks of earthquakes were felt here, both of which together only lasted eight or ten seconds, and were preceded by a rumbling noise: On the evening before, a very violent rain had fallen, which is very extraordinary at this season. For this month past, both land and sea have been covered with a thick fog, and the winds have been as violent as during winter; the sun appears but rarely, and when it does looks very red. These phænomena were unheard of before in Syria. The same earthquake was felt at Libanus, and a whole village near Napoulousia was buried under a rock which fell upon it. These events, together with the recollection of what has happened at Messina, alarm the Turks very much.”<sup>254</sup>

On 2 August 1783, there was a violent hailstorm in Yorkshire, *England*, where the hailstones measured 5 inches in circumference.<sup>242</sup>

On 2 August 1783, a violent storm struck throughout Orleans, *France*.<sup>242</sup>

Around August 1783, *Turkey* reported, “The plague still continues to rage in Constantinople [now Istanbul, *Turkey*] and its neighbourhood. Pera [now Beyoğlu] and Galata [now Karaköy], the residence of the Franks, have suffered severely, and in the new barracks for the gunners at Topana, 20 or 30 are buried in a day. The raw foggy weather that has prevailed here serves to increase the disorder, which has now reached Smyrna [now Izmir].”<sup>254</sup>

Paris reported that the storms that struck *France* on 3 August 1783 were mostly general. “But no part of the kingdom seems to have suffered so much as the countries adjacent to Orleans. On the above day a storm arose, which taking its direction from S.W. to N.E. over-ran, in less than half an hour, a space of 20 leagues [60 miles] in length and one [3 miles] in breadth. By its dreadful and rapid effects 20 parishes have lost every hope of a crop, which was the most promising ever known. The hamlet of St. Bohaire [Saint-Bohaire] suffered most; all the trees were torn up by the roots, the chimneys beat down, and every house, mill, and barn unroofed. The timber work of the church, 56 feet [17 meters] in length, 14 [4 meters] in breadth, and 19 [6 meters] in height, which, though built in the year 1455, was as good as new, gave way during the evening service. Luckily only one life was lost, and about 40 were wounded; the rest owed their lives to the strong ceiling that supported the timber frame.”<sup>254</sup>

On 9 August 1783, Dublin, *Ireland* reported, “We have every reason to hope that the calamities, under which the lower classes of people in this kingdom have so long pined, will be speedily terminated. There is every prospect that our harvest will be early and uncommonly plentiful; and of course bread, and indeed provisions of every sort, will be once more reduced to a reasonable rate.”<sup>254</sup>

In August 1783, *England* reported, “There is no year upon record when the lightning was so fatal in this island as the present; our limits will not admit of half the damage done by it.”<sup>254</sup>

On 7 August 1783, an earthquake was felt in different parts of Cornwall, *England*.<sup>242</sup>

On 16 August 1783, Copenhagen reported that various accounts have been received here of an island having lately arisen in the sea, in the neighborhood of *Iceland*. Although the fact itself is authentic, yet the time of the first appearance of this island, its dimensions, and situation, are not well ascertained. The

information brought by the last ship from thence is, that it was still increasing, and that great quantities of fire issued from two of its eminences.<sup>248</sup>

On 18 August 1783, an extraordinary meteor, or ball of fire was seen in London, *England*.<sup>242</sup>

On 28 August 1783, there was a storm near London, *England*, which damaged the King's Bench.<sup>242</sup> [The King's Bench Prison was located in Southwark, south London. The Court of the King's Bench was a court of law in England.]

On 30 August 1783, a severe storm struck *England*. Two vessels from the coast of France were thrown ashore near Yarmouth and totally lost. A sloop that was coming into the harbor at Folkstone [Folkestone] was no more heard of. Two vessels from the coast of Scotland were driven ashore at Yarmouth. One of these vessels was entirely lost and the crew drowned.<sup>254</sup>

On 30 August 1783, a most tremendous storm of wind, thunder, and lightning struck Cardigan, *Wales*. Several houses were unroofed, some persons killed, and many cattle found dead in the field.<sup>254</sup>

On 31 August 1783, [London, *England*] reported, "A little before twelve at night came on in this metropolis a most violent storm of thunder, lightning and rain, which continued near four hours. Vast damage was sustained in the cellars and warehouses at the waterside, and in almost all the low parts of the metropolis and its adjacencies. Among the slaughter-houses between Saffron-hill and Turnmill-street above 1000 lambs, sheep, hogs, and calves were afloat; and it was with great difficulty they were saved from drowning. The flood was so excessive, that great numbers of sheep and oxen intended for sale could not be brought to market. During the thunder-storm, the house of Messrs. Mount and Page, stationers, on Tower-hill, was almost unroofed by the lightning, and by the fall of rain a great quantity of paper was damaged. Several chimneys were thrown down in different parts of the city. The water rose so amazingly by the stoppage of the shores in the neighborhood of Pimlico, that part of Buckingham-house was overflowed; it rose as high as from 12 to 16 inches before the grates were cleared to let the shores have their proper current."<sup>254</sup>

On 31 August 1783, there was a violent storm of rain in the environs [the area surrounding] of London, *England* and the adjacent counties.<sup>242</sup>

The rains that fell in *Jamaica* during the autumn of 1783 were excessive and have done irreparable damage in many parts of the country. In the vicinity of Spanish Town, the Rio Cobre rose to a greater height than in the great storm of August 1722. The new bridge was overflowed and the level grounds were underwater for several miles distance. At the Bag-Walk tavern, the waters rose as high as the eaves of the houses and people were obligated to take refuge on the sides of a hill, where they were exposed all night to the inclement weather.<sup>244</sup>

In 1783, a violent storm struck the leeward part of the island of Barbadoes [*Barbados*]. It injured several of the principal estates.<sup>241, 247, 250</sup>

Limerick, *Ireland* remarked on 1 September 1783 that "Last night and this morning we had some of the loudest claps of thunder and flashes of lightning ever known, which were attended with very heavy showers of hail and rain: several houses were struck, and some small ships have received considerable damage. There is hardly an instance of a thunder storm extending so far [so late in the season] as that of the 30<sup>th</sup> past [30 August]. It did infinite damage along the *Dutch coast*, where the shore was covered with pieces of wrecks; and in the inland country, houses were unroofed, people killed, and cattle struck dead by the lightning."<sup>254</sup>



Whitehaven, *England* reported that on 3 September 1783 that, “about nine in the forenoon, one of the most violent storms of thunder and lightning, wind, and rain, that has ever been known: and on Saturday, the 6<sup>th</sup>, a gale of wind arose, which, at high tide, increased to a hurricane, by which many houses were unslated [lost their slate roofs], and a great deal of damage done amongst the shipping.”<sup>254</sup>

On 4 September 1783, Brough in Westmoreland, *England* reports that, “about two o’clock in the afternoon, the river Swindale, which runs through Market Brough, was suddenly swoln [swollen] to an unusual height, and in a few minutes it increased to such a flood as had never been seen there before. This uncommon rise is supposed to have been occasioned by a heavy rain, which fell among the mountains above Brough, and which, soon collecting, forced a passage through some mosses into the river. On receiving the inundation, the river became quite black, had a most nauseous and offensive smell, and, rolling down a vast body of water, tore up by the roots vast numbers of large trees. All the stone walls and fences adjoining the river were carried away by the torrent, and two corn-mills rendered useless. Great apprehensions were formed for the safety of the houses which stood near it.”<sup>254</sup>

On 6 September 1783, two smart shocks of an earthquake were felt at Salonica [now Thessaloniki, *Greece*]. On the 8<sup>th</sup>, at half past eight in the morning, there was a very violent earthquake; and in the space of a 15 minutes, three others; and 11 more within 24 hours. Part of the city walls, a bagnio [prison] and some other buildings were thrown down.<sup>248</sup>

[There were other accounts of the earthquakes at Thessaloniki causing great destruction, but these accounts appear to be wildly exaggerated.] As reported on 21 December 1783, the city of Thessalonica, capital of Macedonia [now Thessaloniki, *Greece*], a great magazine for the Levant [eastern Mediterranean] trade, has been totally overthrown by an earthquake; in the lower parts many French, English and Italians, are buried in the ruins. This disaster is more destructive than that of Messina. Warehouses of all kinds of commodities, belonging to the merchants of Marseilles and London are swallowed up.<sup>241, 247</sup> [And then from:] Papers from Vienna Austria on 3 January 1784 reported “The public papers have amused themselves with an account that the ancient city of Salonica [Thessaloniki] was entirely destroyed by an earthquake. This falsehood is contradicted by several letters, from the Levant, and from Salonica, of a more recent date.”<sup>242</sup>

On 9 September 1783, Copenhagen reported that accounts are received from *Iceland*, of a violent eruption having taken place near that island, on 8 June. Several villages have been destroyed, and a considerable tract of country is buried under immense depths of lava. The new island also continues to emit great quantities of fire, and was still increasing, when the last ships came from thence. Letters from Iceland on 24 July contain the most dismal detail of the devastations occasioned by the course of the lava, and affirm that the eruptions continued even at that date.<sup>248</sup>

On 10 September 1783, a violent storm struck Liverpool, *England*.<sup>242</sup>

In Burgundy, *France*, the grape harvest began on 16 September. Heavy rainfalls in the south damaged the corn harvest. There was a grape shortage throughout Languedoc.<sup>62</sup>

Copious rains fell in the southern *France* in 1783. In Montpellier, the winter was very wet. This was followed by an extremely wet summer. This year was also obscured by vapors [fogs]. In Montpellier, the annual rainfall exceeded 3.8 inches (97 millimeters) above the average. The total number of rainy days was 24 more days than average. Provence and Languedoc swam in moisture. Finally, on January 15, a flood of the Saône River at Lyon carried the pavement of the stone bridge in the Perrache quarter.<sup>79</sup>

In the fall of 1783, a hurricane struck the east coast of the *United States*. The *John and Nelly* from New York to Charleston, South Carolina. The ship left New York on the 22 September and was believed to

have foundered in the several gales of wind that struck the coast the beginning of October, as she was not heard from since.<sup>141</sup>

In 1783, a hurricane struck Charleston, South Carolina in the *United States* (much less violent than the hurricane of 1752).<sup>124</sup>

On 19 September 1783, a hurricane struck the east coast of the *United States*. The *Mercury* from Dunkirk to Philadelphia was lost in a furious gale of wind the night of 19 September on Cape May, New Jersey. The captain, mate, and all the crew, except seven men drowned.<sup>141</sup>

In 1783, a great hurricane struck Charleston, South Carolina in the *United States*.<sup>204</sup>

In the fall of 1783, a hurricane struck Delaware in the *United States*. During a gale in the fall, nine large ships were wrecked at Cape Henlopen and many lives were lost.<sup>141</sup>

On 29 September 1783, reports received from *Africa* indicated that the fogs in summer were thicker and most suffocating all along their coasts than was observed in England, and in the Archipelago, and along the Mediterranean too, they were so thick as to render the communications [?].<sup>254</sup>

In *England* on the 25<sup>th</sup> of November, there were great storm of thunder and lightning in Hants and Wilts [Hants and Wilts is an abbreviation for Hampshire and Wiltshire]; also about this period, great storms of wind and rain of “remarkable violence.”<sup>57</sup>

As reported on 6 December 1783, the master of a Dutch ship, a native of Iceland, and named Johan Eagemundson deposed, that passing under *Greenland*, he discovered a new island, from which a thick smoke issued out by day, which by night became a flame, and enlightened the surface of the sea in a great way; he added, that part of his sails were burnt by the sparks which issued from that island, and which were driven to a great distance.<sup>241, 247, 250</sup>

On 9 December 1783 about four o’clock in the morning, the inhabitants of the city of Cambray [Cambrai], in French Flanders [now *France*], were greatly alarmed at a noise, like the report of several pieces of cannon going off as quick as possible: but whether occasioned by a violent explosion, or by the shock of an earthquake, not yet certain. Some chimnies [chimneys] were thrown down by it, and large pieces of stone fell from many of the public buildings; the same noise was heard in several neighbouring villages.<sup>254</sup> [Possible comet fragment bolide air burst]

On 10 December 1783, Constantinople [now Istanbul, *Turkey*] reported, “We have several accounts of the plague since last post; notwithstanding which the mortality is almost entirely ceased. We now flatter ourselves that the cold weather may put a total stop to the contagion, which has cost this city at least 80,000 inhabitants since last June.” Then on 10 January 1784, they reported, “The plague still continues; but it is hoped that the present remarkable cold weather will destroy the infection.”<sup>249, 250</sup>

On 14 December 1783 at Amsterdam in *the Netherlands*, from 10 in the morning until one in the afternoon, the city was wrapped up in so thick a fog, that no one remembers seeing its equal. Everything was in confusion. Not one person could distinguish the way he intended to go. This phenomenon caused several fatal accidents. Many people and some coaches fell into the canals. This fog seems to have struck all of *the Netherlands*. The harbor is entirely frozen over and put a stop to all nautical communications.<sup>244, 249</sup>

As reported on 16 December 1783, the new island which is formed near *Iceland* increases daily; there reigns a continual fermentation in the sea in those parts, which frequently throws up quantities both of

land and rock, which makes it imagined that this island may in a few years become large enough to make some settlement upon, as soon as the fires which exhale from it cease.<sup>244, 249</sup>

On 22 December 1783, there were extraordinary inundations in *Hungary* and the Low Countries [*Belgium, the Netherlands*].<sup>249</sup>

On 23 December 1783, the coast of *Spain* was visited with the most dreadful storms, accompanied by rain. The rainfall was so excessive as to create impassable inundations, so that many villages and part of the flat countries have been reduced to the greatest distress. Seville and the surrounding region were almost entirely overflowed. The large trees and piles, which served for anchoring ships, have been torn up. The bridge of boats has been carried away. A whole village with all its inhabitants was swallowed up in the deluge. Several barks and other ships were dashed on shore, and some even struck houses. The merchant ships, under the command of Captain Zylemaker and J.G. de Vries, were lying on the shore.<sup>244</sup>

In *Spain* on the 23<sup>rd</sup> of December and seven days following, there were dreadful storms, accompanied by rains, "so excessive as to create impassable inundations, so that many villages and part of the flat countries have been reduced to the greatest distress." Floods particularly severe at Seville, *Spain*. Great number of shipwrecks on coast.<sup>57</sup>

In 1783 during the period between 3 March and 1 April, a drought engulfed Shensi (now Shaanxi province) in central *China* at Sui-tê and Shantung (now Shandong province) on the east coast of *China* at Jung-ch'êng and Wên-têng. During the period between 31 May and 29 June, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hsüan-p'ing. Crops were damaged by the floodwaters. During the period between 30 June and 28 July, floods struck Hupeh (now Hubei province) in central *China* at Wuchang, Huang-mei, Ao-ch'êng, Huang-kang and Kuang-chi. During the period between 8 August and 8 November, a drought engulfed Shantung province at Ho-tsê.<sup>153</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April - generally a pleasant month. May 9<sup>th</sup> - after an unusual dry spring up to this time, a deluge of water fell last night. May 10<sup>th</sup> - another great rain. May 20<sup>th</sup> - very cold. May 21<sup>st</sup> - very warm. May 22<sup>nd</sup> - a deluge of rain. May 29<sup>th</sup> - a hot day. May 30<sup>th</sup> - very hot. June - the first part of the month, cold, cloudy and wet; the latter part, very hot. July 6<sup>th</sup> - it rained plentifully. July 11<sup>th</sup> - a grand rain. July 19<sup>th</sup> - hardly any hot weather this month. July 25<sup>th</sup> and 26<sup>th</sup> - very hot; our gardens are surprisingly flourishing. July 30<sup>th</sup> - a deluge of rain. August 7<sup>th</sup> - extremely hot. August 8<sup>th</sup> and 9<sup>th</sup> - very cold, raw and windy. August 12<sup>th</sup> - cold. August 16<sup>th</sup> - extremely hot. August 19<sup>th</sup> - a surprising growing season. August 21<sup>st</sup> - a very hot day. August 24<sup>th</sup> - extremely hot. August 28<sup>th</sup> - more rain. August 31<sup>st</sup> - a remarkable uneven summer; some few days extremely hot; but the most of it heavy raw weather, with sea winds and cold. September has been like the summer, and particularly like the last month of it. October - the same; never the like; a most memorable year. November 12<sup>th</sup> - a strange warm day.<sup>78</sup>

*Also refer to the section 1780 A.D. - 1784 A.D. for information on the drought and famine in Bangladesh, Pakistan, and India during that timeframe.*

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**Winter of 1783 / 1784 A.D.** In 1783, the Seine River in *France* was entirely frozen over.<sup>38</sup>

The winter of 1783-84 was confined primarily to *northern France*. Le Gentil of the Royal Observatory of Paris mentioned this winter as one of the toughest. This rigorous winter broke in December 1783. On the 29<sup>th</sup>, the thermometer at the Paris Observatory, about seven o'clock in the morning read 11.8° F (-11.2° C) and at six o'clock at night 8.6° F (-13° C). The greatest cold came on the 30<sup>th</sup> at a quarter to midnight and was measured at -1.8° F (-18.8° C). Abundant snow strewed the ground. The frosts lasted sixty-nine consecutive days.<sup>79</sup>

The frost in Laon in northern *France* began on 14 December 1783 and ended on 21 February 1784; producing 69 days of frost. This cold was only interrupted on December 25 & 26 and on January 1, 2, 3, 16 and 17. On 31 December the low temperature was  $-1.5^{\circ}\text{F}$  ( $-18.6^{\circ}\text{C}$ ). There was abundant and persistent snowfall between 28 December and 17 February; a period of 27 days with snow, and the amount of snow was measured as 2 feet (0.65 meters). Several people were killed in the snow, the deers die of hunger and the hungry wolves invaded the villages and ripped several people apart. In the countryside and the cities the roads and streets were blocked by snow. The distress was extraordinary, especially in the countryside, because everyone lacked bread, wood and money.<sup>62</sup>

In Paris, *France* and the surrounding area, the wine froze in the cellars and the ground was frozen to 0.65 meters (2.1 feet) deep. Louis XVI ordered in the various districts of the capital, that public fire be set, so that the poor could warm up. At the barrier of the Sergent, a statue representing the king of snow was erected. The Seine River froze, not completely, but created a lot of ice. This ice began on 21 February and proceeded slowly and without any accidents. It was different with the Loire, Oise, Marne, Aisne, rivers, which caused the great damage by sweeping away bridges, and coming close to destroying whole villages, and people with their household furniture. The melting of the vast amount of fallen snow and the resulting floods lasted until the end of February. March and April were cold; the snow was followed by hail; and only on 12 May did the weather clear and warm into springtime.<sup>62</sup>

During the winter of 1783-84, the Loire, Oise, Marne and Aisne rivers in *France* were frozen.<sup>62</sup>

In the extreme cold of 1783 to 1784, Louis XVI of *France* had made light of public fires in different districts of Paris and the distribution of public assistance to the poor. A mob erected a statue made of snow representing His Majesty, and wrote on the pedestal the following lines:

Louis, the poor protected by your kindness,

Can only erect a monument of snow;

But let it appeal far more to your generous heart,

Than a statue made of marble, wet with tears from the eyes of the unfortunate.<sup>58</sup>

[Perhaps because he failed to understand the devastating effect of the extreme cold on the poor and starving, Louis XVI, king of *France*, was executed by guillotine in 1793.]

During the winter of 1783-84, the cold was excessive in Paris, *France* from the night of 29 December to the 31<sup>st</sup> at noon. This excessive cold was preceded by an abundant fall of snow, which has tended to preserve the fruits of the earth [snow acts as an insulator].<sup>241, 247, 250</sup>

On 2 January 1784, Paris, *France* reported, "The oldest inhabitant does not remember so heavy a fall of snow as we have lately experienced. It is now near four feet deep in the streets; and these prodigious showers having been succeeded by a most intense frost, it is impossible to go about, but in traineaux [dog sled], such as are made use of in Russia. The King came in one of these vehicles, followed by sixty more. From Versailles to Paris, on the last day of the year."<sup>249</sup>

On 17 and 18 January 1784, a strong storm struck Rochelle [La Rochelle, *France*]. "The end of the world could hardly afford a more terrifying spectacle. On the 17<sup>th</sup>, towards evening, a strong wind arose, and at nine o'clock we felt a shock of an earthquake, attended with thunder, lightning, and hail. The largest trees were torn up by the roots, the [roof] tiles and windows flew about the streets. Two hundred chimnies [chimneys] were thrown down, the upper stories were demolished, and even some houses have been totally destroyed. In this general destruction we were threatened with a fire, the progress of which we could not possibly have stopped. The fall of chimnies in the places where the fire was beginning to catch, prevented the conflagration; the roofs of several churches, and among the rest the cathedral, were stripped off: the wind even carried away the lead. The postillion [driver of a horse drawn coach or post chaise] from Nantz [Nantes] says, that he saw many trees lying on the road; torn up by the roots; that from

Bourdeaux [Bordeaux] assures, that the country between Rochfort [Rochefort] and Saintes has suffered much; the lightning fell within 20 paces of the said postillion, who was thrown from his horse ten different times. The disaster at sea was still more melancholy. Many ships have foundered, both on our coast, and that of the Isle of Rhé [Île de Ré off the west coast of *France*]. Twenty four dead bodies have been taken out of the water here, and a much greater number were taken up at the Isle of Rhé.”<sup>241, 242, 247, 249, 250</sup>

On 17 January 1784, a violent storm struck Rochelle [La Rochelle, *France*] at 6 o'clock in the evening. The storm was accompanied by an earthquake, thunder, lightning and hail and lasted until 9 o'clock in the evening. The storm blew down many of the largest trees in the neighborhood of the city. Two hundred chimneys were thrown down in Rochelle, together with several houses, and some churches, and amongst the rest the cathedral was much damaged. At Nantes and Rochefort much damage was done. On the coast 27 ships were lost, 80 bodies were washed on shore at Rochelle, and many more on the Isle of Rhé.<sup>244</sup>

In western *France* on the 17<sup>th</sup> of January, there was a violent storm at Rochelle [now La Rochelle], accompanied by an earthquake, thunder, lightning and hail; great damage done to houses and trees. The towns of Nantes and Rochefort much injured; and many ships lost on the coast.<sup>57</sup>

On the night of the January 17<sup>th</sup> to the 18<sup>th</sup> 1784, Rochelle [La Rochelle, *France*] experienced a disaster from excessive high winds and the shock of an earthquake. The city has suffered greatly, and 17 ships are reckoned to be entirely lost on the coast.<sup>242</sup>

In 1783 in Paris, *France*, there were 69 days of frost.<sup>58, 80</sup>

On 26 January 1784, Paris, *France* reported that it was remarkable that while at Paris, in Flanders [now *Belgium*], and in all the *North of Europe*, they experienced the most rigorous cold. At Geneva, *Switzerland* and Lyons, *France* and everywhere on this side, and beyond the Alps, along the rivers Po and the Rhône, they have not felt the least cold, but the temperature of the air there has been extremely mild during the whole of the month of December to the beginning of February.<sup>242, 244, 247, 250</sup>

On 30 January 1784, Paris, *France* reported the streets of the city by the late bad weather was deluged with water and mud, after the first thaw.<sup>244</sup>

The *French* historians cite great mortality of animals due to cold during the winter of 1783-84.<sup>58, 80</sup>

The winter of 1783-84 was remarkable because of its long duration and severity that reigned across *Europe*. In Paris, *France* there were 69 consecutive days of frost. The lowest observed temperature in various European cities were:<sup>62</sup>

Stockholm, <i>Sweden</i>	( -28.7° F, -33.7° C) in January
<i>Ibid.</i>	( -22.0° F, -30.0° C) on 15 February
Siebenbürgen, <i>Romania</i>	( -20.9° F, -29.4° C)
Prague, <i>Czech Republic</i>	( -18.9° F, -28.3° C) on 7 January
Frankfurt, <i>Germany</i>	( -15.2° F, -26.2° C) on 30 December
St. Petersburg, <i>Russia</i>	( -13.2° F, -25.1° C)
Mannheim, <i>Germany</i>	( -9.6° F, -23.1° C) on 30 December
Regensburg (Ratisbon), <i>Germany</i>	( -9.4° F, -23.0° C) on 31 December
Delft, <i>the Netherlands</i>	( -8.5° F, -22.5° C) on 31 December
Vienna, <i>Austria</i>	( -6.2° F, -21.2° C) on 7 January
Munich, <i>Germany</i>	( -6.2° F, -21.2° C) on 15 January
Amsterdam, <i>the Netherlands</i>	( -4.0° F, -20.0° C) on 30 December
Hamburg, <i>Germany</i>	( -4.0° F, -20.0° C) on 8 January



Troyes, <i>France</i>	( -3.3° F, -19.6° C) on 31 January
Paris, <i>France</i>	( -2.4° F, -19.1° C) on 30 December
Strasbourg, <i>France</i>	( -1.7° F, -18.7° C) on 30 December
Chartres, <i>France</i>	( -1.7° F, -18.7° C) on 30 December
Pontarlier, <i>France</i>	( 0.5° F, -17.5° C) on 31 January
Brussels, <i>Belgium</i>	( 2.7° F, -16.3° C) on 31 December
Tournai, <i>Belgium</i>	( 2.8° F, -16.2° C)
Lons-le-Saunier, <i>France</i>	( 7.3° F, -13.7° C) on 31 January
Montluçon, <i>France</i>	( 7.3° F, -13.7° C) on 30 December
Grenoble, <i>France</i>	( 10.8° F, -11.8° C) on 26 January
Montpellier, <i>France</i>	( 25.2° F, -3.8° C) in January
Perpignan, <i>France</i>	( 32.0° F, 0.0° C) on 31 January

In [March 1784], the accounts from *France* are equally deplorable. The weather has driven the wolves in many places even into the farmyards, where they have done much mischief [damage]. It should seem likewise, that the weather has been still more severe on the *American Continent*, as whole flocks of aquatic birds have been seen in the marsh of Champigny this winter, which were never before seen in *France*. They are said to come from Louisiana. They weigh five or six pounds, have black beaks armed with four ranges of teeth set like saws, and from the circumstance take the name of Saw birds [might be merganser, which were often called “sawbills” because of its serrated bill].<sup>244</sup>

In France there was a flood. On 4 March 1784, the Seine River in Paris, *France*, at the bridge “Pont de la Tournelle” reached a height of 6.66 meters (21.9 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

As reported on 25 January 1784 at Hague, *the Netherlands*, many diverse towns on the Meuse River have chunks of ice heaped up to prodigious heights, which have even changed the course of the river and have overflowed a great number of villages. The city of Maestricht [Maastricht] is inundated to such a degree, that it can be entered only by the gates of Tongress and Brussels.<sup>242, 244, 247, 250</sup>

On 23 January 1784, the Visa, near Liege [Liège, *Belgium*] reported, “The whole extent of land from Maestricht [*the Netherlands*] to this place is under water. The inhabitants of the parts inundated, after having abandoned their dwellings, come in crowds here, and in neighbouring parts, to seek an asylum. The [warning] cannon is fired continually on the ice at the bridge of Witch, at Maestricht; but it is thought that it would be better to demolish it at once, to put an end to the misfortunes it occasions by the swell of the waters and the ice. The height of the latter overtops the houses of the neighbouring villages. In the memory of man the Meuse [River] was never seen so swelled. The bodies of ice are so heaped up, from distance to distance, that they look like rocks of an enormous size. Five times the river has been frozen and thawed; it has been seen to rise three feet in half an hour. Yesterday we were witnesses of a melancholy spectacle; it was a coach coming down on the flake of ice, with two gentlemen in it; but it was impossible to afford them any assistance; there were no horses to it, and it was thought they had already perished.”<sup>249</sup>

On 3 February 1784 at Flushing [Vlissingen, *the Netherlands*] reported the Admiral, Peter Hein, of 60 guns, and the Valck Sloop, of 16 guns, arrived in the outer harbor from the West Indies, where they must remain until the severe weather breaks up, as they cannot come in because of the ice. The two Scheids, the Maese, Rhine, Moselle, and indeed all the rivers in these parts, are frozen up. The island of Zealand is surrounded by hills of ice, a circumstance never known before in our memory, and the more extraordinary, as it is almost everywhere surrounded by the sea.<sup>244</sup>



As reported on 4 February 1784, there was intense frost in Holland [*the Netherlands*]. As a result, water was sold at Amsterdam at seven stivers per pail. At Rotterdam, there was the largest fair on the ice ever known, with playhouses and other places of diversion.<sup>241, 244</sup>

Last Saturday [28 February 1784], the ice in the River Waal [in *the Netherlands*] broke, by which a vast length of country is inundated. In the neighborhood of Gorinchen [Gorinchem], there were 72 villages under water; in another district there were 34 villages overflowed, insomuch that the tops of the houses only are to be seen. Many persons and vast quantities of cattle are drowned. In short, the distress is not to be imagined: thousands will be ruined, and vast tracts of land spoiled.<sup>244</sup>

On 3 March 1784, Nimeguen [Nijmegen, *the Netherlands*] reported, “Last Saturday [28 February] evening the ice broke near this city, in the Waal [River]. Since that, a most terrible scene! The dikes broke in many places; so that, from the Panderse Gat to Gorinchem, (a district of seventy-two villages), all are under water; near the Maaswall dike two breaches, whereby thirty-four villages are under water; in the Betuwe, the houses are in water to the tops; people and cattle are drowned in numbers; near Thiel and Kraanburg are large dams of ice.”<sup>249</sup>

In [March 1784], the great lake of Harlem [Haarlem] in Holland [*the Netherlands*] has overflowed its banks. The inundations are inconceivably great. The village of Harlmostadt is entirely destroyed by the floods.<sup>244</sup>

As reported on 1 January 1784 from Copenhagen, the accounts from *Iceland* are not very favorable. The volcano has thrown out such large quantities of sulfurous matter, that the country around to a vast distance is burnt up, which has reduced many families to misery; whole flocks have died for want of food. The sound is at present frozen over, so that the passage is entirely stopped.<sup>242, 247, 250</sup>

On 6 January 1784 at Frankfort, *Germany*, the cold has been excessive since the end of December. According to the observations made at Manheim and Nuremberg, the weather has not been so cold since the beginning of the present century.<sup>244, 247, 250</sup>

At Munich, *Germany*, it was uncommonly cold during the winter of 1783-84. The severe cold began on 28 December. During 6-8 January 1784, the temperature on the Reaumur's thermometer was  $-16^{\circ}$  Re [ $-4^{\circ}$  F,  $-20^{\circ}$  C].<sup>242</sup>

On 19 January 1784, Munich, *Germany* reported, “The cold has been uncommonly severe here since the 28<sup>th</sup> of last month; on the 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> of the present month Reaumur's thermometer was at  $16 \frac{3}{4}$  degrees below the point of congelation, which was three quarters of a degree lower than it fell in the year 1709.”<sup>249</sup>

On 19 January 1784, all the country between Heidelberg and Manheim [Mannheim] in southwest *Germany* was underwater. On the night of the 17<sup>th</sup>, all the lower part of Heidelberg was inundated, and the inhabitants obligated to quite their houses. This inundation was occasioned by the vast quantities of ice, which clogged up the bridge, and stopped the free current of the river. Several houses have been much damaged, and in the country, both mills and houses have been carried away, and it is feared some lives were lost.<sup>247, 249, 250</sup>

Frankfort [Frankfurt], *Germany* reported on 7 February 1784 that accounts from different parts [of the surrounding area], this winter appears to be universally very severe, and the snow lay very deep in most places, the falling of which was preceded by the same kind of gloom which was so general during the last summer. At Heidelburgh [Heidelberg], *Germany*, the present cold is almost insupportable; but the apprehensions of the damage which is expected to follow the breaking up of the frost, by the vast

quantities of ice with which the rivers are now covered, and will then be let loose, is truly shocking to think of. Most of the inhabitants of the streets next to the river have packed up all their effects that they may move off the instant the ice breaks in the river. Cannons have been placed at distances to give notice. These will be fired as soon as the ice loosens. Although some accounts seem to represent that a fourth of Europe is free from the severity of the weather, yet we find by letters from Venice, *Italy* dated the 21<sup>st</sup> of January, that they have very severe frost there, and a great deal of snow. We have the same accounts from other parts of *Italy*, and particularly from Genoa, where the port is so blocked up with ice, that no ship can go in or out.<sup>242, 247, 250</sup>

At Heidesburgh [Heidelberg, *Germany*], in the Palatinate [in southwest *Germany*], the cold is almost insupportable, and the dread of the inundations on the snow's melting so alarming, the inhabitants near the rivers Rhone and Main have packed up their effects, to be in readiness to remove on the first signal [of the ice breaking].<sup>244</sup>

In the morning of 27 February 1784 at Heidelberg [in *Germany*], the beautiful bridge of the city was carried away by the ice. Half of the town is underwater and the destruction and misery both within and without the walls is beyond description. The inhabitants of Nauenheim [Nauheim] have all taken refuge in other places. Opposite to the village, the ice has accumulated in heaps as high as a house.<sup>241, 247, 249, 250</sup>

On 3 March 1784, Cologne, *Germany* reported that the Rhine River is at last tolerably clear of ice. Deutz [an inner city of Cologne] was protected by the ice having been thrown up by the tide and wind in such heaps as to resist the force of the water. Nobody perished there, but some houses were thrown down. Mulheim [Mülheim] was very much damaged. The Catholic Church has almost tumbled down, and upwards of 156 houses had fallen. The Lutheran Church except for the new steeple was also down. Upwards of 200 persons are either drowned or crushed to death. As fast as the waters leave a street, new devastations are discovered. Houses and walls were down, and cellars were blown up. Very few of the merchants who lived on the banks of the river had time to empty their warehouses so the loss in merchandise is immense. Accounts from Bonn indicate large quantities of ice floating down the river have thrown down part of the walls of the town. A vast number of houses on the border of the river had many swept away with all they contained.<sup>244, 247</sup>

On 4 March 1784, the city of Emmerick in the Dutchy of Cleves [now Emmerich am Rhein, *Germany*] reports they have no more dikes. The Rhine River threatens the city with ruin. The fields have disappeared under the water. The desolation that reigns is beyond all description. Great numbers of people have been swallowed up. The cattle perished by the hundreds. Hunger and cold join their ravages to those of the water. "If God does not help us, our ruin must be inevitable."<sup>244, 249</sup>

On 5 March 1784, at Bamberg, *Germany*, the river Reidnitz, which runs through the city, overflowed its banks and caused considerable damage. It carried away a bridge built in 1732, and which cost 140,000 florins. Many houses and mills have been thrown down, and 40 persons have lost their lives.<sup>241, 247, 250</sup>

On 7 March 1784 it was reported at Frankfort on the Main [Frankfurt], *Germany* that the rivers Rhine, the Main, and the Neckar thawed and overflowed. Many houses and mills at Sachsenhausen have been swept away; 13 houses were thrown down at Miltemberg [Miltenberg], and a number of persons buried in their ruins. Many edifices have been washed away by the torrents at Kittingen [Kitzingen]. One half of the town of Bonn was underwater, as well as the villages of Limperic [Limperich], Beul [Bühl], and Schevartz-Shandorffe [Schwarz-Schwandorf], the Lutheran Church and 130 houses have been destroyed at Mulheim [Mülheim].<sup>242, 247, 250</sup>

In [March 1784], one half of the town of Bonn, *Germany* is underwater. The Lutheran Church and 130 houses in Mulheim have been destroyed in the inundation. These inundations have traversed the

provinces of *Spain*, and have occasioned dreadful devastations. The Gadaluviar [Guadalaviar River] especially has swept away an infinite number of houses in its progress.<sup>244</sup>

As reported at Petersburg [a city in the Palatinate region of *Germany*?] on 16 March 1784, the damage done by the overflowing of the rivers Rhine and Necker are distressing beyond conception. The city itself would have been destroyed except for its fortifications, which fortunately withstood the impetuosity of the inundation. The waters on the side next to the Necker rose as high as the roofs of houses, and with such alarming rapidity, that the inhabitants had hardly time to save their lives. The city of Heidelberg has also greatly suffered; not only its magnificent bridge on the Necker, but also about fifty houses have been entirely swept away. The village of Necker Hausen, one of the most beautiful spots in the Palatinate, is so entirely destroyed, that not above [no more than] six houses are left standing. Many of the inhabitants were carried away on stupendous mountains of ice. Some perished and others found means to escape at the distance of several leagues down the river. Of the latter we saw an instance here, a woman, who had remained over 36 hours [on a sheet of ice] in the above uncomfortable situation, was landed here safe, after having seen her father and mother, brothers and sisters, perish by her side. The cold has set in again with double severity. Fuel is scarcely to be had. The provisions we had amassed are exhausted. The roads are impassible.<sup>244</sup>

The following is an extract of a letter to the admiralty of Amsterdam, the Netherlands from Vice-Admiral Reynst, commander of our fleet in the Mediterranean, dated, on board the *Liberty*, in Toulon harbor on 18 February 1784: "Having set sail for Malaga on the 22<sup>nd</sup> ult. [22 January 1784] accompanied by the whole squadron, and aided by a favourable wind, we the next morning got into the latitude of Gates's Capes, where we were first becalmed, and then met with contrary winds; so that, on the 3<sup>rd</sup> [3 February 1784], we had got no farther than the coast of Catalonia [in northeastern *Spain*], in the latitude of the island of Minorca. Here we were assailed some hours before day-break by so violent a tempest, that neither I, in the whole course of my service, nor any of the seamen who were with me, ever remember to have seen it equalled. It lasted eight and forty hours without intermission; and although at its commencement we were at the distance of twenty leagues from the island of Minorca, we found ourselves so close to it on the second day before noon, that it was with the greatest difficulty that we could, by crowding all our sails, keep clear of the breakers which surround the island. We remained in this dangerous situation a considerable time; and when we cleared the last of the breakers, we were so near, that the surge washed our deck. We owed our escape principally to our mizen-mast, which had fresh guards put to it, the first being carried away entirely, as indeed were almost all our sails. When this dreadful storm was in some measure abated, we, on the 7<sup>th</sup> instant [7 February], came up with the *North Holland*, which, during the tempest, besides other considerable damage, had lost all her masts, and floated like a lighter at the pleasure of the winds. A short time after we saw *La Medée* frigate, which had sustained no other loss than that of five of her fore-castle guns, which she was obligated to throw into the sea. I left this frigate to succour [succor] Capt. Ryniveld of the *North Holland*, giving him orders to conduct himself as wind and weather should direct. We have, since Feb. 6. kept cruising in the latitude of Toulou, and the isles of Heires, with very bad weather, having met with three storms, two from the Levant [Eastern Mediterranean], and the third from the northwest quarter. The day before yesterday I was joined by Rear-Adm. Van Braam, and we this morning entered the harbour together. We here found the *Prince William*, one of our fleet. I have not hitherto received any intelligence whatever of the *Hercules*, and am therefore under great apprehensions respecting its fate; nevertheless, I wish I was in the same uncertainty concerning the *Drenthe*, Captain Smissaert, and did not find myself under the necessity of informing your Noble and Mighty Lordships what Captain Valliant told me, namely, that on the first day of the storm he saw one of our ships sink, which he took to be that unfortunate vessel. Capt. Van Ryniveld has confirmed this melancholy piece of information; and as the *Drenthe* was a very remarkable ship, I dare not flatter myself that the two above-named captains are mistaken." <sup>249</sup>

On 30 January 1784 at Leghorn [Livorno, *Italy*], the seas were very stormy for some days past, and many vessels were lost.<sup>244</sup>

On 3 February 1784, the storm that struck during the night at Genoa, *Italy* has done immense damage. The hail was of an immense size. The tops of several houses were blown off. Many trees were torn up by the roots. The olive trees have particularly suffered. The damage done has been valued at a million, and no doubt we shall have accounts of great damage being done at sea.<sup>247, 250</sup>

It was reported in Naples, *Italy* on 3 February 1784, that vast quantities of snow had fallen and detained the courier expected from Calabria a whole week. But he finally arrived and brought some melancholy news from those parts. The earthquake has returned again. Near Palermo, the sea inundated upwards of 6 miles of country. Several warehouses, full of merchandise, were ruined. It was reported that after a violent shock of an earthquake, Catania was covered by the sea.<sup>247, 249, 250</sup>

On 6 February 1784, Rome, *Italy* reported that such a vast quantity of snow has fallen during the last week, that the post could not get over the mountains, although 600 workmen were employed in clearing the road.<sup>244</sup>

In *Italy*, there was severe frost in Venice, Genoa, and Rome.<sup>47, 93</sup>

On 5 March 1784, Madrid, *Spain* reported that the overflowing of the rivers, which traverse their provinces, have occasioned frightful devastation. The Guadalavir [Guadalquivir River] especially had thrown down an infinite number of houses, and occasioned the greatest desolation in all places which it has inundated.<sup>247, 250</sup>

On 7 February 1784, Lisbon, *Portugal* reported that for the last 5 weeks, there have been great storms on their coasts that the oldest man living does not remember anything that compares with this season. No vessel comes into this port without having suffered damage, and many have been lost. Upwards of 100 persons have perished in the Tagus River.<sup>244, 247, 250</sup>

In *Hungary* after deep snows and severe cold, a sudden thaw took place during 27-29 December 1783. The Danube and the river of Maros [Mureş] have exceeded their bounds, and occasioned the greatest destruction in their course. The greatest damage was at Newzaz and Arrad [now Arad, *Romania*]; the latter city is entirely underwater, and the inhabitants of the greater part of the houses were obligated to go to the tops of them for refuge. On 30 December, the misfortune was heightened by a frost, which covered the streets and houses with ice. The frost increased till 5 January, when the Reaumur's thermometer stood at -23.5° [-21° F, -29° C].<sup>244, 249</sup>

During 7-9 March 1784, the cities of Pest and Buda [now combined into the city of Budapest] in *Hungary* were immersed in water, occasioned by the overflowing of the Danube River. The greatest part of these cities was underwater and Pest resembles an island. The damage sustained in goods, merchandize, houses, churches, and cattle, is not to be estimated.<sup>244, 247, 250</sup>

During the beginning of January 1784, Austrian Dalmatia [now generally the region of *Croatia*] experienced a severe storm that lasted 3 days. Much damage was done to the coasts. The winds blew so hard that the inhabitants did not think themselves safe in their houses, fearing they would be blown down every moment.<sup>244</sup>

On 6 March 1784, Vienna, Austria reported, "From all the provinces of this monarchy, we received the most afflicting accounts of the shocking devastation occasioned by the sudden thaw of the rivers. Part of the city of Prague [now in *Czech Republic*] is under water: the loss occasioned by the floods is

considerable; the great bridge is so much damaged, that it cannot be passed over without danger; the guardhouse there has been thrown down, and four men killed, the cities of Lints [Linz, *Austria?*] and Presbourg [now Bratislava, *Slovakia*] have shared the same fate. At Tischamont the waters have risen to a prodigious height; at Schisnau [now Chişinău, *Moldova*], in the same neighbourhood, forty houses have been submerged by the waters; so that it was impossible to give any assistance to the unfortunate inhabitants, victims of this terrible disaster.”<sup>249</sup>

On 15 January 1784, excessive cold struck the city of Smyrna [an ancient city now located at Izmir, *Turkey*]. The cold drove away the plague and putrid fevers which have raged so much of late in these parts.<sup>247, 250</sup>

On 18 February 1784, it was reported that at Cherson [in the southern *Crimea*] that nearly half of the inhabitants of that city have died of the plague. But the severe winter cold of the winter has checked the contagion.<sup>247, 250</sup>

In Selborne, *England* from 23 September until 12 November, the weather was dry and mild. Then till 18 December there was grey soft weather with a few showers. From 18 December 1783 to 19 February 1784, there were hard frosts. During this period it thawed during 2 days (14 January and 5 February). From 19 to 28 February there was mild wet fogs. To 10 March, there was sleet and snow. To 2 April, there was snow with hard frost.<sup>70</sup>

At Leeds in Yorkshire, *England*, the temperature on New Year's Day [1 January] 1784 fell to 8° F [-13° C]. During the winter of 1783-84, there was 89 days of frost.<sup>272</sup>

In *England* during the winter of 1783-84 the frost lasted 89 days. The weather in November was unusually mild. In Montrose in northeastern *Scotland* on the 4<sup>th</sup> of November “the cattle seek shade at noon from the heat.” On the 17<sup>th</sup> of November the thermometer stood at 56° F (13° C) indoors and out. On the 23<sup>rd</sup> and 24<sup>th</sup> there was frost and ice. On 30<sup>th</sup> November, “very hard frost.” On 6<sup>th</sup> January, “Thames not frozen quite over, but navigation stopped by ice.” The frost continued through January and February, and even into March there was snow and cold cutting winds. “From different parts of the country we have accounts of more persons having been found dead in the roads, and others dug out of the snow, than ever was known in any one year in the memory of man.” The cold weather was especially severe in London, Canterbury, Salisbury, Worcester, Northampton, and Barnard Castle in *England*, Edinburgh in *Scotland*, Amsterdam in *the Netherlands*, Mannheim in southwestern *Germany*, Rome in *Italy*, and *Hungary*. The frost was especially severe from the 10<sup>th</sup> to the 20<sup>th</sup> of February. In the last days of February, the spring flowers were out, and the birds were singing. In March, frost, snow, and thick ice all through. Deep snow in Hampshire continued till 3<sup>rd</sup> April. Thames frozen and traffic crossed at many places.<sup>47, 93</sup> [Barnard Castle is in Durham in northeastern *England*.]

On Wednesday last [24 December 1783], a snowstorm struck Aberdeen, *Scotland*. In the evening, it blew a perfect hurricane.<sup>244</sup>

On Monday, 29 December 1783, Aberdeen, *Scotland* reported, “On Wednesday last [24 December] it began to snow, with the wind at north. In the evening, the wind changed to about east, and it blew a perfect hurricane. During the gale, the *Industry*, [commanded by] Macleod, from Newcastle for this place, went ashore a little to the northward of Don mouth. The master and mate were washed overboard a little before she struck; the rest of the crew got safe ashore, and got part of the goods saved, although much damaged. The *Rodney*, [Captain] Taylor, and the *Venus*, [Captain ?], both bound for this port from Sunderland with coals, were wrecked, the one near Sketraw, and the other at Cowie, and all the crews, to the number of 13, perished. The snow has continued ever since Tuesday to fall, with little interval; and a greater quantity is seldom remembered to have fallen in so short a time. All communication with the



country is in a manner stopped. The post was nine hours between Old Meldrum and Aberdeen, and it was only by going over the eminencies [hills] on the road side that they were able to go on. The Edinburgh Saturday's post did not arrive here till Sunday afternoon, and yesterday's post at eight this morning." <sup>249</sup>

In December 1783 and January 1784, there was remarkably cold weather, and prodigious falls of snow in *England and Scotland*.<sup>249</sup>

In December 1783 and January 1784, there were greater falls of snow than has happened for a great many years past. It began at Edinburgh, *Scotland* on 24 December 1783, and continued with very little intermission until the end of the month. The roads were rendered almost impassable, which in a great measure stopped all intercourse with the country. The diligences [public stagecoaches] and slys [sleighs?] which set out from Edinburgh on the 29<sup>th</sup>, after going but a short way from town, were obliged to return, it being impossible for them to proceed. They were subjected to the same inconvenience once or twice during the month of January, by fresh falls. The showers of snow were frequently attended by high winds, which did a great deal of damage on the coast, particularly at Aberdeen, where several vessels were driven ashore and wrecked. In the end of December the cold was excessive. On Sunday the 28<sup>th</sup>, at half past 11 p.m. the thermometer, exposed to the open air at the observatory at Glasgow was 4° F [-16° C]; the next night about the same time, it was 11° F [-12° C]; and on the 30<sup>th</sup>, it was -4° F [-20° C]. The post-boy with the mail from Dumfries to Thornhill, was frozen to death upon his horse. At Edinburgh, on Wednesday the 31<sup>st</sup>, at eight o'clock in the morning, Fahrenheit's thermometer, on the outside of a window, stood at -3° F [-19° C]. This is perhaps the greatest degree of cold known in this country since thermometer registers were kept. The instrument, laid on the surface of the snow in a garden just at sunrise fell to 48° below the freezing point [-16° F, -27° C].<sup>249</sup>

"The frost was so intense on Sunday night [28 December 1783] at Kilkenny, *Ireland* that the [River] Nore was froze over before morning. Multitudes of people assembled on, and walked over it on Monday and Tuesday." <sup>249</sup>

On 31 December 1783, the temperature at Montrose, *Scotland* fell to 8° F [-13° C].<sup>249</sup>

On 2 January 1784, London, *England* reported "Very large quantities of ice are coming down the River Thames, which have occasioned the ships to haul up their cables and moor with chains, to prevent accidents. At Maidenhead the river is so choked up with ice, that no craft whatever can pass up or down the Thames. From all parts of the country we have an account of a great fall of snow last week, attended by an immense frost, by which the arrival of the post, has been a great many hours out of the common course. There was no work done in the Poole yesterday, on account of the ice in the river. The fall of snow between Canterbury and Dover has been so unusually large, that men are employed on the road to clear a channel for travelers to pass with safety. In consequence of the great fall of snow, many other of the roads in the country are impassable, and several of the stage-coaches and other vehicles, which were expected in town early this morning, had not reached their respective inns at three in the afternoon." The temperature on Wednesday [31 December 1783] was 17° F [-8° C] at Highgate.<sup>249</sup>

On 2 January 1784, Tadcaster, *England* reported "You will no doubt be sorry to hear, that on the 1<sup>st</sup> instant we had a most terrible flood; the water rose nearly four feet high in the space of about thirty-three hours, several boats were sunk, and two fishermen were drowned; but what adds still more to this melancholy scene, is to see five of the arches of the bridge torn away, on one of which was a post-chaise, going over at the time this fatal accident happened, whereby the postboy, one horse, and one passenger, by getting on the roof of the chaise, was driven on shore and saved." <sup>249</sup>

On 3 January 1784, Canterbury, *England* reported "The frost on Tuesday [30 December 1783] night was so uncommonly severe, that the River Stour, which runs very rapidly through the city, was frozen in



many places hard enough to walk over; a circumstance which the oldest inhabitant never before remembered.”<sup>249</sup>

On 3 January 1784, Newcastle, *England* reported, “Since Christmas day the frost has set in remarkably keen, attended with much snow, so that the river [Tyne] was frozen up on Tuesday [30 December 1783]. Many keels that morning stuck fast among the large bodies of ice carried by the tide, and one in particular close to the bridge, in a very dangerous situation; the men, however, were drawn up by ropes on the bridge. People were skating on the river on Wednesday, and a passage made very easy to Gateshead.” On Wednesday [31 December 1783] a thermometer exposed to the open air in Newcastle stood at 2.5° F [-16.4° C]. It was the coldest day at Newcastle since 14 January 1780 when the temperature dropped to -3° F [-19.4° C].<sup>249</sup>

On 3 January 1784, Dublin, *Ireland* reported, “The Puddle-hole, near the lower Castle-yard, being deluged over with water, from the melting of the late snow and the intenseness of yesterday’s rain, burst out about ten last night, and in a short time flooded for several feet deep, so much so, that it is said a boy was drowned near the Castle-gate. All the kitchens of the houses of the new buildings, and those opposite Daly’s, Mr. Wilson’s, etc. were filled with water even with the street. Through Crampton-court, Crane-lane, and Cycamore-alley, a wide and rapid river made its course, taking its way down Essex street, filling numerous cellars, and emptying itself into the [River] Liffey at the upper slip. The consternation of the inhabitants of the neighbourhood was great, and the damage done to many articles in cellars, kitchens, etc. that could not be removed in time, it is supposed is very considerable. Patrick street, and the neighbouring avenues were also under water, occasioned by the mountain flood.”<sup>249</sup>

On 3 January 1784, Haddington, *Scotland* reported, “Last night and this forenoon, we had an exceeding great fall of snow, which has rendered our roads almost impassable, insomuch that the post-boy who left Edinburgh last night with the London mail, got to Tranent with great difficulty; and, after stopping there until the violence of the storm abated, only reached this place about five o’clock this afternoon.”<sup>249</sup>

During the winter of 1783-84, in Dublin, *Ireland*, there was a flood. On [Saturday in the Gregorian calendar] 3 January, the very sudden thaw, after the late fall of snow, together with heavy and incessant rain on Friday, occasioned such floods in and about the city, as were attended with considerable injury to the inhabitants situated within. The rivers Liffey and Dodder overflowed all the low grounds and the River Poodle covered Patrick Street to unprecedented height, having risen at the church to near 6 feet. Ship Street as far as Sycamore Alley, was laid underwater, which takes an impetuous course through Crampton Court, Crane Lane, etc. filled all the cellars and kitchens. The suddenness of this inundation threw the inhabitants into the greatest terror, and prevented the removal of many articles, such as sugar, etc. by which many have sustained considerable damage. A young apprentice was killed when a small arch failed.<sup>241</sup>

On 5 January 1784, Salisbury, *England* reported, “The frost was never known in the memory of man so severe in Worcestershire as on Tuesday and Wednesday last week [30 & 31 December 1783]. The [River] Severn was frozen over for miles together, and various are the accounts of people and cattle that perished.”<sup>249</sup>

On 5 January 1784, Aberdeen, *Scotland* reported, “The *Hope*, [Captain] Cravie, was wrecked in Lunan bay, but all the hands saved. The *Newcastle*, of and for this place, was put ashore in the frith, crew and cargo saved. The *Betty*, [Captain] Will, on her voyage from London, lost one of the men, who was washed overboard during the gale. On Monday and Tuesday [29 & 30 December 1783] the frost was exceedingly intense, and the thermometer was at one time 27 degrees below the freezing point [5° F, -15° C]. On Thursday [1 January 1784] the wind came to S.E. and continued to blow strong all that day and Friday; but in the night between Friday and Saturday, it increased to a degree seldom remembered. A

good part of the lead on the roof of the New Inn was tore off; several chimney-tops hurt [destroyed], and some stacks of bear blown down and scattered about the fields: And from about three on Saturday morning was a continued drift of snow, sleet, and now and then hail. In the evening, the wind abated.”<sup>249</sup>

In January 1784, there were extraordinary floods in *England and Ireland*.<sup>249</sup>

Great snowstorms pounded *England* in January and February of 1784, especially in northern York, and in parts of the midland counties. Barnard Castle and Northampton suffered severely. These storms were accompanied with intense frost.<sup>47, 57</sup>

On 6 January 1784, Dumfries, *Scotland* reported, “Last Friday [2 January] afternoon we had here a very heavy fall of snow, attended with a severe easterly wind, which continued till Saturday at mid-day. We do not remember to have seen such a quantity of snow lying on the ground at one time these many years; the great road to England, as well as the Edinburgh road, being almost impassable even to a foot-traveller, which occasioned the Edinburgh post due on Saturday night not to arrive till this morning; and the English post has been full twenty-four hours later than usual. The frost continues at present with great severity, and without the smallest appearance of a change of weather.”<sup>249</sup>

On 7 January 1784, a Prussian vessel called the *Friendship* came ashore in London, *England*. As a result of a strong storm, the ship was in a dreadful situation. It was waterlogged for several days. Its sails were torn to pieces. The storm had produced a very mountainous sea, which broke over the stern half-mast high; her rudder came ashore, and the hatchways blew up. The seven people onboard were quite worn out with the severity of the storm. Only the captain and one member of the crew survived.<sup>241, 242</sup>

On 9 January 1784, Dublin, *Ireland* reported, “We hear from Arklow, that the late floods have marked their progress with distress and desolation along the banks of every stream in the neighbourhood; nor has the storm from the sea been less destructive; two square-rigged vessels have been driven high and dry on shore; one vessel is entirely wrecked, and a great number of small craft beat to pieces, to the utter ruin of many poor families.”<sup>249</sup>

On 18 January 1784, the schooner *St. Barbaras* was working its way up the channel at Dublin, *Ireland* but encountered a violent storm that almost beat the ship to pieces.<sup>241</sup>

On 22 January 1784 the River Tweed at Kelson [Kelso, *Scotland*] was almost covered in ice, which rose above the town in two hours to a height of eight feet perpendicular. The course of the river changed and the ice was thrown up to an amazing height.<sup>244</sup>

Reports out of Bernard Castle in Durham, *England* on 25 January 1784 state: the distress from the snow, and the intensity of the frost (which was there more severe than had been remembered since the year 1740) was so great as to confine the poor within doors, and to put a total stagnation to all sorts of business without. The birds were so tame they might be taken with the hands almost starved to death.<sup>244</sup>

On 30 January 1784, a man walked across the River Thames in London, *England* on the ice at low water from Rotherhithe to Wapping new stairs.<sup>244</sup>

On 9 February 1784, a letter from *Scotland* stated: “At a small village in this country, the snow lying so deep as to be above the houses, the inhabitants have scooped out a way under the snow [a tunnel], the length of the village, leaving a solid arch at least six feet thick overhead. The storm continues with unabated severity, and in the course of the last week, a great quantity of snow has fallen. On Saturday morning it drifted so violently, that several carriages that left town were obligated to turn back, after proceeding about three miles.”<sup>244</sup>

On 10 February 1784 at Northampton, *England*, the snow is so deep in this country, that in many parts, the cottages are so covered as to be no longer visible. There is great apprehension for the poor inhabitants who are feared starved to death.<sup>244</sup>

An extract from a letter from Kilkenny, *Ireland* dated 11 February 1784 related the following story. “The following very singular circumstance occurred in this city one night last week during the very intense frost: A cat having discovered a rat with five or six young one in the corner of a room, made a set at them; the old rat, regardless of her own safety, kept her situation for the protection of her young, and the cat not to be outdone in vigilance remained centinel [sentinel] all night, and in the morning they were all found frozen to death, in the most watchful attitude.”<sup>241</sup>

On 12 February 1784, a heavy snowfall began at Salisbury in Wiltshire, *England* in the morning and continued without interruption for 28 hours. This is longer and deeper than had been known there since the year 1740 when the fall lasted 36 hours. The Heytesbury post boy was frozen coming from thence on the 13<sup>th</sup>. The Weymouth mail, which set out on the evening of the 12<sup>th</sup>, and should have been at Salisbury about the same time on the 13<sup>th</sup>, did not arrive until 11 o'clock in the evening of the 14<sup>th</sup>. The Blandford post boy was lost some hours on Handley Down, where he wandered all night, and in the morning was forced to wade through the trackless snow, with the mail upon his back, leaving his horse behind him. When he reached a house, he was almost speechless, and it was with difficulty he was recovered. A post Chaise, horses and driver, were lost in Cornwall; and both horses and boy perished in the snow.<sup>244</sup>

From 10 December 1783 to 22 February 1784, there has been 63 days of frost in [London, *England*]. Of these it snowed 19 days, thawed 12 days, and rained 9 days. Had the frost continued at 13° F [-11° C], as on 31 December during the night, it would have frozen over the Thames in 24 hours. The snow having fallen soon after the frost in December did not penetrate the ground very deep [because snow acts as an insulator]. But the first snow having partly dissolved was succeeded by a very keen frost, and formed the dissolution into a hard cake, which was afterwards covered with other falls of snow.<sup>244</sup>

The winter of 1739-40 was compared to the winter of 1783-84 at Edinburgh, *Scotland*. During the present winter, the snows began Christmas day in 1783 and continued to 20 February. There were snow showers almost every day accompanied by frost, sometimes very intense as in *England*. The frost of 1740 was more intense and was severe enough to freeze malt liquor and even spirits; but this did not happen in the present frost.<sup>244</sup>

During the winter, the River Thames in London, *England* was frozen below Gravesend. The winter was recorded as being intensely cold throughout *Europe*.<sup>1</sup>

In *England*, the frost during the winter of 1783-84 lasted eighty-nine days.<sup>128</sup>

The frost in *Britain* lasted 89 days.<sup>41, 43</sup>

In *England*, on the fifth bell of the Tadcaster peal it is recorded: “*It is remarkable that these bells were moulded in the great frost, 1783. C. and R. Dalton, Fownders, York.*”<sup>47, 93</sup>

In *Scotland*, daily heavy snowfalls extended over nearly a month.<sup>47, 57</sup>

In *Europe* in 1784, storms and excessive cold were reported from Smyrna, Vienna, Nimeguen, Cologne, Naples (great flood), Leghorn, Rome, Lisbon and Amsterdam.<sup>47, 57</sup> [Smyrna is now İzmir, *Turkey*. Vienna is in eastern *Austria*. Nimeguen is in eastern *Netherlands*. Cologne is in western *Germany*. Naples is in southern *Italy*. Leghorn or Livorno is in northwestern *Italy*. Rome is located in west-central

region of the *Italian Peninsula*. Lisbon lies in *Portugal* in the western Iberian Peninsula on the Atlantic Ocean and the Tagus River. Amsterdam is on the western side of *the Netherlands*.]

On 20 March 1784, Vienna, *Austria* reported that the most melancholy details of the inundations occasioned by the thaw arrived at Vienna from almost all parts of *Germany*, the Low Countries [*Belgium, the Netherlands*], *France, Italy*, etc. so that these misfortunes seem to have been the lot of almost all the countries of *Europe*.<sup>247, 250</sup>

In *Sweden, Denmark, Germany, Holland [now the Netherlands], Poland, England, and Ireland* and even in the *United States*, the winter produced very severe cold, large amount of snow, and great flood disasters caused by the melting of the snow. The Danube River remained frozen almost the whole month of February. For 30 years, this river was rarely closed for shipping. The cold weather in *Portugal*, and especially Lisbon was quite extraordinary.<sup>62</sup>

The winter of 1783-84 was unusually severe and long continued in both *Europe* and *America*. [At Calabria, *Italy*], a thaw of alarming suddenness took place in the middle of March, but afterwards severe cold set in again.<sup>214</sup>

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1783 occurred on 21 November. It snowed 6 inches deep.<sup>116</sup>

In the *United States*, the winter of 1783 was long and severe. The Delaware River closed as early as the 28<sup>th</sup> of November, and continued ice-bound until the 18<sup>th</sup> of March. The mercury was several times below zero (0.0° F, -17.8° C).<sup>1</sup>

The winter of 1783-84 was known as the Long Winter in New England in the *United States*. The first snowfall of the season blanketed the eastern seaboard from New Jersey to Maine on 12-13 November 1783. Morristown, New Jersey (twenty-five miles from New York City) records showed 7 additional snowstorms struck in November and December and then followed by a major snowstorm on 30-31 December. About 20 inches (51 centimeters) of snow accumulated in this late December storm. Three more snowstorms struck in January and then a strong one occurred on 26-27 January piling up 18 inches (46 centimeters) of snow in 24 hours. The total snow accumulation at Morristown during those 3 months was 83.5 inches (212 centimeters) of snow. Snowstorms continued into March and April. Philadelphia, Pennsylvania recorded a temperature -11° F (-24° C) on 9 February. Hartford, Connecticut recorded a temperature of -20° F (-29° C) on 14 February.<sup>27</sup>

In the year 1784, Joseph Clark, the architect who built the dome of the state house in Annapolis, Maryland in the *United States*, skated to that city from Baltimore.<sup>38</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:  
In 1783 on November 13<sup>th</sup> – a deep snow. November 28<sup>th</sup> – a great storm. December – the first half of the month moderate, the latter cold and stormy. In 1784 on January 31<sup>st</sup> – the first week of this month was moderate, but the rest horrid cold, stormy, snowy weather. February – a cold month, and indeed a cold winter through the whole; the longest and coldest ever known. March has been moderate, and not so very windy as usual. April 6<sup>th</sup> – it snowed yesterday and went away today. April 17<sup>th</sup> – this is the third day of cold, rainy, snowy weather.<sup>78</sup>

The winter of 1783-84 was cold and severe in Bradford County, Pennsylvania in the *United States*. On 15 March 1784, a Great Ice Flood took place. The damage was particularly severe in the Wyoming Valley. The breaking up of the Susquehanna River greatly distressed the inhabitants who had built their houses on the low lands near the banks of the river. The uncommon rain and large quantities of snow on the mountains together with the amazing quantity of ice in the river; swelled the streams to an unusual

height of ten feet [3 m] and in many places twenty feet [6 m] higher than it had ever been known since the settlement of the country. Horses, cattle and other effects of the settlers were swept down in the torrent of floodwater and forever lost.<sup>178</sup>

On 10 January 1784, Bombay Castle in India reported that Brigadier General Macleod onboard the *Ranger* that on 28 & 29 December 1783, there was snow off Mangalore, in southern *India*.<sup>249</sup>

On 27 February 1784, a hurricane or waterspout struck Havannah [Havana], *Cuba* and it caused the loss of 17 or 18 sail of vessels [sailing ships]. The hurricane only lasted a few hours and was not felt at any other islands. These tornadoes are frequent in the isle of *Cuba*, and principally upon the seacoast. They are of short duration, but excessively severe and dreadful. One of these stationary storms, or airquakes as the Spanish language terms them, happened in the year 1705, when four men-of-war, with most of their crews, were lost in the harbor of the Havannah, though the period of its lasting was not more than twenty-four hours.<sup>244</sup>

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**1784 A.D.** On 14 April 1784, Lucca in central *Italy* reported, “The inhabitants of the villages of St. Casciano de Controne, belonging to this republic, and situated at the foot of the Apennines [Mountains], lately experienced a most terrible disaster. After a violent rain, accompanied with high winds, on the 29<sup>th</sup> of last month, about noon, an extraordinary motion of the earth was felt in the village of Celle; which occasioned the inhabitants to leave their falling houses, with what effects they could collect amidst their horror and amazement, and retreat to a large plain, driving their cattle thither for safety. In the evening of the same day, they had reason to congratulate themselves for the prudent precaution they had adopted; for a dreadful chasm opening, not less than fifty houses, which had been inhabited by about 300 people, were in an instant swallowed by the earth. The effects of this phenomenon were felt in a circumference of about three miles, which now exhibits a shocking scene of desolation. The loss sustained is estimated at 35,000 crowns.”<sup>249</sup>

On 6 May 1784, a waterspout was observed at Aberdeen, *Scotland*.<sup>249</sup>

On 10 May 1784, Aberdeen, *Scotland* reported, “Upon Thursday last week [6 May], in the forenoon, there appeared at Ellon, something very uncommon, at least in this country. About eleven o’clock, there was observed, to the eastward, something like the smoke that arises from a whin-bush or wet straw when set on fire, and seemed to issue from a black thick cloud; one side of which, a column of seeming smoke, appeared as if it ascended, and the other side of it, as if it descended, and sometimes the whole column seemed to move round. Soon after, there was seen, a little below the town of Ellon, upon the river and some of the grounds adjacent, a grayish-coloured vapour [waterspout], which moved up the river, the water of which, at the surface, was whirled about, and is said to have been raised sometimes to a considerable height; at which time there was heard an uncommon noise, which, at first, was thought to be thunder, but it seems plain it was not; for the sound was quite different from the sound of thunder; and it did not intermit, but continued equally the same, till it ceased altogether, which happened about two or three minutes after it was first heard. Whether this noise was occasioned by the vapour, or by the approach of a very heavy shower of uncommonly large hail, seems to be uncertain. The grayish-coloured vapour moved up the river, whirling, or at least ruffling, the surface of the water. When it came a little below the place where the ferry-boat passes, it appeared, on the south bank, in the form of a cone, and was seen to move round rapidly, for a little; and about the same time, one of the ferry-boats, it is said, was whirling about again and again; and in a little after, it disappeared, and was not seen any more by the people about Ellon. No hurt was done to trees, nor any thing else, as has been reported. Some say, that, while the vapour was moving up the river and its banks, they felt the smell of sulphur; but others, who were equally near, say, that they felt no such smell.”<sup>249</sup>



On 26 May 1784, a most alarming thunderstorm did considerable damage in the neighborhood of London, *England*. A ball of fire entered a gentleman's house in Hounslow, threw down a stack of chimneys, and struck a manservant and a footboy senseless, who notwithstanding, soon recovered. The lightning blasted many trees; and, what is remarkable, the leaves fall from the trees, in several places, as if in autumn, without any apparent cause.<sup>244</sup>

On 31 May 1784, a strong hailstorm struck Welch Pool [Welshpool], *Wales* and the surrounding neighborhood. The storm produced the most violent and heavy rain and hail, attended with the most tremendous thunder and lightning, ever remembered in those parts. The torrents of water pouring from the long mountain, brought down a most amazing quantity of earth and large stones, carrying away every mound and railing in its course, and entirely choking up the little bridges across the roads, so as to overflow them in several places.<sup>249</sup>

On 4 June 1784 it was reported that the principal square of a fortified town Ronda in the Kingdom of Grenada, *Spain* sunk, with all the houses that surrounded it. Approximately 3,000 people lost their lives. The disaster is attributed to the continual rains, which undermined the foundation of rock on which the town was built.<sup>247, 250</sup>

On 5 June 1784, there was an extraordinary storm of rain and hail in *England*.<sup>249</sup>

On 5 June 1784, a strong hailstorm struck Sherborne in Hants, *England*. "A very extraordinary storm or hail happened on the 5<sup>th</sup>, which was preceded by drops of rain as broad as a half crown. These drops of rain were soon followed by round hail, and then by pieces of ice, some of which measured more than three inches in girth; these stones coming from the N.W. [northwest] broke all the windows and garden glasses which were open to that quarter, but the principal damage was done in several farms at the N.W. of this village, where it has made great havoc indeed. The beans, pease [peas], and clover, are in appearance half ruined; but the wheat not being in the ear we hope has escaped pretty well. All the hop gardens in that part of the parish are much injured, and yet all the while there was no hail at several of the neighbouring villages, neither did it extend to the top of this; the storm appeared to have been not more than a mile in breadth. In the spot where the centre of the storm passed, there arose a vast and sudden flood, which seems to have done as much mischief [damage] as the hail; the soil is swept out of the corn-fields into the lanes, and the meadows filled with mud and gravel; such a torrent came down the hollow lanes as tore up the very rocks. It is impossible at present to estimate the damage. The great pieces of hail were, I thought, somewhat of the shape of crockles [clams], with a white nucleus in each; it lay three feet deep in some places, and continued all day yesterday."<sup>249</sup>

On 19 June 1784, a new island near *Iceland* totally disappears. There was great devastation from subterraneous fires.<sup>249</sup>

On 13 July 1784, Sclavonia [now *Croatia*] reported that although the season has been remarkably temperate, the Save [Sava] River has not completely returned to its original channel, and many of the low grounds still are flooded. This is due to the vast amounts of snow that fell upon the mountains during the winter.<sup>247, 250</sup>

On last Wednesday se'night [14 July 1784] in the island of Jersey [a British Crown dependency just off the coast of Normandy, *France*], a tremendous storm of thunder and lightning passed over the island without doing any damage. But a vessel arrived from St. Maloes [Saint-Malo, *France*] indicating a great deal of damage was done to that city by the storm. Tops of chimneys were thrown down, houses unroofed, several persons killed, and a great many cattle were found dead on the ground adjoining that city. The vessels in the harbor took fire and were totally consumed.<sup>247</sup>



On 18 July 1784 in *France*, there was a hailstorm in the Pyrenees. Some of the hailstones weighed 18 ounces.<sup>93</sup>

In the Pyrenees Mountains, on the borders of *France* and *Spain*, on 18 July, there was a hailstorm; stones as large as hen's eggs, some weighing 23 ounces.<sup>41, 43, 57</sup>

On 19 July 1784, a violent storm struck Lago Maggiore [Lake Maggiore] in *Austria/Switzerland*. This storm destroyed almost 32 villages on the border of the lake. The part, which suffered the most was the coast opposite that belonged to the house of Austria. The hailstones were so large and fell in such quantities, that all the trees were stripped of their leaves. For some days after this, the weather was very cold.<sup>241, 247, 250</sup>

A hurricane struck *Jamaica* on 30 July 1784.<sup>41, 42, 124</sup>

Port-Royal in *Jamaica* destroyed by a terrible storm on July 30, 1784.<sup>41, 43, 56</sup>

On 20 July 1784, a storm did great damage at Port Royal, *Jamaica*.<sup>128</sup>

On 30-31 July 1784, a hurricane struck *Jamaica*. Many lives were lost. Two drowned from the ship *Hanover Planter*. Half the crew was lost from the ship *Industry*. On two other ships, most of the people perished.<sup>141</sup>

On 30 July 1784, *Jamaica* suffered from a hurricane. Upon the night of July the 30<sup>th</sup>, every vessel in the harbor, except four, was either sunk, dismasted, or driven on shore, and numerous lives lost; the barracks at Up Park Camp were blown down, and five soldiers killed; the workhouse was destroyed, and ten of its inmates killed or wounded. The storm began at half-past eight p.m., and continued till past eleven p.m. Two severe shocks of an earthquake were felt. [These appear to be hurricane-induced earthquakes.] On the first 3 days of August, the island [*Dominican Republic, Haiti?*] suffered severely from a storm.<sup>146</sup>

On 30 July 1784, a hurricane struck *Jamaica*. "After a close and warm day, the sun appearing more red than usual, and the hills being clear of those cloudy caps which usually cover them, about five in the evening the sky all of a sudden began to look extremely angry; the sea in the harbour of Kingston, rose in swells, without any apparent cause, as there was little wind stirring; the sun set in blood; and when the moon, which was near full, arose soon after, there was a duskiness across her disk, all which foreboded what we afterwards experienced. At seven o'clock the wind shifted, and began to blow fresh; on which occasion the ships in Kingston and Port-Royal harbour, many of which were preparing to get away, remoored. Captains and other officers, who were on shore regaling, made haste to get on board their ships. By ten o'clock the gale increased to such a degree, that there was no such thing as a boat living; the small craft were all drawn up on shore. At midnight the hurricane had increased to an alarming height; the clouds exceeding low and black, and a violent torrent of rain issuing from them. At two in the morning a smart shock of an earthquake was felt, which caused the people to get out of their beds, and many ran naked into the fields; within a few minutes after another shock was also felt, but less severe, though accompanied with a hollow noise as of thunder, which went gradually off in about four minutes. By four o'clock, which was before day-light, a prodigious devastation was done in Kingston. At six the gale began to moderate; and by nine it was so near over, that boats ventured off. The morning discovered an awful sight, the wrecks of vessels, some of the ships still at anchor, but dismasted, and mere wrecks; among which were the *Flora* frigate of 36 guns, Capt. Montague, who flung most of her guns over, and were obliged to cut away all her masts. The *Janus*, of 44 guns, where the Commodore's pendant was, luckily lay in a kind of eddy, sheltered from the wind's greatest force. To our great surprise, neither the ships at Port Royal, nor this place, suffered so much as was to be expected. Some houses were blown down at New Greenwich, and a few at Spanish Town. In St George's parish, at Crawford Town, they had

a great deal of mischief [damage] done, and seven people killed. In the harbour of Port Morant, four vessels were lost. In Manchineel [Manchioneal], two are lost, and a number of craft. To the parish of St. Thomas in the East, which is at the S.E. [southeast] point of the island, the most damage has been done. There has been much mischief [damage] at St. Ann's, but the accounts are various. The number of people killed is about 170 in all the island, chiefly slaves.”<sup>249</sup>

On 31 July 1784, a hurricane struck *Jamaica*. The effect of this hurricane last night was fatal beyond imagination. Every vessel in the harbors, except three or four, among which is numbered his Majesty's packet-boat *Thynne*, were either sunk, dismantled, or driven on shore, and great numbers of lives were lost. The *Martha* was one of the ships destroyed, and every soul perished, except for the carpenter. The barracks at Up-Park Camp were leveled with the ground, and five soldiers killed. The inner barracks on the parade was in ruins, and several soldiers terribly maimed. The workhouse was also destroyed, and about 10 persons killed or wounded. In the upper part of town, and to the eastward, the scene is fearful beyond example. The whole town has suffered immense damage. The storm began about 8:30 p.m., with a deluge of rain, and continued with increasing violence till past 11:00 p.m., when it moderated. To add to the horror of this dreadful night, two severe shocks of an earthquake were felt between 9 and 10 o'clock at night, which completed the destruction of several houses. His Majesty's ship *Janus* rode out the storm. The ship *Brothers* was totally dismantled, and six of her hands were washed overboard and perished. The ships *Simon Taylor* and *Ester* were both [washed] ashore on the Palisadoes. The former it is believed was lost, the latter got off, though not without considerable damage. The vessels sunk and otherwise damaged at *Jamaica* included: the *Thompson*, his Majesty's brigs *Antelope* and *Duke of Rutland*, and the *Friendship*, *James*, *Industry*, *Adventure*, and *Regulator* (a brig belonging to Captain Everet, and every soul perished), and the Spanish brig *Souverain*. Several schooners were lost including: *Eliza*, *La Bische*, *Marianne*, *Endeavour*, *Kingston*, *Union*, *Bell*, *Daphne*, and a watering schooner. Several sloops were lost including: the *Fly*, *Patty*, *Dolphin*, *Viper*, and *Surprize*. The vessels onshore include: *Three Sisters*, *Tartar*, *Esther*, *Jett*, *Two Brothers*, *Sally*, *Sophia*, *Fox*, *Providence*, *Three Friends*, *Grand Folie*, *Success*, *Two Friends*, *St. Croix Packet*, *Ann*, *Kingston* and *Juno*. The vessels dismantled included the *Flora* man-of-war, *Thynne* packet, *Maria*, *Martha*, *Garnet*, *Two Brothers*, *Nancy*, *Dragon*, *Fort Augusta*, *Betsey*, and *Durald*. Two unknown vessels were dashed to pieces on the rocks near Fort Small, and most of the people perished. The ship *Portland Planter* was dashed to pieces at the mouth of Plantain Garden River. A new fort to the east of Port Royal stood up fairly well to the force of the hurricane. But the barracks at Fort Augusta was mostly in ruins. It fell to the earth so suddenly that four soldiers were killed instantly and thirty others wounded and some of these wounds are so grievous that they may perish. The barracks in Spanish Town was blown down by the fury of the storm, crushing one soldier to death and wounding three others very dangerously. The parishes of St. George and St. David suffered enormous damage and most of the estates and plantations in those districts have lost their buildings and provisions. The storm struck with ten times more fury in the parish of St. Thomas, which now is a scene of complete desolation. Many people have perished there. The villages of Morant Bay and Port Morant were destroyed. At the harbor of Port Morant, the ship *Eliza* was utterly lost and the ship *Fame* was driven on the rocks. Every vessel in this harbor was either ashore, sunk or entirely destroyed. The parishes of Clarendon and Vere suffered great destruction. Several vessels fled the port before the hurricane struck and afterward returned in distress. The *Rosehill* lost her main and mizzenmast. The *Philippa* was totally dismantled and one of the crew killed. At Annotto Bay, the ship *Spencer* was totally destroyed and two brigs were driven ashore. At New Charles Town, the two wings of the barracks on the palisade were blown by the hurricane. The main body of the building was moved from the pillars on which it stood a distance of at least 15 feet. At Old Harbor, the ship *London* is totally lost and the ships *Benson* and the brig *Sally* are completely dismantled. Also great quantities of sugar, rum, coffee and cotton in the stores were destroyed or damaged beyond use. Great numbers of dead bodies, of all colors, have been found on the beach at Hunt's Bay, and other parts of the harbor. The damage done at Kingston and Port Royal and to the shipping is computed at a moderate estimate as

500,000 *l.* [In present currency, that would be equivalent to £685 million in damages based on the retail price inflation index.]<sup>241, 247, 250</sup>

On 1-3 August 1784, a hurricane struck the island of San Domingo [*Haiti*]. It lasted 3 whole days, attended with very heavy rain, which has done incredible damage to the plantations, particularly the cotton grounds; but the most heavy loss is in the cattle, which taking shelter in the valleys from the violence of the storm, were found drowned, the water having come down from the hills in torrents. The northwest parts, where the plantations lie, have received very great damage; the Spaniards have not suffered near so much, except in their shipping, of which it is already known they have lost thirteen sail of vessels [sailing ships]. The king's ship *L'Amphibieux*, of 36 guns, was in the harbor on the 2<sup>nd</sup>, but drove to sea, and is feared to be lost. The Spaniards, as we learned, felt it [the hurricane] severely at Havana, Cuba.<sup>250</sup>

In 1784, a hurricane struck the *Caribbean* island of Curacao. During a hurricane, several large ships were wrecked in the main harbor and others forced to sea, where they were lost without a trace.<sup>141</sup>

In *England*, there were great floods in Yorkshire; Tadcaster bridge thrown down and several lives lost.<sup>47</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Nîmes, <i>France</i>	(101.1° F, 38.4° C)
Angers, <i>France</i>	(100.4° F, 38.0° C) on 17 July
Perpignan, <i>France</i>	( 97.3° F, 36.3° C)
Montdidier, <i>France</i>	( 95.0° F, 35.0° C) on 20 May
Tonneins, <i>France</i>	( 91.6° F, 33.1° C)
Étampes, <i>France</i>	( 91.6° F, 33.1° C)
Beaune, <i>France</i>	( 90.5° F, 32.5° C) on 6 July
L'Aigle, <i>France</i>	( 89.4° F, 31.9° C)
Brest, <i>France</i>	( 86.0° F, 30.0° C)
Montluçon, <i>France</i>	( 86.0° F, 30.0° C)
Mont-Dauphin, <i>France</i>	( 80.6° F, 27.0° C) on 7 July
Castel-Sarrazin, <i>France</i>	( 75.2° F, 24.0° C) on 18 July

The year 1784 was irregular in *France*. Excessive cold and heavy snows characterized the winter. There was a stubborn drought in the spring that destroyed the forage. The summer was characterized by alternately periods of excess heat and cold, humidity and drought. Premature chills invaded the autumn.<sup>79</sup>

During the summer of 1784, the heat at Mesulapatam [Machilipatnam, *India*], in the East Indies was very uncommon and extraordinary. The thermometer was up at 109 [° F, 42.8° C], and at Ellone rose to the astonishing height of 120 [° F, 48.9° C] out of the sun [in the shade].<sup>272</sup>

On 27 August 1784, a most violent hurricane [tornado] attended with dreadful thunder and lightning struck Newhaven [New Haven, Connecticut in the *United States*]. Its course was from northwest to southwest and its greatest force about 300 yards [900 feet, 274 meters] wide. In one parish ten dwelling houses, five barns, two great mills, and a sawmill were leveled to the ground. The parsonage demolished, and the Rev. John Minor Jehu buried in the ruins [ruins]. The planks of a new bridge, formally spiked down, were torn off and carried a considerable distance; the largest trees rooted up on the forest. The lightning set fire to many stacks of hay. In short, destruction marked its progress."<sup>272</sup>

On 29 August 1784, Constantinople [now Istanbul, *Turkey*] reported, "After a continuance for some weeks of the hottest weather ever remembered in this country, the contagious disorder seems to have entirely ceased in this capital and its environs; so that there has been no appearance of the plague for this last fortnight. The same cause has operated like happy effects at Smyrna [an ancient city now located at

Izmir, *Turkey*], and in the islands of the Archipelago, where, as the last letters mention, the contagion had also nearly ceased.”<sup>249</sup>

On 29 October 1784, *Scotland* reported that the harvest was very productive and the crop was the finest they had in many years. As a consequence, meal is already down to 11 *d.* per peck.<sup>247</sup>

On 23 November 1784, Elsineur [now Helsingør, *Denmark*] reported, “There has been great damage done among the shipping here, occasioned by two different gales of wind which happened last week. The first began at one o’clock on Thursday [18 November] morning, the wind westerly, and continued about 18 hours, the second began on Thursday evening, when the wind shifted to the E.N.E. [east northeast] and continued till Friday evening a very severe storm. There are a great many ships wrecked and drove on shore; about 12 vessels betwixt [between] Elsineur and the Coble, some on the Danish and some on the Swedish shore. They are mostly Swedes. A Danish West Indiaman is entirely lost, about six miles below the castle, homeward bound, with a cargo of coffee, rum, Madeira, &c. the people saved. There are several other vessels on shore, which have not yet come to our knowledge. The following is the damage done among the Scots ships. The *Nelly*, [Captain] Webster, of Montrose, for Leith, struck upon the Anholt, but is got off again; she is now at Copenhagen repairing, as she was leaky. The *Leviathan*, [Captain] Nicols, of Dysart, was run foul of by an English bark, and is greatly damaged. He also is at Copenhagen repairing. Capt. Chilton, of Sunderland, for Leith, is supposed to be a-ground somewhere, as he did not come back when the other ships returned. Capt. Anderson, of the Margaret of Inverkeithing, from Memel, with grain, is arrived here in a ship belonging to Newcastle, who took him up at sea, his own vessel having sprung a leak, and was sinking when the Newcastle ship picked him and his crew up, on Saturday last, betwixt this and Memel [now Klaipėda, *Lithuania*?].<sup>249</sup>

Great damage done in America (*United States*) from a storm, particularly in the New England area in 1784.<sup>41, 56</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 29<sup>th</sup> – raw, cold; the spring is very backward. May 9<sup>th</sup> – a pleasant day. May 15<sup>th</sup> – a hot summer day. May 25<sup>th</sup> – a deluge of rain. June 3<sup>rd</sup> – a hot morning. June 5<sup>th</sup> – a hot day; thus summer breaks in upon us. June 12<sup>th</sup> – cold. June 18<sup>th</sup> – hot. June 20<sup>th</sup> – very hot. June 27<sup>th</sup> – (Sunday). A terrible tempest, which obliged me to break off in [the middle of] my sermon. June 30<sup>th</sup> – as growing a season as we could wish; strawberries are very plenty, large and good. July – frequent rains this month. July 18<sup>th</sup> – there came suddenly as great a tempest as ever I knew, preceded by some hideous darkness, and accompanied by a vast shower. July 20<sup>th</sup> – extremely hot. July 31<sup>st</sup> – fair, and good hay season, but not before. August 4<sup>th</sup> – heavy rain. August 14<sup>th</sup> – we have had a week of very hot weather. August 18<sup>th</sup> – a wonderful growing season. August 23<sup>rd</sup> – great rains frequently. September 2<sup>nd</sup> – a deluge of rain. September 14<sup>th</sup> – uncommonly cold. September 19<sup>th</sup> – cold. September 29<sup>th</sup> – a warm, delightful day. September 30<sup>th</sup> – no frost yet to hurt the corn or do much damage.<sup>78</sup>

In 1784 during the period between 21 February and 20 March, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ning-yang and Ho-tsê. During the period between 21 March and 19 April, a drought engulfed Hopei (now Hebei province) in northern *China* at Ta-ming. During the period between 18 June and 16 July, a drought engulfed Hupeh (now Hubei province) in central *China* at Ying-ch’êng. During the period between 8 August and 8 November, a severe drought engulfed Shensi (now Shaanxi province) in central *China* at Ning-shan and Sian.<sup>153</sup>

*Also refer to the section 1780 A.D. – 1784 A.D. for information on the drought and famine in Bangladesh, Pakistan, and India during that timeframe.*

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### 1784 A.D. – 1785 A.D. England, France, Italy and Spain. Drought

During the two years of 1784 and 1785 around Toulouse, *France*, the drought caused the loss of all draft animals. As a result, many of the cultivators had to let their field lie fallow.<sup>87</sup>

On 3 May 1785, a dreadful drought was reported in *France, Italy, Spain*, and Piedmont [a region of Italy].<sup>251</sup>

On 9 May 1785, there was a great drought in *England*. The River Thames was so low at Kew and Richmond, that the passage-boats were obstructed. On 11 May, some persons set fire to the heath growing in Windsor Forest, which continued to burn for several days. The like accident happened near Boughton, in Kent. The heat and dryness of the season occasioned these fires to spread. On 1 July letters were received from *France, Spain*, and *Italy*, which stated that they had experienced a most uncommon heat and dryness of the season.<sup>128</sup>

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#### **1784 A.D. – 1785 A.D. Egypt. Drought and Famine**

In November 1783, the plague was brought in from Constantinople into *Egypt*. Not less than 1,500 dead bodies were carried out of the gates of Cairo, *Egypt* each day [for burial]. During the summer of 1783, the inundation [of the Nile River] was insufficient. A great part of the lands therefore could not be sown for want of water, and another part was in the same predicament for want of seed. In 1784, the Nile again did not rise to a favorable height and a dearth immediately became extreme. Soon after the end of November, the famine carried off, at Cairo, nearly as many as the plague. The streets, which before were full of beggars, now were completely empty of them. All had perished or deserted the city. Nor were its ravages less dreadful in the villages where the inhabitants who attempted to escape death, scattered to the adjacent countries. *Syria* was full of them. In January 1785, the streets of Saide and Acre, and every town in *Palestine*, were crowded with Egyptians, easily distinguished by their tawny skin. Some of them had wandered even as far as Aleppo, *Syria* and Diarbekar [Diyarbakir, *Turkey*]. *Egypt* had lost approximately one-sixth of its population. The famine in *Egypt* was severe. As an example in 1785 under the walls of ancient Alexandria, two wretches sitting on the dead carcass of a camel were disputing its putrid fragments with the dogs.<sup>224</sup>

In November 1784, the news from *Egypt* was troubling. “In Alexandria they are almost entirely deprived of water. The troubles in Cairo having prevented the departure of the Bey, sent annually from Cairo by the government, until the Nile should overflow, for the purpose of conducting the water by the canal, which furnishes Alexandria for a whole year, the Arabs, who inhabit the borders of the river, have taken the opportunity to make so many cuts, as almost entirely to deprive Alexandria of water. The inhabitants, on the very point of perishing by drought, have retired to Rosetta. Thurat Bey, induced by their intreaties, has taken every precaution to remedy this evil; and it is hoped will succeed, as the Nile already begins to overflow; meantime the distress is extreme. The rich in Cairo and Alexandria pay six times more for grain, and other necessaries; and the poor are daily dying of famine.”<sup>249</sup>

In 1784-85, a dreadful famine raged in *Egypt* caused by a deficiency in the inundation of the Nile River. The streets of Cairo, which at first was full of beggars, were soon cleared (because they perished or fled). A vast number of unfortunate wretches, in order to escape death, spread themselves over all the neighboring countries and the towns of Syria were inundated with Egyptians. The streets and public places were crowded by famished and dying skeletons. All the most revolting modes of satisfying the cravings of hunger were resorted to, and the most disgusting food was devoured with eagerness. The depopulation of the two years was estimated at 1/6<sup>th</sup> of all inhabitants.<sup>188</sup>

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**Winter of 1784 / 1785 A.D.** In Selborne, *England*, the winter was remarkable for the exceedingly severe cold of December 1784. From 6 November to the end of the year 1784, the weather alternated between fog, rain, and hard frost. The longest and most severe frost occurred in December. On 2 January 1785, a thaw began, and rainy weather with winds continued until 28 January. From then until 15 March, there was hard frost. To March 21, mild weather ensued with sprinkling showers. From then until 7 April there was a hard frost.<sup>70</sup>



A dreadful storm struck the north coast of *England* on December 5, 1784.<sup>41</sup>

In December 1784, there was great damage done by a storm, among the shipping at Newcastle, *England*, and along the east coast of *England* and *Scotland*.<sup>249</sup>

On 8 December 1784, the weather took a most remarkable turn in the southern climates of *Great Britain*. From very mild, a gentle frost, just intense enough to break up the roads, set in from the north. It was accompanied with a fall of snow that in less than 24 hours laid the flat country everywhere level as a plain, so that the most experienced stage coachmen had no certain signal to direct their way. Even the post-boys and their horses (the guides most to be depended upon) were unable in many places to proceed; and where they were daring enough to make the attempt, were obliged to remain at the first sheltering place till the roads could be made passable by the labor of men. The mail-coach from Bristol was twice in the night dug out of the snow on Marlborough downs; and, when it reached Marlborough town, the passengers were glad to stay behind, while the drivers with astonishing perseverance proceeded with the mail, and brought it in only a very few hours later than usual to the post-office in Lombard street. A greater interruption to business and traveling has not been felt since the general improvement of the roads by the establishment of turnpikes. For two days afterwards, the frost was intense, and the cold excessive. But though the country wore the livery of winter, the inhabitants, in comparison with those of the northern climates, felt little of the rigors of it. Much about the same time the winter began in Holland [now *the Netherlands*]: before the 13<sup>th</sup>, the rivers were all covered with ice and snow; and in *France*, the Seine River was frozen over so early as November.<sup>272</sup>

At Newcastle [Newcastle upon Tyne in northeast *England*] reported on 11 December 1784, a strong storm struck *England*.<sup>247, 249, 250</sup>

— On Sunday morning [5 December] a large fleet of upwards of 150 vessels sailed from Yarmouth Roads. About 4 p.m. between Cromer and the floating light, a violent storm arose with heavy rain, and wind, which separated the fleet. The gale increased and split all the sails into shivers, so that it was impossible to work the ships, or keep them off the land, and many were obliged to cut away their mast.

— On Sunday night at 9 p.m., a strong wind sprung up from the east, and about midnight it blew a perfect hurricane, attended with a heavy fall of hail and snow, which continued with unremitting fury until Tuesday [7 December] at noon. The snow continued intermittently until Thursday [9 December] when it was very severe the entire day. The snowfall was so great on Monday that all the roads were completely blocked. Numerous laborers were procured to clear the roads, especially the great North road, between Felton and Alnwick, and westward between Harlow Hill and Hexham. The mail on Tuesday was obliged to have an additional horse to drag it through the snow from Durham to Newcastle and from Newcastle to the North. All trade is now at a standstill. No wagons were able to arrive in town, except the Darlington yesterday.

— At sea it was dreadful beyond description. The entire coastline was strewn with wrecks, and vessels aground, so that from every part we hear of nothing but distress. A prodigious number of ships have been driven ashore, many entirely lost and a great number of seamen and passengers drowned.

— Some ships were seen to founder at sea, the crews of which immediately perished; and no doubt but many others have had the same miserable fate.

— Sunderland reports that on Monday morning about 30 keels were found sunk in the river, mostly laden with coal. Also several ships broke from their moorings, but received little damage. That day a sloop for Leith, Scotland laden with barley drove onshore between the piers. The master and mate drowned, but two men, ship and cargo were saved. On Tuesday morning, the coast wore an awful appearance, being covered with wrecks and dead bodies. Upwards of 50 sails [sailing ships] were onshore between that port and Hartlepool, and about 16 between it and Shields.

— Seaton reports the most melancholy and distressing scene of ships, some upon the rocks, others upon the sands, others at anchor some distance from the shore, which appear in the utmost danger, and the sea



running to high, that it is impossible to give them any assistance from shore. There are about 16 ships on shore near Hartlepool, one of which has no living creature onboard and appears to be a light oiler. There has been a great fall of snow in Cleveland, particularly on the mountains near Kirkleatham, Gainsborough, and Stokesley.

The storm that struck *England* between 7-9 December 1784; at sea was dreadful beyond description. The entire coastline was strewn with wrecks, and vessels aground, so that from every part we hear of nothing but distress. A prodigious number of ships have been driven ashore, many entirely lost and a great number of seamen and passengers drowned. The following is the best intelligence that can be procured, and may be depended on:<sup>249</sup>

— The *Restoration*, [Master] Hutchinson; *Broderick*, [Master] Craister; *Friendship*, [Master] Stephenson; *Loyalty*, [Master] Hillyard, [at] Druridge Sands, *England*. *Leostaff*, [Master] Tinley, off Sunderland. *Hunter*, of Sunderland; *Royal Briton*, of Whitley, to the northward. *Isis*, [Master] Ware; *Providence*, [Master] Watt, [at] Cresswell. *Friendship*, [Master] Dean, of Sunderland, [at] Prior's Haven, broke up, and the master drowned. *Leighton*, [Master] Leighton; *Newcastle*, [Master] Redhead, northward; supposed will break up. *Good Design*, [Master] C. Heron; *Elisabeth*, [Master] Greenwell; *Robert*, [Master] A. Scott, northward, lost [at sea]. *Pallas*, [Master] Shipley, [at] Hartlepool, broke up. *Elisabeth and Mary*, [Master] Armstrong, Willington, Scott, Herd, [at] Goodwin? Sands. *Grace*, [Master] Armstrong, a little to the south of the bar, with her masts gone, riding. *William and Frances*; [Master] Crescent, of Blythe [Blyth, *England*], near Sunderland. *Joseph*, [Master] D. Smith, near Hartlepool. *Northumberland*, (Clarke's), [at] Amble [in Northumberland, *England*] Pans [a natural basin], broke up. *Industry*, [Master] Spence; *Richard*, (Clarke's); *Thomas and Sarah*, [Master] Ayre, of Lynn; *John's Endeavour*, [Master] Chapman, of Sunderland, [at] Hawkesley. *Margaret*, (Rayne's), south of Bondicar [Bondicar Rocks in Northumberland, *England*]. *Eliza*, [Master ?], [at] Hudston Rocks. *Friendship*, [Master] Carling; Hartley and Broderick, south of Hudston Rocks. *Jane*, of Whitby, (Clarke's), lost; and *Mary*, [Master] Carling; *Success*, [Master] Garbutt; *Venus*, [Master] Cannaway; [at] Cresswell Sand. *English Hero*, (Story's), [at] Blythe [Blyth, *England*], thirteen drowned, and four boys saved. *Fame*, [Master] Scott, [at] Hartlepool, broke up. *Good Design*, [Master ?], [at] Herd, broke up. *Friends*, [Master] Wilson, near Storey's Landing, will be got off. *Good Agreement*, [Master] Wright; *Betsey*, [Master] Tewart, south of Sunderland, broke up. *Good Intent*, [Master] Ware, northward. *Charles and Jane*, (Cunningham's), [at] Hawkesly; *Spring*, [Master] Appleby, [at] Hawkesly, lost. *Happy Return*, [Master] Barton, [at] Sunderland. *Endeavour*, [Master] Carling, [at] Cresswell. *Adventure*, [Master] Cart, (Rowe's); *Mercury*, (Hall's), [at] Hartlepool, will be got off. *Friendship*, lost in the harbor, by some evil-disposed persons cutting her ropes. *Two Janes*, [Master] Guy, southward, gone to pieces. *Perseverance*, [Master] Jefferson, of Newcastle, northward, lost. *Active*, [Master] Gale, of Petershields, northward, lost, crew perished in going into Dunbar. *Jane*, [Master ?], of Borrowstounness [Bo'ness], with goods, gone to pieces on Cresswell Rocks, five men and passengers drowned. *Friend's Regard*; *Traveller's Restoration*, near Hartlepool. *Friendship*, [Master] Coppin, [at] Yorkshire coast. *Dorothy*, [Master] Scott, near Hartlepool, lost. *Kitty*, [Master] Harwood, [at] Hartlepool, gone to pieces. *Good Intent*, [Master] Smart, [at] Marston. *Rochester*, [Master] Rippon, south of Sunderland. *Ann and Mary*, [Master] Davidson, south of Sunderland, lost. *Susannah*, (Wallace's), off Tees, lost. *Industry*, [Master] Wood, at Cullercoates, feared will not be got off. *Folkstone*, [Master] Robinson, northward, lost. *Two Brothers*, [Master] Walton, [at] Cresswell. *Cromer*, [Master] Crook, lost, with all hands, in making the harbor. *Amity*, of Ipswich, [at] Hartley. *Hopewell*, [Master] Scarse; *Squirrel*, [Master] Hellow; *Fame*, [Master] Murray; *Brothers*, [Master] Hall, loaden from Petersburg, [at] Dunstonburg. *Elisabeth*, [Master] Greenwell, north of Sunderland, lost. *Margaret*, [Master] Alex. Stephenson, of Shields; *Samuel*, [Master] W. Dee; *William*, [Master] J. Moor; *Hartley*, [Master] J. Howe; *Elisabeth and Hannah*, [Master] Mark Liddell, of Sunderland; *Adventure*, [Master] S. Liddle, of Scarborough; *Friend's Adventure*, [Master] Jackson Kildin, of Yarmouth; *Granby*, [Master] Thomas Bygate, of Wisbech; the master and one man drowned, all on shore, off Warkworth. A sloop, attempting to make the harbor, lost, and all hands.

— Mr. Dean, the master of the *Friendship*, which went on shore in Prior's Haven, was washed overboard, and drowned, and two of his seamen nearly suffered the same fate; but were providentially thrown back by the next wave. Some men from the shore humanely lent every assistance; and particularly one Ralph Franks, who, with equal courage and humanity, dashed into the waves, swam to the ship, and, with a rope in his hand, back again to the shore. To this rope was fastened a large cable, which the people on shore pulled to them, and secured; and by that means seven of the crew got safe to land. A subscription has been opened for rewarding him.

— Mr. James Craister, master of the *Broderick*, was once washed overboard, but: was thrown back by the next waves. The lives of many are owing to the same providential circumstance.

— When the *English Hero* was cast on shore at Blythe [Blyth, *England*], the crew took to their [life] boat, and left two boys on board, whom they would not take in. One of them, determined to follow it, was preparing to throw himself in, but was hindered by the other; and when he perceived the [life] boat overset [overturned], soon after he told his companion, who kept above board, that he would go down to prayers, where he continued till low tide, when the people came to their assistance. The boy on deck, being asked if any more were on board, told them of his companion, whom he supposed was dead, not having seen him so long; but on going to the hold, they found the boy fast asleep, as if nothing had happened. Ten of the bodies of the boat's crew have been found, and buried in Blythe burying ground.

On 6 December 1784, Alemouth, *England* reported, “The effects of the late storm must be dreadful, (from what I see here), beyond any thing on this coast perhaps in the memory of man. There are eleven vessels on shore betwixt this and Cocket Island, besides what are foundered, or gone to pieces among the rocks; the lives of the crews of the eleven are providentially saved. There are fifteen ashore to the northward of this, and thirty betwixt the Cocket and Cresswell Point.”<sup>249</sup>

On 24 December 1784, Newcastle [Newcastle upon Tyne in northeast *England*] reported, “The fatal effects of the dreadful storm [of 5 December] are perceived daily, by the dead bodies and wrecks which float up the [River] Humber.” On land, the storm produced great drifts of snow deep enough to bury sheep alive. Several people died in these snow drifts.<sup>249</sup>

A dreadful storm struck *Italy* in December 1784.<sup>41, 43</sup>

In 1785, the frost in *Britain* lasted 115 days.<sup>41, 43</sup>

In *England*, the frost during the winter of 1784-85 lasted 115 days.<sup>128</sup>

In Selborne, *England*, on 7 December, the barometer sank to 28.5, and heavy snows began to fall, which continued that day and the next and the most part of the following night. So that on the morning of the 9<sup>th</sup> “the works of men were quite overwhelmed. The lanes filled so as to be impassable, and the ground covered twelve or fifteen inches without any drifting. In the evening of the 9<sup>th</sup>, the air began to be so very sharp that we thought it would be curious to attend to the motions of a thermometer.” On the morning of the 10<sup>th</sup>, the quicksilver [mercury] of Dolland's glass was down to half a degree below zero (-0.5° F, -18.1° C). During the night of 10 December, at eleven in the evening, even though the air was perfectly still, Dolland's glass went down to one degree below zero (-1.0° F, -18.3° C).<sup>70</sup>

In December 1784, the temperature fell to -1° F [-18° C] at Selburne [Selborne], *England*; +17° F [-8° C] at Newton; -5° F [-21° C] at Fyfield, near Andover; +11° F [-12° C] at S. Lambeth; +15° F [-9° C] at London; and +2° F [-17° C] at Winchester. The observed temperatures were relative with elevation. Those at the lower elevations fell the lowest. In houses without cellars, the frost penetrated into the storerooms and their entire stock of roots and fruits were destroyed by the cold. During the intenseness of the cold, shining spiculæ of ice were seen floating in the sunshine, like the particles of dust in a ray of light admitted into a dark room [diamond dust]. [Captain] Middleton observed this appearance in the

severe weather at Hudson's Bay [in *Canada*].<sup>272</sup>

At Leeds in Yorkshire, *England*, the temperature in December 1784 fell as low as 6° F [-14.4° C], a degree of cold greater than has been felt in England these many years. Beginning around 13 January 1785 there was a great fall of snow followed by intense frost. On 19 January, the temperature fell to 7° F [-13.9° C]. [As of March 1785], during the winter of 1784-85, there was 117 days of frost.<sup>272</sup>

In *England* in 1785, there was severe frost. At Hinckley (Leicestershire), the thermometer registered on the last day of February: 19° F (-7.2° C). There was much snow.<sup>47, 93</sup>

In 1785, the frost was severe throughout *Europe*; particularly in Holland [now *the Netherlands*].<sup>47, 93</sup>

In Constantinople [Istanbul, *Turkey*] in the winter of 1784-85, the weather was uncommonly mild, with soft rain, and the air so warm, that the inhabitants kept their windows open during the best part of the day. On 22 February 1785, there was a dreadful storm, which overset 40 vessels and 500 people lost their lives.<sup>272</sup>

According to accounts from *Silesia*, the degree of cold felt on the mountains on 28 February 1785 was equal to that felt at Petersburg in 1709.<sup>246</sup>

On 8 March 1785, Naples, *Italy* reported, "All our neighbouring mountains are deeply covered with snow, and that of [Mount] Somma affords a very singular spectacle, consisting of the burning lava issuing from the mountain, and melting the snow it encounters; in many parts torrents of fire and water are seen, intersecting each other in a variety of directions, amidst the white and glittering congelations with which the face of the country is overspread."<sup>272</sup>

On 10 March 1785, Prague [*Czech Republic*] reported, "that the snow had fallen incessantly from the 5<sup>th</sup> till that date; that there was not a spot to be found in the mountains that was not six feet [1.8 meters] deep; and that the birds were flying about, not knowing where to rest, so that they were easily caught by the hand. All Bohemia [now western *Czech Republic*] was in the same situation, though in lat. 32 [latitude 32° North]."<sup>272</sup>

On 12 March 1785, Warsaw, *Poland* reported, "The result of the observations made upon the cold since the year 1776, in the Royal Observatory in this city, are as follow, viz. in 1776, on the coldest day, the thermometer of Reaumur was at 21 degrees [below zero, -15° F, -26° C]; in 1777, at 17 [degrees below zero, -6° F, -21° C]; in 1778, at 16 [degrees below zero, -4° F, -20° C]; in 1779, at 18½ [degrees below zero, -10° F, -23° C]; in 1780, at 16½ [degrees below zero, -5° F, -21° C]; in 1781, at 17 [degrees below zero, -6° F, -21° C]; in 1782, the same [-6° F, -21° C]; in 1783, at 19½ [degrees below zero, -12° F, -24° C]; and in 1784, although the cold was universally severe, the thermometer was only at 17 degrees [below zero, -6° F, -21° C]; and on the 28<sup>th</sup> of Feb. this year [28 February 1785] it was at 24½ degrees [below zero, which would equal -23° F, -31° C]; our accounts from Petersburg [*Russia*] mention, that on that day the thermometer was at 30 degrees [below zero, -35.5° F, -37.5° C]."<sup>272</sup>

On 26 March 1785, Elsinore [Helsingør, *Denmark*] reported, "The ice still remains in the Sound, so that the people are continuing to walk to and from *Sweden* on the ice. There is intelligence of some ships being in the Cattagat at present. There have been in sight of Hornbeck, two days ago, six ships, but since drove away with the ice; at the same place (which is six English miles [10 kilometers] below our castle) there were found some pieces of a wreck, supposed to be a Dutch ship."<sup>272</sup>

On 2 April 1785, London, *England* reported, "The winter season, to date it from the first of snow on the 7<sup>th</sup> of October last [1784], to that which fell this day, has lasted 177 days. And if we except about 12 days

towards the latter end of January, the whole of this period has been frosty or snowy, or both. Such another instance has not occurred in this island in the memory of man. The frost too has been more intense.”<sup>272</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1784 on November 30<sup>th</sup> – a wonderful month; so moderate, and no hard frost until last night. December 9<sup>th</sup> – it has not frozen in the house yet. December 11<sup>th</sup> – perhaps there never was so moderate a season. December 13<sup>th</sup> – cold and windy; winter seems to be setting in. December 19<sup>th</sup> – a terrible windy, cold day. December 20<sup>th</sup> – snow. December 22<sup>nd</sup> – another terrible snowstorm. In 1785 on February 3<sup>rd</sup> – very cold—the harbor is frozen up. February 12<sup>th</sup> – a cold, stormy day. February 13<sup>th</sup> – very cold and stormy. February 20<sup>th</sup> – moderate for several days. February 25<sup>th</sup> – an exceeding great driving snowstorm. March 1<sup>st</sup> – very cold. March 9<sup>th</sup> – more snow, but level [not drifted]. March 15<sup>th</sup> – very cold and windy. March 24<sup>th</sup> – blustering cold. March 31<sup>st</sup> – true winter weather. April 3<sup>rd</sup> – more snow. April 7<sup>th</sup> – Middle-street is all water and mire. April 10<sup>th</sup> – Back-street, the snow is as high as the fences; no sleighs can pass. April 13<sup>th</sup> and 14<sup>th</sup> – very cold. April 24<sup>th</sup> – the snow melts surprisingly, but it is still 2 or 3 feet (0.6 or 0.9 meters) deep in the woods.<sup>78</sup>

The winter of 1784 was tolerably mild in Philadelphia, Pennsylvania in the *United States* but significant snow fell.<sup>1</sup>

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**1785 A.D.** During the spring of 1785, letters were received from Daub [the region of the Duab Mountains in *Turkestan*] that many have perished by famine in that district. Whole bodies have been eaten by dogs and vultures.<sup>246</sup>

On 20 January 1785, an inundation in *Germany* caused the destruction of thousands of houses.<sup>128</sup>

During the evening of 13 February 1785, “the sea in sight of Alicant [Alicante, *Spain*] appeared as if on fire. This wonderful phænomenon excited every body’s curiosity, though nobody could account for the cause. The fire shone splendidly in the water, and its brilliance increased as the waves drew nearer the shore. When they broke upon it, they sent forth an infinite number of luminous particles, some great, some small, which flew to a considerable distance. This appearance began at half an hour after seven, and lasted three hours.”<sup>272</sup> [Bioluminescence from an algae bloom?]

Letters received from Rotterdam on 28 February 1785 reported a violent hurricane struck Curacoa [an island off the coast of *Venezuela*]. Several full laden ships in the harbor were driven ashore, while others were driven out to sea and never heard from again. This hurricane caused damage of immense value. A long range of warehouses, full of goods, was blown down and the goods buried in the ruins.<sup>272</sup>

On 10 March 1785, Friburg [Fribourg, *Switzerland*] reported, “The Rhine [River] is now so low at Klaussenberg [Klausenberg, *Germany*], that the rocks at the bottom of the river are entirely uncovered; an event which has not happened for many years past. An inscription, engraven on ascertains the date.”<sup>272</sup>

During the spring of 1785, there was great distress in *Germany* from inundations [floods]. A great part of the town of Writzen [Wriezen] on the Oder [River], together with 100 villages and farms, were inundated. The sleine [sluice] near New Gliezen, and the dikes above Custrim [Küstrin, now Kostrzyn nad Odrą, *Poland*], were both broken down and torrents of floodwater that issued were irresistible. Many of the strongest edifices [homes/buildings] were carried away, with whole families within. Both sheep and cattle without number perished.<sup>246</sup>

An inundation at Riga, *Latvia*, began on 21 April 1785 and continued until the 28<sup>th</sup>. The water rose 2.5 fathoms [15 feet, 4.6 meters], so that a part of the town and all the country round were overflowed. Over 2,000 masts were carried away.<sup>246</sup>

On 25 April 1785, it was reported that an epidemical disorder occurred in Calabria in Sicily, *Italy* and almost depopulated the region.<sup>251</sup>

In April 1785, the Mississippi River at St. Louis, Missouri in the *United States* reached a flood stage of 42 feet. This was 0.6 feet higher than the flood of 27 June 1844. In comparison, during the flood of 1892 in the vicinity of St. Louis, the Mississippi River reached a stage of 36 feet. During the 19<sup>th</sup> century, the Mississippi River flooded in 1815, 1828, 1844, 1849, 1850, 1851, 1858, 1859, 1862, 1865, 1867, 1874, 1882, 1884, 1890, 1892, 1893, and 1897.<sup>123</sup>

In May 1785, it was reported that, “The effects of the inundations in *Germany* this season have been unusually dreadful. The Elbe, the Oder, the Havel, and the Warta [rivers], have all overflowed their banks; and the dykes [dikes] being broken down, the whole of the neighbouring country is laid under water.”<sup>272</sup>

In May 1785, Breslau [now Wrocław, *Poland*] reported, “that the sudden melting of the snow in the mountains, and of the thick ice on the rivers, has caused so great an inundation, that almost all the *Lower Silesia* is under water. The rivers Kosbach [Valea Mare], Bober [Bóbr], Oder, and others, have so rapidly overflowed their banks, that all the roads are rendered impassable, and all communication is cut off.”<sup>272</sup>

In May 1785, Magdeburgh in Saxony [Magdeburg, *Germany*] reported, “that the dykes [dikes] of the Elbe [River] have been unable to resist the force of the waters, and that an immense tract of country is inundated. If the inhabitants have saved their lives, ‘tis well, the cattle must have perished: all the winter grain is destroyed.”<sup>272</sup>

On 12 June 1785 in *England*, there was a great storm in Cambridgeshire and Suffolk.<sup>93</sup>

On 16 June 1785 in *England*, there was a hailstorm in Yorkshire.<sup>93</sup>

On 16 June 1785, “a most dreadful storm of thunder and lightning threw the town of Green-hammerton, in Yorkshire [*England*], and its neighbourhood into the utmost consternation. Its violence exceeded any thing of the kind ever remembered by the oldest man living. It began about noon, and for 20 minutes the elements seemed to be in a blaze, and the thunder incessant and tremendous. The lightning shivered a large oak near the town, tearing it up by the roots, and casting its limbs, some half a ton weight, to the distance of 20 yards [18 meters], and others not so ponderous to the distance of 100 yards [91 meters]. Two women near the place had a miraculous escape. A great deal of damage was done in the neighbourhood by the hail-stones, some of which measured an inch and a half in circumference.”<sup>272</sup>

At Fordham in Cambridgeshire, *England*, near Newmarket, a violent hailstorm struck on 16 June 1785. It killed more than 230 sheep out of the town’s flock of 2,000.<sup>246</sup>

On 22 June 1785, the Danube River [in *Austria*] suddenly overflowed its banks in so violent a manner as to carry away bridges, houses, people and even whole villages. This unexpected inundation has done incredible damage, as no measures could be taken to prevent the effects of it. Vast numbers of cattle have been drowned. But the greatest misfortune is, that several hundred persons have some lost their lives, and others their means of subsistence. The cause of this terrible inundation is attributed to the vast quantities of snow upon the Tyrol, Saltzbourg [Salzburg], and upper Austrian mountains.<sup>246</sup>

On 25 June 1785 in *England*, there was a hailstorm in Sussex.<sup>93</sup>

On 1 July 1785 in *France*, there was a severe hailstorm in Paris.<sup>93</sup>



In Paris, *France* on the 1<sup>st</sup> of July, there was a severe hailstorm.<sup>57</sup> Hailstones as large as cherries.<sup>41, 43</sup>

A storm struck the *West Indies* on July 6, 1785.<sup>41</sup>

A violent thunderstorm struck Albrighton in Shropshire, *England* on 11 July 1785 and at Guilford in Surrey on the 12<sup>th</sup>.<sup>246</sup>

On 5 August 1785, a dreadful storm arose in Western Prussia [now part of *Poland*], accompanied with hail and laid waste to 132 villages and farms.<sup>246</sup>

In *France*, storms laid waste to one hundred and thirty-one villages and farms.<sup>57, 90</sup> Storm occurred on August 5, 1785.<sup>41, 43</sup>

The continual rains in Padolia, Walkinia, and Ukraine [now the regions of *Ukraine* and *Moldova*], which fell for ten days incessantly, about the beginning of August, has laid those provinces almost underwater. But what has astonished and frightened the neighboring inhabitants, the forest of Iarmaliniac has disappeared without any emotion [vibration] of the earth. It sunk down at once and nothing is to be seen but the tops of some of the trees.<sup>246</sup>

On 24 August 1785, a hurricane struck the island of *Saint Kitts* in the West Indies. Five vessels ran ashore and were lost at Deep Bay. Many houses and estates in that parish suffered considerably.<sup>246</sup>

About the 24<sup>th</sup> of August 1785, a heavy gale of wind did considerable damage at St. Kitt's [Saint Kitts], Antigua, Nevis, and St. Eustatius [Sint Eustatius] in the *West Indies*; and, on the 21<sup>st</sup> of September, a like gale broke forth, with more violence, which extended to Harbour-Island, Habacco [Abaco Island], Eleuthers, Long Island, and Nassau, in the *Bahama Islands*.<sup>251</sup>

On Saturday [27 August 1785], the island of *Jamaica* was again visited by an equally violent hurricane but of much longer duration than the hurricane last year. The damage sustained by the inhabitants has been immense, and must be the more severely felt by them, as they had not recovered the heavy losses occasioned by the last.<sup>246</sup>

In 1785, a hurricane struck the Cayman Islands in the *Caribbean Sea*. Many lives were lost.<sup>141</sup>

On 24-29 August 1785, a hurricane struck *Jamaica*, *Puerto Rico*, *Cuba*, and the *Caribbean island* of St. Croix causing more than 142 deaths.<sup>141</sup>

On 27 August 1785, the island of *Jamaica* suffered from a hurricane.<sup>124, 146</sup>

On Monday morning [29 August 1785], a violent tornado struck Gloucester in southwest *England*. It caused the roof and tower of the cathedral to vibrate considerably. It lasted 15 minutes. A tornado reached Bath in the evening and overset [overturned] some new houses that had been erected in the square.<sup>246</sup>

In the fall of 1785, letters were received from *Antigua* and other islands describing the distresses of the inhabitants for want of corn and other provisions. The hurricane and a variety of other bad weather had destroyed almost their whole provisions. If not allowed to trade with the Continent of America, a famine is apprehended.<sup>246</sup>

On 2 September 1785, a hurricane struck the coast of Delaware in the *United States* causing 181 deaths.<sup>141</sup>



In *England*, during 5-6 September 1785, a hurricane struck [London] and the shipping on the River Thames. That damage done to London was not so considerable as compared to the great damage done to other seaports. From the Downs, from Portsmouth, Plymouth, and all along the British Channel, the shores were covered with wrecks, and ships stranded.<sup>246</sup>

On 12 September 1785 in *England*, there was a great hailstorm in Cumberland, in Hampshire, and in Warwickshire.<sup>93</sup>

On 25 September 1785, a sudden hurricane, which lasted an hour, drove from their mooring a whole tier of ships from off Rotherhithe Church to Blackwall in London, *England* on the River Thames.<sup>246</sup>

Continual and heavy rains fell in Lille, [*France*] on 25-26 September 1785. The rains lasted for 30 hours. It greatly increased the inundation [flooding] that was already occurring.<sup>246</sup>

On 30 September 1785, letters from the Midland counties of *England* indicated this year's crop produced exceptional yields (40 bushels per acre).<sup>246</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Rieux, <i>France</i>	( 94.6° F, 34.8° C)
Vannes, <i>France</i>	( 89.8° F, 32.1° C)
Mirecourt, <i>France</i>	( 86.0° F, 30.0° C)

The year 1785 was irregular in *France*. Excessive cold and heavy snows characterized the winter. There was a stubborn drought in the spring that destroyed the forage. The summer was characterized by alternately periods of excess heat and cold, humidity and drought. Premature chills invaded the autumn.<sup>79</sup>

There were great floods in different parts of *England* in September and October.<sup>41, 43, 47</sup>

Accounts were received from *Lithuania* that constant rains from August to October 1785 have retarded the crops from maturing. The subsequent hurricane and severe frosts have completed the destruction of the crops. Within 3 miles of Wilda [now Vilnius] there arose such a terrible tempest of hail, and of such a size, that the men and cattle in the open field, were desperately wounded by it, and at the same time the wind that blew unroofed the houses and barns, and left not a leaf to be seen on the trees for miles. At about 12 miles distance from Wilda, the weather produced a fall of snow, wholly unprecedented at this season of the year. The same thing happened at Samber [Sambir, *Ukraine*] on the 28<sup>th</sup> and the 9<sup>th</sup> of September.<sup>246</sup>

During September and October 1785, the inundations in the middle counties [of *Scotland*] have been very destructive. On 23-24 September, the river Clyde inundated the city and neighborhood of Glasgow. The lower floors were filled with water and the inhabitants suffered incredible loss. At almost the same time, the waters on the River Almond rose to an uncommon height, and inundated the low grounds in the neighborhood of Edinburgh. Some farmhouses were carried away by the stream, and the corn [grain], which was not yet cut, was damaged. The River Cart rose suddenly on the people who were employed at the harvest, and it was with difficulty they saved their lives. The River Elliot [Elliot] rose so suddenly, that the boy, who carried the mail from Dundee to Montrose was carried away. The horse was saved, but the mail was driven out to sea. The River Keven swelled to such a degree, that it broke down the embankments. At Ashburn [Ashbourne] in Derbyshire Dales, *England*, the rains that fell on the 23<sup>rd</sup> inundated the low grounds in that neighborhood to a greater extent than was ever known. The river rose between seven and eight feet in four hours. On the River Lea, a recently erected cotton mill was greatly damaged.<sup>246</sup>

A flood swept through New England in the *United States* during October 1785. A considerable amount of rain fell during September and intermittently during October. A heavy rainstorm struck the area 20-22 October dumping 9 inches [23 centimeters] of rain. The rain fell principally in southeastern New Hampshire and the adjoining country.<sup>199</sup>

— The Merrimack River rose to great heights at Haverhill, Massachusetts and the Cocheco River in New Hampshire rose to its highest flood mark, 15 feet [4.6 meters] above its usual height. It carried away 7 mills and several hundred thousand feet of lumber. A store was wholly destroyed by the floodwaters. Two bridges at Dover were washed away. On the Salmon Falls branch of the Piscataqua River, the water overflowed the banks and flooded a house to the depth of 4 or 5 feet [1.2-1.5 meters]. Every bridge on the river was carried away. A sawmill in Great Falls floated downstream. The freshet raised the river all the way to the ocean. At Portsmouth, New Hampshire, several ships under construction along with stores, mills and great quantities of lumber were carried away into the sea.

— East of Portsmouth [in Maine], many bridges were destroyed. All the bridges on the Presumpscot River were also carried away.

— At Berwick, Maine, the freshet caused a great disaster. It wiped out the bridges and destroyed sawmills, double sawmills, gristmills, fulling mills. It was estimated that the flood caused twenty thousand dollars in damage.

— In the town of Kennebunk, Maine, the Mousam River overflowed sweeping away the sawmill, the gristmill, lower ironworks, the bridge and nearly every other structure on the stream. The Kennebunk River also flooded sweeping away a sawmill. Significant property was also destroyed at Wells.

— The Saco River also flooded along its whole length from Notch [mountain pass] in the White Mountains in New Hampshire to the sea on the coast of Maine, a distance of 160 miles [258 kilometers]. The area around North Conway, New Hampshire was totally devastated. Farms were entirely submerged, barns and houses floated away, crops were destroyed, and many domestic animals drowned.

— This storm even washed away into the sea part of the cemetery at Cole's hill at Plymouth, Massachusetts, where the bones of the Pilgrim Fathers were laid to rest.

In *Germany*, there were extended floods and vast destruction of property.<sup>47</sup>

In different parts of *Germany* in 1785, thousands had their houses and property destroyed by inundations.<sup>41, 43</sup>

On 12 October 1785, a most dreadful storm of thunder and lightning accompanied by hail and pieces of ice alarmed the town of Whitehaven in Cumbria, *England* and its neighborhood. In a few minutes, it inundated the lower parts of the town, and rendered the furniture and bedding of the poor, by the mud and dirt, utterly unfit for use. In Lowswater, large flakes of ice fell, the like never seen before by the oldest man living. Some of the same kind [of hail] was picked up at Portsmouth. At Statford-upon-Avon, the same storm was still more dreadful.<sup>246</sup>

On Sunday [16 October 1785], at Montreal, *Canada*, the sun at intervals appeared a dusky red, approaching a copper color. At 2:15 p.m. the atmosphere became very dark and 5 minutes later totally dark, so that people ran against one another in the open streets. In the darkness nothing could be more dreadful. The horror that it occasioned exceeded all description. The rain that fell was of a strong sulfurous smell, and when the weather cleared up appeared as black as ink. At 2:42 p.m. it appeared to clear up for about 5 minutes, then darkness returned but in less than 20 minutes it dissipated. On 9 October at Quebec, the sky appeared fiery, luminous, yellow color. This was followed by squalls of wind and rain with severe thunder and lightning, which continued most of the night. This was uncommon in Quebec for this season, it having frozen the night before. Then on Saturday the 15<sup>th</sup>, at 3:15 p.m., it became darker than the Sunday before but of the same color. On Sunday the 16<sup>th</sup> at 10:30 a.m. it became so dark that ordinary print could not be read out of doors. After a short squall of rain, the great darkness returned until 12:10 p.m. The ministers of the churches were obligated to suspend the [church] service.

From that time until 4:45 p.m. there were intermittent periods of extreme darkness, mixed in with wind, rain and thunder.<sup>246</sup>

On 1 November 1785, a whirlwind [tornado] struck Swinton, near Nottingham, *England*. It leveled a barn, unroofed several houses and tore seven trees down by the roots. It lifted up one boy in the air over several hedges into an adjacent field.<sup>246</sup>

On 19 November 1785, a temporary hurricane [tornado or straight line winds?] struck London, *England* and its neighborhood. It began at 7 p.m. and continued until 11 p.m. It caused considerable damage on the river. It unroofed many houses, blew down several trees in St. James's Park, and in the fields round the metropolis. It threw a 12-pound slate, a distance of 50 or 60 yards in Surrey Street.<sup>246</sup>

At Plymouth, *England* on the 3<sup>rd</sup> instant [3 December 1785] at night, and the 4<sup>th</sup> in the morning, they had the severest gale of wind ever remembered by the oldest man living. The wind was from the south-southeast to south. The damage done among the ships is almost incredible. *Twee Gususters*, with wine and onions from Bourdeaux [Bordeaux] to Amsterdam, sunk at anchors in the Pool [Poole]. The *Zeelust* from Nantz [Nantes] to Amsterdam, with sugar and prunes, drove from her moorings in the Pool and sunk. The *Rosamond* from Newfoundland, with fish and oil, sunk in the Pool, and her stern stove in. The *St. Antonio Boa Viagam*, from Oporto to London, stern stove in, and the vessel otherwise much damaged; in short the Pool was an entire scene of wreck. At Falmouth, several store houses and dwelling houses were washed away by the sea's rising to an uncommon height. On the 4<sup>th</sup> it blew a hurricane. At Cowes, the *James of Sunderland* was totally lost on the back of the Isle of Wight. The *Catherine*, from Lisbon to London, and *Speedwell*, from Bilboa to Plymouth were both lost. At the Isle of Scilly, a large Dutch ship drove onshore in the morning of the 6<sup>th</sup>, and about 4 o'clock foundered, and all on board perished. A large brig belonging to Dartmouth, from Newfoundland, with passengers and agents, was lost on Bigbury Bay, and all onboard perished. A Dutch vessel cast away upon Lundy Island. That island, during the storm was entirely obscured by the uncommon height of the waves, which were singularly awful to the oldest and most experienced mariners. The *Ramirez*, a French sloop of war of 16 guns, totally lost on the rock near the Isle of Alderney, and all on board perished. The *Philip and Mary*, from Jersey to Bourdeaux [Bordeaux], totally lost two hours after she sailed. The *Friends*, [Master] Collingwood, from Seville to London, totally lost off Portland. In short, never was such havoc made among the shipping on this coast in the memory of man. The *French and Dutch coasts* are said to have been equally strewed with wrecks. At the Texel, *the Netherlands*, a Dutch man-of-war broke from her mooring and lost; the people saved. The Zuydazee [Zuiderzee, a shallow bay of the North Sea in the northwest of *the Netherlands*], a large West Indies ship lost and many people perished. The mouths of the Maese, Scheldt and Dort rivers are full of wrecks. The *Thisbe* frigate, which carried Lord Keppel to Italy, on her return met with the same storm at the chops of the [English] Channel, as proved so fatal to the *Halsewell East-Indiaman*. The lightning came on with such violence as to strike the men down upon the deck, though luckily they soon recovered. The masts were split, and the rigging torn from them, so as to make it necessary to cut them quite away to clear the wreck. This ship was later dashed to pieces on the rocks of St. Purbeck, on the Isle of Portland, *England*. Upwards of a hundred people were drowned in the shipwreck. At St. Ives in Cornwall, *Wales*, the lightning and thunder was terrible; but they preceded the snow, which was afterwards remarkably heavy for several hours. In Mount's Bay, *Wales*, several vessels were driven onshore.<sup>251</sup>

On 25 January 1786, London, *England* reported, "Out of a fleet of 13 sail of Swedish merchant ships, laden with naval stores, consigned for l'Orient in France, two only have reached their destined port, the other eleven having been wrecked in that heavy gale of wind [of 3-6 December 1785] in which the *Halsewell* perished. The coast of Essex has been covered with the spoils of this unfortunate fleet."<sup>215</sup>

In 1785, droughts engulfed many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 8 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tsinan and Ho-tsê.

— During the period between 11 March and 8 April, a drought engulfed Hupeh (now Hubei province) in central *China* at Wuchang and Ao-ch'êng.

— During the period between 6 May and 8 August, a severe drought engulfed Shantung province at Lin-i, Tsou-p'ing, Tung-a, Fei-ch'êng, T'êng, Ning-yang and Jih-chao; Chekiang (now Zhejiang province) on the east coast of *China* at Chia-shan, T'ung-hsiang and Hsüan-p'ing; and Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Kao-ch'un, Wu-chin and Yangchow. The rivers dried up. [Lin-i is located at longitude 116.52° East and latitude 37.13° North.]

— During the period between 8 August and 8 November, a drought engulfed Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing; and Shantung province at Kuan-ch'êng, Shou-kuang, An-ch'iu, I-shui, Chu-ch'êng, Po-hsing, Ch'ang-yüeh and Huang.

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 28<sup>th</sup> and 29<sup>th</sup> – wonderfully warm, spring-like days. May 5<sup>th</sup> – cloudy and dull for five days past. May 8<sup>th</sup> – rainy. May 14<sup>th</sup> – a deluge of rain. May 19<sup>th</sup> – the country people are but now beginning to plant, the spring is so backward, cold and wet. May 23<sup>rd</sup> – the May storm. May 27<sup>th</sup> – deluge of rain, fatal, it is feared, to the Indian corn, just planted. May 30<sup>th</sup> – a hot day, which causes the cherry and plum trees to begin to blossom. May 31<sup>st</sup> – another hot day, which occasions great joy. June 2<sup>nd</sup> – a very hot day. June 7<sup>th</sup> – cold. June 18<sup>th</sup> – very hot weather. June 21<sup>st</sup> – cold and rainy. June 22<sup>nd</sup> – very hot. June 23<sup>rd</sup> – raw; cold. June 25<sup>th</sup> and 26<sup>th</sup> – hot. June 27<sup>th</sup> – piercing cold. June 29<sup>th</sup> – hot day. June 30<sup>th</sup> – perhaps there never was a more seasonable year for grass. July 31<sup>st</sup> – we had marvellous seasonable weather up to this time; everything is flourishing; never a better prospect. August 8<sup>th</sup> – a deluge of rain. August 9<sup>th</sup> – remarkably cold. August 18<sup>th</sup> – third day of hot weather. August 20<sup>th</sup> – the heat continues; happy season! August 22<sup>nd</sup> – a seventh hot day. August 27<sup>th</sup> – cloudy, windy and cool. September has been (except for a day or two) a month of raw, cold, uncomfortable weather, but no frost yet. October – this month has been unusually cold, raw and unpleasant. October 21<sup>st</sup> – for two days and two nights it rained without ceasing, as hard as was ever known, which raises the freshets [floods] in such a hideous manner as to carry away all the bridges on the Presumpscot River and many elsewhere, and also many mills. Saco River bridges carried away. November 6<sup>th</sup> – cold Sabbath. December 2<sup>nd</sup> – cold.<sup>78</sup>

*Also refer to the section 1784 A.D. – 1785 A.D. for information on the drought and famine in Egypt during that timeframe.*

*Also refer to the section 1784 A.D. – 1785 A.D. for information on the drought and famine in England, France, Italy and Spain during that timeframe.*

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**Winter of 1785 / 1786 A.D.** In Selborne, *England*, there was wet rainy weather until 23 December. This was followed by frost and snow until 7 January. Then there was a week of mild and very rainy weather, followed by a week of heavy snow. From 21 January to 11 February, the weather was mild with frequent rains. Then to 21 February, there was dry weather with high winds. Then to 10 March there was a hard frost. Following this came alternating rains and frosts until 13 April.<sup>70</sup> [The source list this as the winter of 1786-87 but I believe this is a misprint because the reference describes two different winters for this period and because the entries are in sequential order with the winter of 1785-86 missing.]

On 2 January 1786, Youghall [Youghal, *Ireland*] reported. “Last night, during as hard a frost as ever we experienced, an accidental fire broke out in this town; this dreadful accident first began in an out-house [shed], at several yards distance from any other building, and was for some time thought of no consequence; but at length, from the scarcity of water [because the water was frozen], the fire communicated to many dwelling-houses, four of which, with most of their contents, were destroyed, and several others considerably damaged, before a stop could be put to the flames. The loss is supposed to amount to near 2000*l*.” [In present currency, that would be equivalent to approximately £219,000 in damages based on the inflation rates using the retail price index.]<sup>251</sup>

On 3 January 1786, there was a furious storm (mistral) in Provence, *France*. The storm was mixed with snow. Herds were driven four or five leagues (12 to 15 miles, 19 to 24 kilometers) from their pastures. Many travellers and animals perished in the plain of La Crau in southern *France*. Of five shepherds who drove eight hundred sheep; three died with almost the entire herd.<sup>79</sup>

On 4 January 1786, Dublin, *Ireland* reported, “The damages done by the late floods are immense, particularly at the following places: Carlow, Newbridge, Rathangan, Cusshines, Lucan, Cellbridge [Celbridge], Luttrellstown [Luttrellstown], Palmerstown, etc., etc., by the breaking of bridges, washing away houses, and injuring mills. Happily all the principal works of the Grand Canal are found to be so ably constructed as to have escaped the general ruin, and no injury has been done to any part of them, save to two inconsiderable places Rathangan and Monasterevan [Monasterevin]. We hear from different parts of the country, that the swell in many rivers was so great, on the sudden dissolution of the snow, as to cover hundreds of acres, which, lying rather low, resembled some of our largest natural lakes. The [River] Barrow rose to such a height, that the waters ran over several streets in Carlow; and the town of Leighlinbridge, looked like a little Venice, peeping out of an ocean. A very few days, we hope, will change these unnatural appearances, and, by an early spring, disappoint the rapacious speculators in provision, for man and beast, who enjoy the shameful pleasure of enriching themselves at the expense and ruin of their neighbours.”<sup>251</sup>

There was a great storm in the *English Channel* in January 1786, which caused the loss of the *Halswell* Indiaman along with other ships.<sup>41,56</sup> [Indiaman is a ship operating under charter or license to any of the East India Companies of the major European trading powers of the 17<sup>th</sup> through the 19<sup>th</sup> centuries.]

On 15 February 1786, Flushing [Vlissingen, *the Netherlands*] reported, “that during the late storms and furious winds which raged last week, part of the mole [a massive stone wall constructed in the sea] which forms the harbour of that town gave way. This fatal event is attributed to the sensible encroachments made by the waters of the sea (which in stormy weather violently drive back those of the Scheldt [river]) on that part of Zealand, which have been so great, that the inhabitants are very apprehensive of the consequences.”<sup>251</sup>

On 6 March 1786, Belfast, *Ireland* reported, “Saturday and yesterday, the Dublin mails arrived here, which had been retarded on account of the depth of snow lying between the Man of War and Newry; they were obligated, we understand, to be carried by persons on foot greatest part of the above road, which was totally impassable by horses, and all the stages [stagecoaches] were stopped. It is remarkable that scarce any snow lay for several miles round this town last week, nor was travelling at all impeded. It is not remembered by the oldest inhabitant here, that the Dublin post was ever detained three days by stress of weather until last week.”<sup>251</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1785 on December 4<sup>th</sup> – a snowstorm. December 7<sup>th</sup> – snow again. December 8<sup>th</sup> – horrid cold. December 17<sup>th</sup> – a deluge of rain, and a thorough thaw. December 18<sup>th</sup> – a summer's day. December 19<sup>th</sup> – another; the snow is all gone, and the frost out of the ground. December 25<sup>th</sup> – cold. December 30<sup>th</sup> – severely cold snowstorm. January 1786 – a cold month, though it ends moderately. February 18<sup>th</sup> – a warm day, but the rest of the month was cold weather and good sledding. March 7<sup>th</sup> and 9<sup>th</sup> – pleasant and moderate. March 10<sup>th</sup> – windy and cold. March 14<sup>th</sup> – moderate. March 19<sup>th</sup> – a most beautiful day. March 26<sup>th</sup> – a surprising warm summer's day. April comes in raw and cold. April 2<sup>nd</sup> – a severe snowstorm.<sup>78</sup>

The winter of 1785 was tolerably mild in Philadelphia, Pennsylvania in the *United States* but significant snow fell.<sup>1</sup>



**1786 A.D.** In 1786 in *Ireland*, there was a thunderstorm at Arklow, Coolgraney, and Redcross (Wicklow County). This storm was "succeeded by a tremendous shower of hailstones, which killed a number of lambs, and wounded many persons."<sup>93</sup>

In Ferrara, *Italy* on the 17<sup>th</sup> of July, hailstones as big as hen's eggs.<sup>41, 43, 56, 57</sup>

On 17 July 1786 in *Italy*, there was a hailstorm with "stones as big as hens' eggs."<sup>93</sup>

A storm at High Bickington, in Devonshire *England* in July, thirteen trees were removed upwards of two hundred yards from their original spot, and they remained standing upright in a flourishing state – a rock, at the same place, was divided upwards of eight feet asunder, and all the poultry and corn for several miles were destroyed by the thunder and lightning.<sup>41, 43, 56</sup>

There was a storm at the island of *Barbados* on August 11.<sup>43, 56</sup>

In August 1786, a violent storm laid waste the southern coast of Española [*Dominican Republic & Haiti*]. At the *Caribbean* island of St. Eustatius [Statia], it drove all the shipping to sea, and destroyed most of the small craft in the harbor.<sup>146</sup>

On 16 August 1786 in northeastern *England*, there was a hailstorm at North Shields [near Newcastle].<sup>93</sup>

In North Shields, *England* on the 16<sup>th</sup> of August, great hailstorm. The hailstones were as large as pigeons' eggs.<sup>41, 43, 56, 57</sup>

On 23 August 1786, a violent tornado struck Woodstock, Connecticut in the *United States*. About 5 o'clock in the afternoon, a very dark cloud appeared in the west, moving with great speed in an easterly direction. An uncommon darkness with a violent tempest and tornado followed. More than one hundred buildings were either unroofed, shattered or destroyed and an immense number of forest trees laid desolate.<sup>174</sup>

On 23 August 1786, a tornado struck Sturbridge and Southbridge in Massachusetts and Woodstock, Pomfret and Killingly in Connecticut in the *United States*. The path of destruction caused by the tornado was ¼ mile [400 meters] wide. Houses and barns were leveled. People and cattle were killed or seriously wounded. Trees and crops were destroyed. At Woodstock, more than a hundred buildings were either unroofed or destroyed.<sup>199</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Lille, <i>France</i>	( 96.1° F, 35.6° C)
Saint-Malo, <i>France</i>	( 95.7° F, 35.4° C)
Versailles, <i>France</i>	( 86.0° F, 30.0° C) on 12 June
Saint-Lô, <i>France</i>	( 77.7° F, 25.4° C)

The summer of 1786 in northern *France* was very hot.<sup>79</sup>

On Saturday, 2 September 1786, an alarming hurricane threw the inhabitants of Barbados in the *Lesser Antilles* into the utmost consternation. At eleven in the evening, when the storm was at its height, a meteor in the southeast issued from a dark cloud, and spreading its diverging rays to a vast circumference, continued, with unabated splendor, near forty minutes. In the morning of the 3<sup>rd</sup>, Carlisle Bay, Barbados was a scene of desolation — not a vessel had ridden out the storm. In the country, great damage was done to houses and crops: many persons were killed in the ruins of their own houses.<sup>146</sup>



On 2-3 September 1786, a hurricane struck Barbados in the *Lesser Antilles*. Many people were killed in the ruins of their own houses.<sup>141</sup>

On 10 September 1786, Guadeloupe in the *Lesser Antilles* was swept by a hurricane, which destroyed most of the plantations, and wrecked three ships in the harbor.<sup>146</sup>

On 12 September 1786 in *England*, there was a great hailstorm in Hampshire.<sup>93</sup>

On 5 October 1786, news was received of a dreadful hurricane in the *West Indies*. It greatly damaged Barbados and Grenada.<sup>128</sup>

In early October 1786, when the crops of corn and pumpkins were still on the ground, continuous rains produced a freshet, which had seldom been equaled in Bradford County, Pennsylvania in the *United States*. Crops were swept away and the river was covered with floating pumpkins. The loss was severely felt and many cattle died the succeeding winter for lack of sustenance. For many years, this freshet was known by the old inhabitants as the "Pumpkin Flood".<sup>178</sup>

In Sussex, *England*, there was an irruption of the sea; blockhouse at Brighthelmstone [now in the city of Brighton] washed down on October 9, 1786.<sup>41, 43, 47</sup> [The blockhouse at Brighthelmstone was a fort or storehouse for armor and ammunition. This blockhouse was a circular fort, 50 feet in diameter, 16 feet in height with walls 8 feet thick. It had 6 large guns and 10 small cannons, which long afterwards shared the fate of most of the buildings on the Brighton front and was washed away by the sea.]

On 9 October 1786, Exeter, *England* reported that the rain, which fell in their neighborhood, was most violent within the recollection of the oldest living person living. Saturday [October 7<sup>th</sup>] morning the River Exe began to rise to an unusual height, and by 11 o'clock it had covered the Bonbay and Island, forcing the inhabitants to flee their homes or move to the upper rooms. Boats were used to transport people across St. Thomas's near the bridge. The wall of a glue yard on the haven was washed away near the Vine Inn. Okehampton road was impassable and on the river a great number of sheep, cattle, and furniture passed through the bridge. There was an immense loss in various parts of the country. Cattle were carried away by the torrents. Houses were thrown down and some lives were lost. The River Culm rose so high as to cover Etherly Bridge, where a boy attempting to cross on horseback was carried off and drowned. At Stoke Canon, eight houses were thrown down, and the main pier of the bridge destroyed with the rivers Exe and Culm meeting in the midst of the village. At Uffculme, the bridge was thrown down and a single farmer lost 13 sheep and one cattle.<sup>251</sup>

On 20 October 1786, a hurricane struck *Jamaica*.<sup>124</sup>

On 20 October 1786, it blew a hurricane at *Jamaica*. The trees were stripped of their leaves, and appeared as if fire had destroyed their verdure. The shores were covered with aquatic birds that had been dashed against the trunks of the mangroves, and killed.<sup>146</sup>

On 20 October 1786, a hurricane struck *Jamaica*. Seven people died [on the island]. A small shallop [large heavy boat, usually having two masts and carrying fore-and-aft or lugsails] was wrecked off Gun Key and every soul perished. On a plantain boat all perished except for one person.<sup>141</sup>

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: April 9<sup>th</sup> to 14<sup>th</sup> – cold and windy. April 22<sup>nd</sup> – the whole week, except Friday, has been heavy, raw, rainy weather. May 31<sup>st</sup> – the spring a thought to be forward; most people have planted. June 1<sup>st</sup> – summer commences with a hot day. June 4<sup>th</sup> – extremely hot. June 5<sup>th</sup> – cold. June 7<sup>th</sup> – very hot. June 13<sup>th</sup> – growing season. June 30<sup>th</sup> – never was more seasonable weather, and never a greater prospect as to all the fruits of the earth. July 2<sup>nd</sup> – extremely hot.

July 9<sup>th</sup> and 11<sup>th</sup> – extremely hot. July 12<sup>th</sup> – rain; happy season. July 18<sup>th</sup> – cold. July 22<sup>nd</sup> – only a few hot days thus far. July 30<sup>th</sup> – hot morning, but dismal sea wind in the afternoon. August 31<sup>st</sup> – very little hot weather this month. September – the whole of this month has been wonderfully moderate. October 30<sup>th</sup> – a wonder of a fall thus far; almost constant uniform moderate weather. It has been as dry and hot as summer; no rain but one day. November 12<sup>th</sup> – raw and cold.<sup>78</sup>

In 1786, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

In 1786 during the period between 5 February and 6 May, floods struck Shantung (now Shandong province) on the east coast of *China* at Chan-hua and Hupeh (now Hubei province) in central *China* at Ch'ung-yang. Also during the period between 5 February and 6 May, a drought engulfed Shantung province at Tung-p'ing. During the period between 27 May and 25 June, a drought engulfed Kansu (now Gansu province) in northwest *China* at Lin-t'an. During the period between 25 July and 23 August, a drought engulfed Hupeh province at Ching-mên and Sung-tzû. During the period between 22 September and 21 October, floods struck Hupeh province at Chiang-ling.<sup>153</sup>

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**Winter of 1786 / 1787 A.D.** Three snowstorms between 4-10 December 1786 dropped a total of 41 inches (104 centimeters) of snow on Morristown, New Jersey in the *United States* in one week.<sup>27</sup>

In December 1786, great snowstorms struck New England in the *United States*.<sup>199</sup>

— The winter of 1786-87 came very early. On 14 November 1786, the St. George's River in Maine was frozen so hard and thick that the ice bore horses and sleighs as far down as Watson's Point [near Thomaston]. The river remained frozen until the following March. By 20 November, the harbor at Salem, Massachusetts was frozen over as far out as Naugus Head. The Connecticut River froze so quickly that at Middletown, Connecticut, boats were floating over the river one day and 24 hours later, the ice on the river had become strong enough to bear heavy weights and people were driving on it with their horses and sleighs.

— Snowstorms in December were unusually severe. Great quantities of snow fell. The entire winter was severe. At Rockland, Maine, snow remained on the ground as late as 10 April and was so deep and hard-crusted that teams passed over the fences in every direction without obstruction.

— On 4 December, a two-day blinding snowstorm struck the area. The strong winds brought in one of the highest tides experience in that region. When the storm ended, the snow was 6 feet [1.8 meters] deep in Boston, Massachusetts. The tide overflowed the wharves and entered the stores causing great damage to the goods. Several ships were wrecked in the storm including the brig *Lucretia*, which ran aground on Point Shirley. Several men jumped from the ship into the terrible surf and managed to make it to shore only to die of cold in the snowstorm. The sloop *Thomas* was wrecked on Marshfield Beach where the Captain and mate froze to death. Another ship was driven onto Plum Island during the snowstorm and wrecked.

— On 8 December, another powerful snowstorm struck the region. This storm also produced a great snowfall. After this storm, the depth of snow on the ground was believed even greater than that experienced during the winter of 1716-17. Traveling was very difficult and in many places completely stopped. The roads were completely filled with snow from wall to wall throughout New England. Several people became lost in the blinding snowstorms and died.

— The storm of 8 December was very severe along the coast. In Long Island Sound [an estuary between Connecticut and New York], many vessels went ashore, and some were entirely lost. All the vessels at Stonington, Connecticut were driven ashore except for one schooner that fled to sea and was never seen or heard from again. At Newport, Rhode Island, ten or twelve ships, brigs and other vessels of the larger build were driven from the wharves and forced ashore at Brenton's Neck. Two sloops went ashore at Nantasket Beach in Massachusetts. A small schooner was cast away near Cape Ann. A sloop was driven ashore on Lovell's Island in Boston harbor, and all onboard perished. A schooner was driven ashore on Cape Cod, and all onboard perished. A schooner *Nancy* was also cast ashore at Cape Cod, about 3 miles

[5 kilometers] from Provincetown.

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1786 on November 17<sup>th</sup> – it snowed, and came up windy and cold. November 20<sup>th</sup> – cold. November 25<sup>th</sup> – fine sledding; true winter since the 17<sup>th</sup>. November 30<sup>th</sup> – so dry a fall was never known. The wells went dry, and the prospect for water is dark. December 1<sup>st</sup> to 3<sup>rd</sup> – very cold. December 5<sup>th</sup> – a snowstorm. December 8<sup>th</sup> – another snowstorm but greater. December 14<sup>th</sup> – moderate. December 20<sup>th</sup> – the roads are all blocked up with snow. December 24<sup>th</sup> – cold and stormy; a vast deal of damage done by the late storms. December 31<sup>st</sup> – the weather moderated. January 1787 – it has been severely cold for most of this month. February 3<sup>rd</sup> – cold weather. February 12<sup>th</sup> – a little more moderate. February 19<sup>th</sup> and 20<sup>th</sup> – cold. February 28<sup>th</sup> – there have been no deep snows with us, but from Portsmouth to Boston the roads have been blocked up, and to Newport and New London it has been vastly deeper. Truly a memorable winter. March 1<sup>st</sup> – the heavy, dull weather still continues. March 4<sup>th</sup> – last night there was a great storm of snow, near a foot (0.3 meters) of snow fell. March 12<sup>th</sup> – pleasant. March 13<sup>th</sup> – the snow is 5 feet (1.5 meters) deep in the woods. March 15<sup>th</sup> – the closest [overcast] winter remembered. March 17<sup>th</sup> – we have had the longest and coldest winter remembered.<sup>78</sup>

The winter of 1786 was tolerably mild in Philadelphia, Pennsylvania in the *United States*. There were some cold days of course.<sup>1</sup>

In Selborne, *England*, early in November 1786, there was frost. But then until 16 December there was rain with only "a few detached days of frost." Following that came a fortnight [14 days] of frost and snow and then 24 days of dark, moist, mild weather. Then from 24 to 28 January there was frost and snow. Then came mild showery weather until 16 February. This was followed by dry cool weather until 28 February. This was followed by stormy rainy weather until 10 March. The next fortnight was bright and frosty. This was followed by mild rainy weather to the end of April.<sup>70</sup>

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**1787 A.D.** In Manchester, *England*, a great flood did much damage.<sup>47, 92</sup>

There was a great storm in the *West Indies*, where great damage was done, particularly in the French islands in July 1787.<sup>41, 56</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Nezeroy, <i>France</i>	( 99.5° F, 37.5° C)
Saint-Jean-d'Angély, <i>France</i>	( 99.5° F, 37.5° C)
Besançon, <i>France</i>	( 97.3° F, 36.3° C)
Saint-Sever, <i>France</i>	( 91.6° F, 33.1° C)
Saint-Paul-Trois-Châteaux, <i>France</i>	( 91.0° F, 32.8° C)
Fontenay, <i>France</i>	( 90.7° F, 32.6° C)
Tournus, <i>France</i>	( 90.5° F, 32.5° C)
Versailles, <i>France</i>	( 86.0° F, 30.0° C)
Grande-Chartreuse, <i>France</i>	( 81.5° F, 27.5° C)

A storm struck several parts of *England* in August.<sup>41</sup>

In August 1787, Dominica in the *Lesser Antilles* was visited by three gales of wind [hurricanes], on the 3<sup>rd</sup>, 23<sup>rd</sup>, and 29<sup>th</sup>, which destroyed all the vessels at the island. All the barracks and buildings upon Morne Bruce were blown down and destroyed, and several houses in the town shared the same fate.<sup>146</sup>

In December 1787, reports were received of a dreadful hurricane in the *West Indies* that caused great damage.<sup>128</sup>

On 4 August 1787 in *Normandy*, there was a hailstorm with "stones as big as hens' eggs."<sup>41, 43, 56, 57, 93</sup>

On 15 August 1787, a tornado struck New England in the *United States*. It first appeared at Lake George, New York. It struck the cities of New Britain, Newington, Wethersfield, East Windsor, Glastonbury, Eastbury [part of Eastbury became Marlborough], Bolton, Coventry and Thompson in Connecticut. Then it struck Gloucester, Rhode Island. Then it struck Oakham, Rutland, Northborough, Mendon, Framingham, Southborough, Marlborough and Sudbury in Massachusetts. Finally it moved into Rochester, Dunbarton, and Concord in New Hampshire. The tornado leveled or unroofed homes and barns, killed and injured many people and domestic animals, and uprooted or broke many trees in two. It even picked up a ferryboat on the Merrimack River carrying it a considerable distance before dropping it into the water again. The tornados path of destruction varied between 60 and 300 feet [18-91 meters].<sup>199</sup>

On 19 August 1787 in northern *Italy*, there was a hailstorm in the city of Como and its district. The hailstones weighed 9 ounces.<sup>93</sup>

In 1787 in Dublin, *Ireland*, there was a most violent hailstorm.<sup>93</sup>

In Navarre in northern *Spain*, there were great torrents of water from the mountains; over 2,000 persons lost their lives.<sup>47, 92</sup>

In September 1878 at Navarre, *Spain*, 2,000 lost their lives in a flood, all the buildings of several villages carried away by the torrents of water from the mountains.<sup>41, 43, 56, 90</sup>

In *Ireland*, there were great floods in most of the principal rivers of *Ireland*; in Dublin there were 8-feet of water in the cathedral.<sup>47, 92</sup>

On 23 September 1787, a hurricane struck Honduras [*Belize*] causing around 100 deaths.<sup>141</sup>

On 23 September 1787, at Balize [*Belize*], between four and five in the morning, a hurricane came on from the N.N.W. About ten, it shifted to the S.W., and blew with increased violence. At the same time the sea rose and prevented the running off of the land floods. The lowlands were overflowed: not a house, hut, or habitation of any kind, on either side the Balize [*Belize*], was left standing — more than 500 were thrown down. One hundred persons perished: dead carcasses and logs of mahogany were floating about in every direction. Eleven square-rigged vessels, besides smaller ones, were totally lost.<sup>146</sup>

A terrible inundation by the River Liffey, in *Ireland*, which did very considerable damage in Dublin and its environs, 12 November 1787.<sup>41, 43, 56, 90</sup>

In Portland, Maine in the *United States*, the weather was recorded as:

March 19<sup>th</sup> – wonderful warm, pleasant day. March 21<sup>st</sup> – winter seems to be over. April 4<sup>th</sup> – a hot summer's day. April 5<sup>th</sup> – cold again. April 8<sup>th</sup> to 17<sup>th</sup> – moderate and pleasant. April 19<sup>th</sup> – five days of very blustering and tempestuous cold weather, night and day. April 30<sup>th</sup> – from the 17<sup>th</sup>, this has been a cold month; but few warm days, yet we begin to dig our garden three weeks sooner than the two years past. May 8<sup>th</sup> – a hot summer's day. May 10<sup>th</sup> – a rainstorm. May 16<sup>th</sup> – the dreadful eastern weather continues. May 25<sup>th</sup> – a deluge of rain. May 26<sup>th</sup> – horrid cold, and frosts. May 31<sup>st</sup> – a cold spring. June 2<sup>nd</sup> – dismal raw and cold. June 18<sup>th</sup> – the week past was hot weather. June 24<sup>th</sup> – a hot but windy Sabbath. June 25<sup>th</sup> – heavy rain. June 30<sup>th</sup> – Indian corn is backward, but there is a good prospect of English grass. July 1<sup>st</sup> to 3<sup>rd</sup> – raw, cold, easterly weather. July 7<sup>th</sup> – the four days past were very hot. July 17<sup>th</sup> – a fine rain. July 19<sup>th</sup> – very cold. July 28<sup>th</sup> – there has not been a hot night this summer. July 31<sup>st</sup> – nothing like summer yet. Alas, for the Indian corn! August 1<sup>st</sup> and 2<sup>nd</sup> – raw; cold. August 3<sup>rd</sup> – summer breezes. August 13<sup>th</sup> – foggy. August 21<sup>st</sup> – no hot weather yet. August 27<sup>th</sup> – cold. August 30<sup>th</sup> – warmer. September – some warm and some cold weather. October 2<sup>nd</sup> and 3<sup>rd</sup> – hot summer days. October 8<sup>th</sup> – cold. October 13<sup>th</sup> – a week of warm weather. October 20<sup>th</sup> – a week of uncommon cold, windy weather. October 24<sup>th</sup> – three surprising hot days. October 31<sup>st</sup> – the raw, heavy, cold weather returns. November 30<sup>th</sup> – this month has been

favorably moderate. The ground has hardly froze, and no snow. December – the weather this month, has been quite moderate.<sup>78</sup>

In *India* during 1787-88, there were floods in Behar and other northwest provinces of the Punjab; said to have caused loss of 15,000 lives and 100,000 herd of cattle. “The rains commenced abnormally early in 1787, and continued for months almost without cessation. In some of the districts of Bengal [*India* and *Bangladesh*] and in Behar it is stated that from the latter part of March to the latter half of July, they had continued with such violence as almost to render cultivation impossible. There was a break in the rains about the end of July, but early in September the waters were out again as widely as ever in Sylhet, and similar complaints were made from Jesson, Nuddea, and Central Bengal [*India* and *Bangladesh*]. About 1<sup>st</sup> October a tremendous storm of rain and wind swept all over the western districts of Bengal, which ended in a cyclone of unexampled extent, which seems to have swept across almost the whole of Bengal. By this disaster the late crops, which, after all previous disasters were fast getting into ear, were in a great measure destroyed over larger tracts of country.”<sup>47</sup> [Sylhet is now located in northeastern *Bangladesh*. Jesson (Jessore ?) a district located in the Khulna Division of southwestern *Bangladesh*. Nuddea (Nadia) is a district of the state of West Bengal, in the northeast of *India*.]

In May 1787 in Coringa, Hindostan [now *India*], there was a great inundation that swept away all the houses, and destroyed nearly the entire population. It extended far inland. Loss of life 15,000 people; and more than 100,000 head of cattle.<sup>92</sup> [Coringa is a tiny village of the East Godavari district, in Andhra Pradesh, on the southeastern coast of *India*. Hindostan is another variant of Hindustan.]

In *India* during 1787-88, there was a famine in Behar and the northwest provinces of Punjab, which was a consequence of the rain and floods. The Government laid an embargo on the exportation of grain.<sup>57</sup>

In 1787 from the beginning to the end of the season, there was one continued succession of excessive rains, floods, and storms in Bengal [today this is *Bangladesh* and the state of West Bengal in *India*] and Behar [now Bihar in northern *India*]. Three separate attempts to sow the land failed. Around 30 September / 1 October, a tremendous storm swept over all the western districts of Bengal, doing immense damage. The ocean passed with great rapidity carrying down houses and cattle, men, women and children. The town of Burdwan [now Bardhaman in West Bengal, *India*] was “totally destroyed, not a vestige of a mud-house remaining, and even those of brick and many of them fallen.” Then on 2 November, a cyclone of unexampled extent seemed to have swept across the whole of Bengal. The storm swept from Midnapore, *India* to Sylhet, *Bangladesh* rising to a furious hurricane that carried everything before it. As a result of this disaster, the late crops were to a great degree destroyed over large tracts of the country.<sup>183</sup>

To ease the increasing overcrowding in British jails following the loss of the American Colonies in the American War of Independence, the British established a new penal colony, which was the first European settlement in *Australia*, at Sydney Cove in January 1788. Captain James Cook had charted the east coast of the Australian continent in 1770. On 13 May 1787, the ‘First Fleet’ of eleven ships commenced a historic journey from Portsmouth, England to establish the first European settlement in *Australia* of 1,030 people including 736 convicts, livestock, grains, seeds, young plants and two years store of supplies. They arrived on 19 January 1788 in Botany Bay, *Australia*. During the eight month journey:<sup>104, 108</sup>

\* The Fleet encountered squally tropical humid weather after passing the Equator into the Southern Hemisphere, resulting in a convict woman being crushed to death and one man being thrown overboard and drowned.

\* After leaving Cape Town, South Africa on 13 November, the ships were blown off course in the Roaring Forties [below 40 degrees latitude south].

\* Ferocious weather of violent summer storms of very strong gales and heavy seas battered the Fleet in the Southern Ocean between November and December 1787. The winds were so strong that they lost a topsail in December.



\* Chilly temperatures as cold as England in December were recorded close to Christmas 1787 [the Southern Hemisphere's summer].

\* The Fleet was forced to slow down New Year's Day when they encountered the strongest winds of the journey losing one man overboard and injuring the cattle on board.

\* In the first week of January 1788, the Fleet sails past the southeast corner of Van Diemen's Land (Tasmania, *Australia*), into a violent thunderstorm and observe small patches of snow along the coastline during the height of summer.

\* Sailing north up the coast of New South Wales against strong headwinds, many ships of the Fleet and its cargo of precious seedlings, were damaged by sudden squall of wind and very high seas in a severe storm on 10 January 1788. The squall was strong enough to split the mainsail on one ship and another ship lost its main yard carried away in the slings.

\* Between 24 and 26 January 1788, a strong wind and huge seas buffeted ships sailing out of Botany Bay to the more suitable location of Port Jackson, where on 26 January 1788, a Union Jack flag, was planted to celebrate the beginning of European settlement in Australia.

In 1787 during the period between 18 April and 16 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Huang and Po-hsing. During the period between 6 May and 8 August, a severe drought engulfed Shantung province at T'êng.<sup>153</sup>

The year 1787 was a year of abundance in the vicinity of Shanghai, *China*.<sup>166</sup>

In 1787, there was a great drought in the vicinity of Shanghai, *China*. Then during the 7<sup>th</sup> moon, dragons fought. A great wind overturned houses; and carried off, no one knows where, half a stone bridge. [In early *China*, tornadoes and waterspouts were commonly described as dragons.]<sup>166</sup>

During the famine of 1787 in *China*, many died in the streets of Canton. Individuals killed their infants, their young children and their aged parents in order for them to avoid the agonizing death of starvation.<sup>188</sup>

**Winter of 1787 / 1788 A.D.** In Selborne, *England*, in November the weather was mild until the 23<sup>rd</sup>, with the last week of the month frosty. The first three weeks of December were still and mild with rain but the last week was frosty. The first thirteen days of January were mild and wet; then five days of frost, followed by dry, windy weather. February was frosty but with frequent showers. The first half of March saw hard frost, but the rest of the month was dark harsh weather with much rain.<sup>70</sup>

During the winter of 1787-88 at Kimbolton in Cambridgeshire, *England*, the thermometer fell below the freezing point [of water] on 14 & 15 January and 6, 7, 8, 10, 11, 12, 13 & 17 March.<sup>240</sup>

The winter of 1787-88 in northern *France* was a very mild winter followed by a hot dry spring.<sup>79</sup>

The winter of 1787 was tolerably mild in Philadelphia, Pennsylvania in the *United States*. There were some cold days of course.<sup>1</sup>

**1788 A.D.** On 1 January 1788, reports were received of a storm at *Honduras* that drove the sea over the low lands, by which all the houses were destroyed, and fifteen vessels wrecked.<sup>128</sup>

There was considerable damage done to Tower-ditch at London, *England* from a storm, where the ground on Little Tower-hill was trenched nearly twelve feet deep on June 20<sup>th</sup>.<sup>41, 56</sup>

On 26 June 1788, the rain fell so heavy as to flood the streets of London, *England* and blow up one of the sewers.<sup>128</sup>

On 11 July 1788, there was a great inundation in *Scotland* and the north of *England*.<sup>128</sup>



On 13 July 1788 in *England*, there was a great hailstorm in Cheshire.<sup>93</sup>

On 13 July 1788 in *France*, there was a storm.<sup>93</sup>

Almost total darkness prevailed in many parts of the country; this was followed by a hurricane of wind, rain, hail, lightning and thunder. The hail worked the greater destruction. "The whole face of nature was so totally changed in about an hour . . . instead of the smiling bloom of summer and the rich prospects of forward autumn . . . it now presented the dreary aspect of universal winter. . . . The soil was changed into a morass, the standing corn beaten into a quagmire, the vines broken to pieces, . . . the fruit trees of every kind demolished. . . . The hail was said to be composed of enormous solid and angular pieces . . . some of them weighing from 8 to 10 ounces. Even robust forest trees were incapable of withstanding the fury of the tempest."<sup>93</sup>

In the neighborhood of Paris: "the country for many square leagues is laid wholly waste, and the fruits of the earth so totally eradicated that no harvest can be expected this year. His Majesty's hunting seat has shared the common ruin. . . . He was witness to what fell, which could not be called hail: they were enormous pieces of ice of several pounds weight, by which lambs, sheep, and even cows, were killed and many people dangerously wounded." The Archbishop of Paris issued a mandate recommending all rectors, vicars, and curates in his diocese to make the largest collections possible on account of the sufferers. The King created a lottery on a large scale for a like object.<sup>93</sup>

In connection with this storm the following is on record: Some of the farmers who have been offered considerable sums to indemnify them for their losses, and to encourage them to carry on with spirit the cultivation of their lands, with new seeds, new implements, etc., have peremptorily refused, on account of a foolish report that prevails in some parts of the country where the storm happened. They say that 'two giants were seen peeping out of the clouds, and threatening with terrible countenances, gigantic frowns and high-sounding words, that they would return next year, on the same 13 July, with greater scourges than the present one. Terrified either at the report, or at the fancied sight of the giants, which terror and a weak brain will often produce, many of the unhappy sufferers have abandoned their houses and turned beggars.

"Hail fell as large as a quart bottle; and all the trees from Vallance to Lisle were torn up or destroyed."<sup>93</sup>

The estimated damage from this storm was estimated at 5,000,000 francs.<sup>93</sup>

On 13 July 1788 at St. Germain [now in Paris] in *France*, hail fell as large as pint-bottles, and did immense damage. All the trees from Vallance to Lisle were destroyed.<sup>43,47</sup> [Vallance is in southeastern *France*. Lisle is in southwestern *France*.]

At St. Germain in Laie, in *France*, hail fell as large as a quart bottle, and all the trees from Vallance to Lisle were torn up by the roots on July 13.<sup>41,56</sup>

On 13 July 1788, a terrible hailstorm struck the whole extent of *France* and even into the *Netherlands*. The hailstones were a singular form, elongated and armed with points.<sup>271</sup>

Volney, in his *Views of the Climate of America* says that after a storm [in Pontchartrain, *France*] that occurred on 13 July 1788, he picked up some hailstones [larger than] the size of a man's fist.<sup>43</sup> [The

hailstones at St. Germain weighed more than 3 pounds.] [Pontchartrain is now Jouars-Pontchartrain, a commune in the Yvelines department in the Île-de-France region in north-central *France* just 35 kilometers north of Paris.]

On 13 July 1788, a terrible storm, accompanied by wind, rain and hail, burst upon Paris, *France*. This storm had already ruined the Poitou, the Touraine, and the Beauce regions of *France* and the countryside of Chartres. This storm spread desolation throughout the kingdom to another. At Paris, this storm was preceded by a suffocating heat, which seized mostly in the streets, similar to the heat from a furnace. The first signs of the storm appeared at eight o'clock in the morning by the appearance of violent winds, clouds and the accumulation of a great darkness. An hour later, the wind blowing from the southwest, a large rolling thunder rumbled almost two hours without interruption. That's when the clouds burst, and the sky gushed floods of rain and hail. In central and southern Paris, the hail was very ordinary, and quickly drowned by the rain. But on the rue du Faubourg-St-Antoine, this storm destroyed the gardens and orchards. This storm then drove through and ravaged Ile-de-France, Picardy and Flanders [now *Belgium*]. Several provinces suffered cruelly. In less than a quarter of an hour everything was lost. It destroyed the harvests, upset the fields, broke trees in half or uprooted them, lifted off roofs, smashed game and poultry, killed or bruise livestock, even seriously wounded men and women. The storm produced enormous size hail. They found a hailstone weighing more than 750 grams (1.7 pounds). The storm passed through Paris and northern *France* in an area a hundred leagues (300 miles, 483 kilometers) and a width of twenty (60 miles, 97 kilometers). On 17 July, two monstrous clouds, travelling from the southwest to the northeast, a distance of two hundred leagues (600 miles, 966 kilometers), crossed *France* in eight hours time. These clouds of hail ravaged all the way, an area two to four leagues (6 to 12 miles, 9.7 to 19.3 kilometers) wide, without causing any damage in the intermediate band.<sup>79</sup>

The summer of 1788 was warm in various places in *Europe*. The summer in Paris, *France* was characterized by:

Hot days	52 days
Very hot days	3 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Verona, <i>Italy</i>	( 96.1° F, 35.6° C)	in June and July
Chartres, <i>France</i>	( 96.1° F, 35.6° C)	
Chalons-sur-Marne, <i>France</i>	( 96.1° F, 35.6° C)	
Montauban, <i>France</i>	( 94.8° F, 34.9° C)	
Berne, <i>Switzerland</i>	( 92.8° F, 33.8° C)	
Paris, <i>France</i>	( 92.7° F, 33.7° C)	on 12 July
Milan, <i>Italy</i>	( 92.1° F, 33.4° C)	
Lons-le-Saunier, <i>France</i>	( 90.5° F, 32.5° C)	
Saint-Die, <i>France</i>	( 90.5° F, 32.5° C)	
Dunkirk, <i>France</i>	( 88.5° F, 31.4° C)	
Bourbonne-les-Bains, <i>France</i>	( 88.3° F, 31.3° C)	
Geneva, <i>Switzerland</i>	( 83.8° F, 28.8° C)	in August
Le Puy (upper Loire), <i>France</i>	( 81.9° F, 27.7° C)	
London, <i>England</i>	( 79.9° F, 26.6° C)	on 27 May and 2 June

On 13 July a great hailstorm struck parts of *France* causing terrible devastation. In Burgundy, the grape harvest began on 15 September. The quantity of grapes harvested was small but the wine produced was of excellent quality. The grain harvest was sufficient.<sup>62</sup>

In 8 August 1788 in [*Great Britain*], upwards of 5,000 head of horned cattle perished from want of sustenance, owing to the dryness of the season.<sup>128</sup>

In 1788, *England* experienced a defect of rain, and in consequence a great want of water on the close of the year universally felt. At Kimbolton in Cambridgeshire, *England*, the average rainfall for the 7 years preceding [years 1781-1787] was 25 inches. But the rainfall for 1788 was only 14.5 inches. It is believed that the entire island of *England* was affected by this drought.<sup>230</sup>

On 14-19 August 1788, a hurricane struck the *Caribbean Island* of Martinique, the *Dominican Republic*, the *Bahamas*, and New England in the *United States*. The hurricane caused between 600 and 700 deaths.<sup>141</sup>

In *Scotland*, the bursting in of the dam-dikes at Kirkwaid caused great destruction.<sup>47</sup> [Kirkwaid is now Kirkwall located on the largest island, known as the "Mainland" in the Orkney Islands, an archipelago in northern *Scotland*.]

On 19 August 1788, a disastrous gale struck New York and the western portions of New England in the *United States*. The wind brought in unusually high tides at New Haven, Connecticut; driving the waves against Long Wharf with such fury that it caused considerable damage. Throughout the region, a considerable number of houses, barns and other buildings were blown down or were unroofed. Hundreds of acres of tall timber trees were broken off or torn up by the roots. Roads were so blocked by the fallen trees that they became impassible for several days. Many cattle, horses and several persons were killed or injured by falling trees. Some of the towns in Massachusetts that suffered significant damage were Springfield, Northampton, Hatfield, Whately, Conway, Ashfield, Pittsfield, Petersham, Westminster and Deerfield. In Vermont the towns of Dummerston and Putney suffered. In New Hampshire, the towns of Sanbornton, Hanover, Meredith and New Hampton suffered.<sup>199</sup>

At Kirkwaid in *Scotland*, an inundation by breaking the Dam-dikes on October 4<sup>th</sup>, nearly destroyed the town.<sup>41, 43, 56</sup>

In the three Danish islands [now the *Virgin Islands* of St. Thomas, St. John and St Croix], a want of rain [drought] prevailed there for about four years [1788-1791] and killed a great number of Negroes.<sup>146</sup>

It was reported on 27 December 1788, that the greatest scarcity of water prevailed during the year in *Scotland*, as ever was known.<sup>128</sup>

In 1788 during the period between 6 April and 5 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Huang.<sup>153</sup>

In 1788, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 4 June and 3 July, floods struck Hopei (now Hebei province) in northern *China* at Lin-yü; Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang, Chin-hsien and Kiukiang; Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-shan and Ch'ing-yüan; and Hupeh (now Hubei province) in central *China* at I-ch'ang. At I-ch'ang, tens of house-sections were damaged by the floodwaters.

— During the period between 4 July and 1 August, floods struck Hupeh province at Wuchang, Hanyang, Ao-ch'êng, Huang-p'o, Hsiang-yang, I-ch'êng, Kuang-hua, Ying-ch'êng, Huang-kang, Ch'i-shui, I-tu, Kuang-chi, Huang-mei, Kung-an, Shih-shou, Sung-tzū, Chiang-ling, Chih-chiang and Lo-t'ien. At Chiang-ling, the dikes and houses were damaged by the floodwaters. At Chih-chiang, the houses were damaged. At Lo-t'ien, the city walls were damaged and many people drowned.

— During the period 2-30 August, floods struck Hupeh province at Chiang-ling, Ch'ien-chiang and Hanyang. At Chiang-ling, the dikes were damaged.

The year 1788 was a year of abundance in the vicinity of Shanghai, *China*. Some rice had double-

heads.<sup>166</sup>

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**Winter of 1788 / 1789 A.D.** The winter in *England* was intensely cold from November 1788 to January 1789. The River Thames was crossed opposite the Customhouse, the Tower, Execution-dock, Putney and Brentford.<sup>2, 41, 42, 43</sup>

In *England*, the frost was long and severe.<sup>47, 93</sup>

In *England*, there were fairs on the frozen River Thames during the winter of 1788-89.<sup>90</sup>

On 14 January 1789, a most severe frost in *England*, which began on the 25<sup>th</sup> of November 1788, continued unremitted for seven weeks. The River Thames was frozen in a remarkable manner, and the ice this day for the first time, broke up at the time that a fair was held thereon.<sup>128</sup>

In Selborne, *England*, the winter of 1788-89 was very severe. Hard frost continued from 22 November 1788 until 13 January 1789. The rest of January was mild with showers. February was rainy, with snow showers and heavy gales of wind. The first thirteen days of March produced a hard frost with snow, then until 18 April, the weather consisted of heavy rain, frost, snow and sleet. This winter was also severe on the Continent [*Europe*].<sup>70</sup>

“In the year 1788, however, the citizens of London had a complete revival of the ancient sports on the river. The frost set in on the 25<sup>th</sup> of November 1788, and lasted with great severity for several weeks. The river Thames, which at this season usually exhibits a dreary scene of languor and indolence, was this year the stage on which there were all kinds of diversions, bear-baiting, festivals, pigs and sheep roasted, booths, turnabouts, and all the various amusements of Bartholomew Fair multiplied and improved. From Putney Bridge in Middlesex, down to Rotherhithe, was one continued scene of merriment and jollity; not a gloomy face to be seen, but all cheerfulness, arising apparently from business and bustle. From this description the reader, however, is not to conclude that all was, as it seemed. The miserable inhabitants that dwell in houses on both sides of the river during these thoughtless exhibitions, were many of them experiencing the extreme of misery; destitute of employment, though industrious, they were with families of helpless children pining for want of bread; and though in no country in the world are the rich more extensively benevolent than in *England*, yet their benefactions could bear no proportion to the wants of the numerous poor, who could not all partake of the common bounty. It may, however, be truly said, that in no great city or country on the continent of *Europe*, the poor suffered less from the rigour of the season than the inhabitants of *Great Britain* and London; yet, even in London, the distress was very great, and though liberal subscriptions were raised, many perished through want and cold.”<sup>29</sup>

From November 1788 to January 1789, there was a general frost throughout *Europe*. The River Thames in London, *England* was passable on the frozen ice, opposite the Custom House.<sup>90</sup>

The winter was recorded as being intensely cold throughout *Europe*. A *German* newspaper of 17 December 1788, says the cold was so intense, as to sink the mercury to -27° F (-33° C). In the *United States*, the whole winter was intensely cold. The Delaware River was closed from the 26<sup>th</sup> of December to the 10<sup>th</sup> of March.<sup>1</sup>

The winter of 1789 in *France* was very severe.<sup>79</sup>

During the winter of 1788-89. The Rhône River in *France* began to experience ice on 23 December 1788; on 25 December a temporary thaw occurred; on the 27<sup>th</sup> the river froze along the coast opposite the city of Valence to a fairly significant extent, even though in this place the river is always very rapid, and remained frozen until 13 January 1789. From the 11<sup>th</sup>, men and women crossed the river sometimes even

with loaded mules. The Rhine, the Elbe, the Danube, the Seine, the Loire, the Garonne and many other rivers, frozen to a degree that pedestrians and even wagons crossed the rivers. From 2 to 20 January individuals traveled by wagons over the ice covered Great Belt.<sup>62</sup>

In northern *France*, the memorable winter of 1788-89, one of the toughest, was followed suddenly by stubborn heat.<sup>79</sup>

The *Baltic Sea* froze.<sup>37</sup>

During the winter of 1788-89, the *Baltic Sea* was completely covered with ice.<sup>68</sup>

The winter was intensely cold throughout *Europe*, particularly Holland [now *the Netherlands*].<sup>41, 42, 43</sup>

The winter of 1788-89 was one of the most severe and most persistent winters, which has extended over the whole of *Europe*. In Paris, *France*, the frost began on 25 November, and with the exception of a break during a single day (25 December) lasted 50 days until 13 January. When a thaw finally came; the amount of snow was measured as 0.60 meters (2 feet). On the large channels of Versailles, to the several rivers, ponds and the ice reached a thickness of 0.60 meters (2 feet). The water froze even in some very deep wells, and the wine in the cellars froze. The Seine River began to freeze over on 26 November 1788. It was only towards the 20th of January that the river returned back to normal. The lowest temperature observed in Paris was -7.2° F (-21.8° C) on 31 December. In the remaining portion of *France* and throughout *Europe*, the cold was also severe. The Rhône River was frozen completely in Lyon, *France*. The Garonne River was completely frozen at Toulouse, *France*. In Marseille, the sides of the docks were covered with ice. On the shores of the Atlantic Ocean, the sea was frozen to a distance of several leagues. On the Rhine River, the ice was so thick that loaded wagons could travel over it. The Elbe River was completely covered with ice, and carried heavy freight wagons. The ice at the Port of Ostend, *Belgium* was frozen so hard that people could cross it on horseback and the sea was frozen to a distance of four leagues (12 miles, 19 kilometers) from the outer fortifications. And no vessels or ship could approach the harbor because of the ice. The River Thames was frozen to Gravesend, six leagues below London, *England*. The Thames Frost Fair lasted from Christmas to 12 January with the river in London covered with booths. In *Ireland*, the rivers were covered with ice, the River Shannon froze at Limerick. The straits of the *Great and Little Belts* were frozen and great wagons crossed on the ice. The Sound between Helsingborg, *Sweden* and Kronborg, *Denmark* remained open only to a width of 200 meters. The Neva River at St. Petersburg, *Russia* was completely frozen over beginning on 15 November 1788. The Lake Geneva near Geneva, *Switzerland* in January was covered with ice for 14 days. There was very abundant snow everywhere, especially in *Austria* and *Italy*. The streets of Rome, *Italy* and the surrounding fields were covered with snow for 12 days. In Constantinople (now Istanbul, *Turkey*) the cold was very violent and produced deep snow; on the adjacent seas there was so much ice that the vessels did not dare approach. In Lisbon, *Portugal*, the winter produced severe cold for three weeks.<sup>62, 70</sup>

The following are the lowest temperatures observed in different cities:<sup>62</sup>

Basel, <i>Switzerland</i>	(-35.5° F, -37.5° C) on 18 December 1788
Bremen, <i>Germany</i>	(-32.1° F, -35.6° C) on 16 December 1788
Saint Albans, <i>England</i>	(-28.8° F, -33.8° C) on 31 December 1788
Warsaw, <i>Poland</i>	(-26.5° F, -32.5° C) on 18 December 1788
Dresden, <i>Germany</i>	(-25.8° F, -32.1° C) on 17 December 1788
Erlange, <i>Germany</i>	(-24.3° F, -31.3° C) on 18 December 1788
Oseberg, <i>Norway</i>	(-24.3° F, -31.3° C) on 29 December 1788
Innsbruck, <i>Austria</i>	(-24.3° F, -31.3° C) on 30 December 1788
St. Petersburg, <i>Russia</i>	(-23.1° F, -30.6° C) on 12 December 1788
Neuf-Brisach, <i>France</i>	(-22.4° F, -30.2° C) on 18 December 1788
Hanover, <i>Germany</i>	(-20.9° F, -29.4° C) on 16 December 1788



Weimar, <i>Germany</i>	(-19.8° F, -28.8° C) on 17 December 1788
Ansbach, <i>Germany</i>	(-19.8° F, -28.8° C) on 19 December 1788
Berlin, <i>Germany</i>	(-19.8° F, -28.8° C) on 28 December 1788
Munich, <i>Germany</i>	(-19.8° F, -28.8° C) on 30 December 1788
Leipzig, <i>Germany</i>	(-17.5° F, -27.5° C) on 17 December 1788
Wettin, <i>Germany</i>	(-15.3° F, -26.3° C) on 21, 27 and 28 December 1788
Saint-Die, <i>France</i>	(-15.3° F, -26.3° C) on 31 December 1788
Augsburg, <i>Germany</i>	(-15.3° F, -26.3° C) on 30 December 1788
Grande-Chartreuse, <i>France</i>	(-15.3° F, -26.3° C) on 30 December 1788
Copenhagen, <i>Sweden</i>	(-15.3° F, -26.3° C) on 4 January 1789
Strasbourg, <i>France</i>	(-15.3° F, -26.3° C) on 31 December 1788
Colmar, <i>France</i>	(-14.1° F, -25.6° C) on 19 December 1788
Tours, <i>France</i>	(-13.0° F, -25.0° C) on 31 December 1788
Gotha, <i>Germany</i>	(-11.9° F, -24.4° C) on 17 December 1788
Lons-le-Saunier, <i>France</i>	(-11.2° F, -24.0° C) on 31 December 1788
Pontarlier, <i>France</i>	(-10.8° F, -23.8° C) on 31 December 1788
Mannheim, <i>Germany</i>	(-10.8° F, -23.8° C) on 18 December 1788
Troyes, <i>France</i>	(-10.8° F, -23.8° C) on 31 December 1788
Arras, <i>France</i>	(-10.1° F, -23.4° C) on 30 December 1788
Chalons-sur-Saône, <i>France</i>	(-9.0° F, -22.8° C) on 31 December 1788 and 5 January 1789
Moulins, <i>France</i>	(-8.7° F, -22.6° C) on 31 December 1788
Orléans, <i>France</i>	(-8.5° F, -22.5° C) on 31 December 1788
Beaugency, <i>France</i>	(-8.5° F, -22.5° C) on 31 December 1788
Osen, <i>Norway</i>	(-8.5° F, -22.5° C) on 30 December 1788
Lyon, <i>France</i>	(-7.4° F, -21.9° C) on 31 December 1788
Étampes, <i>France</i>	(-7.4° F, -21.9° C) on 31 December 1788
Rouen, <i>France</i>	(-7.2° F, -21.8° C) on 30 December 1788
L'Aigle, <i>France</i>	(-7.2° F, -21.8° C) on 30 December 1788
Paris, <i>France</i>	(-7.2° F, -21.8° C) on 31 December 1788
Tournai, <i>Belgium</i>	(-6.2° F, -21.2° C) on 30 December 1788
Verviers, <i>Belgium</i>	(-6.2° F, -21.2° C) on January 5, 1789
Liège, <i>Belgium</i>	(-6.2° F, -21.2° C)
Grenoble, <i>France</i>	(-6.2° F, -21.2° C) on 31 December, 1788
Roanne, <i>France</i>	(-5.1° F, -20.6° C) on 31 December, 1788
Joigny, <i>France</i>	(-1.7° F, -18.7° C) on 31 December, 1788
Angoulême, <i>France</i>	(-1.7° F, -18.7° C) on 31 December, 1788
Löwen, <i>Germany</i>	( 0.1° F, -17.7° C) on January 4, 1789
Marseille, <i>France</i>	( 1.4° F, -17.0° C)
Livorno (Leghorn), <i>Italy</i>	( 2.8° F, -16.2° C) on 30 December, 1788
Orange, <i>France</i>	( 3.7° F, -15.7° C)
Antwerp, <i>Belgium</i>	( 5.0° F, -15.0° C) on 5 January 1789
London, <i>England</i> (outside city)	( 6.1° F, -14.4° C)
Honfleur, <i>France</i>	( 6.3° F, -14.3° C) on 30 December, 1788
Milan, <i>Italy</i>	( 7.3° F, -13.7° C)
Limerick, <i>Ireland</i>	(10.4° F, -12.0° C)
Oxford, <i>England</i>	(12.9° F, -10.6° C) on 30 December 1788

In the region of Toulouse, *France* in almost every household the bread was frozen and could not be cut; until it was warmed by a fire. Several passengers perished in the snow to Lemberg in Galicia. In three days of December, 37 people found frozen to death. Birds, which usually reside in the far north, appeared in several provinces of *France*. Fish perished in the fishponds because of the thickness of the ice. Many fruit trees were badly damaged. A portion of the vines froze. The pear trees suffered much, and so did the apple trees. Almost all walnut trees were destroyed. In the southern provinces the orange, olive and pomegranate trees were damaged. The great cold held in the Provence from 20 December to 8 January; the thermometer fell in Orange to 3.7° F (-15.7° C). The forest trees were heavily damaged, and those who



belong to the family of the pines were destroyed in large parts; other trees burst from top to bottom. The winter crops were protected by the thick snow that covered them, against the effects of cold. When spring arrived they appear from under the snow, very green and are even denser than usual, because the cold had killed the weeds that normally suffocated them. Many sheep were trapped in unhealthy shelters and as a result lost their wool or died. But the sheep that had remained under the open sky retained their fleece and have not become ill. Of all domestic animals, the horses have suffered the least. The land birds have died of hunger because of the snow. At the time of the spring thaw ice was very destructive. On the banks of the Loire River, the bridges in Tours, Nevers and La Charité in *France* were swept away. The Saône and the Dordogne rivers which were ice-strengthened also caused great damage.<sup>62</sup> [Lemberg is now Lviv in western *Ukraine*. Galicia is a historical region in Eastern Europe, currently divided between *Poland* and *Ukraine*.]

The winter of 1788-89 was very intense. It froze the rivers, seaports and the sea off the coast of *France*. The mass of ice disrupted communication from Calais, *France* to Dover, *England*. The *English Channel* was covered with ice two leagues (6 miles, 9.7 kilometers) off the coast. The ice clogged waterways and ports, imprisoning ships. The cold, mixed with snow, appeared suddenly at the end of November 1788, and the cold reigned ever since, except a few short interruptions, until April 1789. The Rhône River and other rivers were crossed on foot, on horseback, by carriage and, in some places, with heavily laden wagons. Olive trees, vines and fruit trees suffered greatly or died.<sup>79</sup>

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#### **1789 A.D. – 1791 A.D. Australia. Drought**

During 1789-91, there was a drought in New South Wales, *Australia*.<sup>101</sup>

No rain is said to have fallen at Sydney, *Australia* between June to November 1790 and all the grass was dried up.<sup>103</sup>

In January and February 1791, there were several weeks of excessive heat, hot winds, birds dropped dead from trees and everything burnt up, streams of water supplying Sydney, *Australia* nearly dried up.<sup>103</sup>

On 27 December 1790, the temperature in Sydney, *Australia* reached 102° F (38.9° C) in the shade. Then on 10 and 11 January 1791, the temperature in Sydney reached 105° F (40.6° C). Great heat was experienced. In January 1791, the settlement was visited by myriads of flying foxes and birds that dropped from the trees dead due to the extreme heat. The heat continued into February. On February 12, the country around Rose Hill and Parramatta was on fire for many miles.<sup>103</sup>

On 10 and 11 February 1791 the temperature at Sydney, *Australia*, stood in the shade at 105° F (40.6° C). The heat was so excessive at Parramatta, made worse by the bush fires, that immense numbers of the large fox-bats were seen to drop from the trees into the water, and many dropped dead on the wing. At Sydney about the harbor in many places the ground was found covered with small birds, some dead, others gasping for water. At Parramatta, an officer of the relief guard left the beat to find a drink of water, he had to walk several miles in a dry watercourse before he found it, many birds dropping dead at his feet. The wind was northwest, and burned up everything before it. Persons whose business obliged them to go out declared that it was impossible to turn the face for five minutes to the wind.<sup>103</sup>

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**1789 A.D.** In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.<sup>1</sup>

On 10 April 1789, a violent storm struck off the coast of North Carolina in the *United States*. In the Albermarle [Albemarie] Sound there was a very violent gale of wind, with an amazing rise of tide, about 9 feet above common high water mark. A number of ships were lost along the Outer Banks; at least two of these wrecks resulted in the death of the entire crew.<sup>141</sup>

A storm struck Liverpool, *England* on June 29, 1789.<sup>41</sup>

On 29 June 1789, Liverpool, *England* was much damaged by a storm.<sup>128</sup>

In *Scotland* and the north of *England*, inundations in July 1789.<sup>41, 43</sup>

On 16 July 1789, there were great inundations in *Scotland* and the north of *England*.<sup>128</sup>

On 22 July 1789 in *England*, there was a great hailstorm in Cambridgeshire.<sup>93</sup>

On 3 August 1789 in *England*, there was a great storm of hail at Amersham (Bucks). The hail fell with such violence as to kill birds, destroy fruit trees, crush garden frames, and accomplish similar damage on a large scale. The storm extended into Suffolk and Leicestershire.<sup>93</sup> [Bucks is an abbreviated form of the county of Buckinghamshire.]

On 16 August 1789, a famine was felt at Paris, *France*.<sup>128</sup>

On 22 August 1789 in *Scotland*, there was a great hailstorm at Kelso and Hawick. The hail was accompanied with angular pieces of ice, which fell in great abundance, and did much damage.<sup>93</sup>

In *England*, there were great rainstorms in the north.<sup>47, 92</sup>

In the south [of *France*] after the very severe winter of 1788-89, summer, autumn and winter began a little early again. In Burgundy, the grape harvest began on 7 October. The yield was negligible and the wine was bad. The cereal harvest in *France* produced very poor results.<sup>62</sup>

In *France* in 1789, there was a grievous famine in the province of Rouen.<sup>57, 90, 91</sup>

In the three Danish islands [now the *Virgin Islands* of St. Thomas, St. John and St Croix], a want of rain [drought] prevailed there for about four years [1788-1791] and killed a great number of Negroes.<sup>146</sup>

In 1789, there was not any rain that fell in Antigua, a Leeward Island in the *West Indies* for seven months. The crop of sugar was destroyed and 5,000 horned cattle perished for want of water.<sup>146</sup>

In 1789, a powerful cyclone struck Coringa, *India* causing 20,000 deaths.<sup>98</sup>

In 1789-92, there was a famine in the Madras Presidency in *India*.<sup>156</sup>

In 1789 during the period between 27 March and 22 June, a severe drought engulfed Hupeh (now Hubei province) in central *China* at I-tu. During the period between 25 May and 22 June, floods struck Hupeh province at I-ch'ang and Chekiang (now Zhejiang province) on the east coast of *China* at Shui-an and Ning-hai. During the period between 19 September and 18 October, floods struck Hopei (now Hebei province) in northern *China* at An-hsin and Lin-yü.<sup>153</sup>

*Also refer to the section 1789 A.D. – 1791 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1789 / 1790 A.D.** The winter of 1789-90 in Selborne, *England* was very mild. In November to the 17<sup>th</sup>, there were heavy rains with violent gust of wind. To 18 December, there was mild dry weather with a few showers. Then to the end of 1789, there was rain and wind. To 13 January 1790, the weather was mild and foggy with occasional rain. To 21 January, (5 days only) there was frost. Then to

28 January, the weather was dark with driving rains. Then to 14 February, it was mild dry weather. Then to 22 February (8 days) of hard frost. Then to 5 April, bright cold weather with a few showers.<sup>70</sup>

The winter of 1790 was unusually mild in *France*. However, spring and summer were severely cold, which often kept them constantly below normal temperature.<sup>79</sup>

In Philadelphia, Pennsylvania in the *United States* the winter of 1789 was very mild until the middle of February, when the weather became exceedingly cold to the close of the month. The whole spring was so cold that fires were comfortable until June. The summer months were exceedingly hot, the mercury frequently rising to 96° F (35.6° C) in the shade.<sup>1</sup>

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**1790 A.D.** In *India*, there was a great drought in the district of Baroda, and in some adjoining districts, resulting in a severe famine.<sup>47</sup>

In *India* during 1790-91, there was a famine in the district of Baroda [Vadodara], and in many adjoining districts, in some of which, however, it was only partial and local. "Very little is known concerning the famine in many of the districts named, beyond the fact that in 1790 tradition records the occurrence of a very severe famine. An almost total failure of rain was the immediate cause, apparently, of the calamity; and sufficient information exists to prove that it was one of the most remarkable on record. So great was the distress that many people fled to other districts in search of food; while others destroyed themselves, and some killed their children, and lived on their flesh. In Belgaum the scarcity was aggravated by people flocking into the district boarding on the Godavery [Godavari River]."<sup>57</sup> [Vadodara is in the state of Gujarat in northwestern *India* on the Arabian Sea. Belgaum is in western *India*. The Godavari River runs from western to southern *India*.]

In *India* during 1790-92, there was serious dearth in the northern districts of the Madras Presidency, and the pressure continued for about two years, from November 1790 to November 1792. "Many deaths from starvation occurred. At an early period Government suspended the import and transit duties on all kinds of grain and provisions, and they imported grain from Bengal [*India* and *Bangladesh*]. In the latter part of 1791 the export of rice from Tranjore [Thanjavur] was prohibited, except to the distressed districts. Rice was distributed by Government, and relief was afforded by employing the poor on public works." [This is the first occasion of the poor being employed on public works by the government in *India*.]<sup>57</sup> [The northern districts of the Madras Presidency is now the state of Tamil Nadu in southeastern *India*. Tranjore is located in Tamil Nadu State and is the main rice producing region and hence known as the Rice Bowl of Tamil Nadu.]

In 1790, there was a famine at Bombay and nearby regions in *India*.<sup>156</sup>

From November 1790 to November 1792, a serious dearth took place in the northern districts of the Madras Presidency in *India*. In April 1791, it was stated that 1,200 people died of starvation in the neighborhood of Vizagapatam [now Visakhapatnam along the southeast coast of India]. Early in 1792, the district of Ganjam in the state of Odisha, India] was in great straits for food, and those of Ellore, Rajamundry and Condapilly were in serious distress. In Masulipatam [now Machilipatnam in the state of Andhra Pradesh, *India*], there were numerous deaths from starvation in all quarters of the neighboring countryside.<sup>188</sup>

In 1790 during the period between 10 August and 8 September, floods struck Shantung (now Shandong province) on the east coast of *China* at Ch'ang-ch'ing, Pin, Yü-ch'êng and P'ing-yüan. During the period between 9 September and 7 October, floods struck Hopei (now Hebei province) in northern *China* at Luan, Yüeh-t'ing, Wu-ch'iang and Kao-t'ang.<sup>153</sup>

In the three Danish islands [now the *Virgin Islands* of St. Thomas, St. John and St Croix], a want of rain [drought] prevailed there for about four years [1788-1791] and killed a great number of Negroes.<sup>146</sup>

A hurricane struck *Jamaica*.<sup>41, 42</sup>

On 30 July 1790 in [northeastern] *Scotland*, there was a hailstorm at Monymuch [Moneymusk]. The ice was in angular pieces, about the size of a musket ball. The hailstones fell to the depth of 3 feet on the ground. The hailstones did much damage to vegetation of all kinds.<sup>93</sup>

In August 1790, twenty vessels in Tobago, *Republic of Trinidad* were driven on shore by a hurricane, and completely lost. Mr. Hamilton's sugar-works, with all the stores, were completely destroyed. His new mansion, which had been built upon pillars, was lifted up by the tempest, and removed to some distance; but being well made, did not go to pieces. Mrs. Hamilton, two ladies, and five children, were in the house, and suffered little or no harm. Mr. Hamilton, being absent from home, knew not what had happened; but returning in the night, which was excessively dark, and groping for his door, fell over the rubbish left on the spot, and so far hurt himself, that he was confined for a week. An old uninhabited building, which stood close by the house, was lifted from the ground and thrown upon their habitation; so that they expected every moment to be buried in the ruins of both.<sup>146</sup>

In the memoirs of James Montgomery who was visiting Tobago, *Republic of Trinidad* when the hurricane struck in August 1790:

— “In the country the devastation was no less sudden and terrible. Mr. Hamilton's sugar-works, being above seventy feet long, were totally destroyed, with all the stores they contained. His elegant new mansion, which was built upon pillars, was lifted up by the wind and removed to some distance; but being very well put together, did not go to pieces, but was only put out of square. Mrs. Hamilton fainted away and hurt her face in the fall; but two ladies, and five children, who were in the house at the time, suffered little or nothing. Mr. Hamilton happened to be absent, and not knowing what had occurred, went home in the dark; but in seeking the door fell over the rubbish that was left upon the spot, and hurt himself so much that he was confined for a week. My wife had a violent fever; and three days before this took place, the physician visited her twice a day. I had watched with her three nights. Our dwelling is old and out of repair, and close adjoining was an old house uninhabited, and in a ruinous condition. About eleven at night, when the storm arose to a hurricane, a great part of this old building was thrown upon our house, and we expected every moment to be buried in the ruins of both. I ran out of the house to look about me, but could see nothing for rain and lightning. Rafters and shingles were flying about in the air, and the storm soon forced me back into our dwelling. In these few minutes the rain had as thoroughly penetrated my clothes, as if I had fallen into the sea. I now carried my poor sick wife into an adjoining chamber; but though it was very firmly built, the rain beat in at all corners, so there was but one small spot where my wife could sit dry. In this situation we waited till the storm abated, and were graciously preserved from further harm, except that my wife's illness increased, and I got so violent a cold that I did not recover within a fortnight after.”

On 21 November 1790 in *England*, there was a great hailstorm in the neighborhood of London, and in Hampshire and Wiltshire.<sup>93</sup>

In *Northern Europe*, the summer of 1790 was hot and excessively dry with the exception of *Sweden*. The summer in Paris, *France* was characterized by:

Hot days                      40 days

Very hot days                6 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:

Verona, <i>Italy</i>	( 96.1° F, 35.6° C ) in August
Paris, <i>France</i>	( 94.3° F, 34.6° C ) on 22 June
London, <i>England</i>	( 86.0° F, 30.0° C ) on 22 June

There were very strong rains in Provence and Languedoc. In Burgundy, the grape harvest began on 27 September. The wine was not very plentiful and of mediocre quality. The grain harvest was poor.<sup>62</sup>

A flood broke out in 1790 in *France*. The amount of rainfall exceeded the average annual rainfall levels almost everywhere in *France*. But it was particularly large in the Languedoc and Montpellier. Here the rainfall was 47.6 inches (1,208 millimeters) almost double the yearly average and the highest amount in thirty-two years. The month of November alone gave more than 19.1 inches (486 millimeter) rainfall. The remainder is split primarily between the months of May and March.<sup>79</sup>

In *England*, almost over the entire kingdom, there was a storm that did considerable damage on December 23.<sup>41, 56</sup>

*Also refer to the section 1789 A.D. – 1791 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1790 / 1791 A.D.** In Selborne, *England* in November 1790, mild autumnal weather prevailed till the 26<sup>th</sup>, after which there were five days of hard frost. Then to the end of the year the weather consisted of rain, snow, with a few days of frost. The whole month of January 1791 was mild with heavy rains. February was windy with much rain and snow. Then to the end of April, it was dry but rather cold and frosty.<sup>70</sup>

On 23 December 1790, a violent storm did considerable damage; the whole roof of copper, on the top of the Chancery-Offices, was rolled up by the wind, and blown off. The storm was felt in most parts of *England*.<sup>128</sup>

On 14 January 1791, the fog was so dense at Amsterdam, *the Netherlands* that over 230 persons fell into the canals and were drowned.<sup>128</sup>

The winter of 1791 was unusually mild in *France*. However, spring and summer were severely cold, which often kept them constantly below normal temperature.<sup>79</sup>

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**1791 A.D.** On 2-3 February 1791 in *England*, the tide in the River Thames was so uncommonly high that it overflowed its banks and boats were floated into Westminster Hall. In Essex, it did great damage.<sup>128</sup>

In June 1791 in *England*, there were several violent hailstorms.<sup>93</sup>

In June 1791 in *Italy*, there was a violent hailstorm.<sup>41, 56, 57, 93</sup>

In 21 June 1791 in *Cuba*, great torrents of rain; 3,000 persons and 11,700 head of cattle of various kinds drowned.<sup>47, 92</sup>

Rains in the island of *Cuba*, on the 21<sup>st</sup> of June 1791, caused 3,000 persons and 11,700 cattle of various kinds to perish, by the torrents, occasioned by the rain.<sup>41, 56</sup>

On 21-22 June 1791, a great hurricane struck western *Cuba* causing approximately 3,000 deaths.<sup>107, 141</sup>

At day-break on 21 June 1791, it began to rain near the Havana, *Cuba*, which continued till half-past two in the afternoon of the following day, with such force as to cause the greatest flood ever remembered in that country. The royal tobacco mills, and the village in which they stood, were washed away, and 257 of the inhabitants killed. In the spot where the mills stood, the water, or a partial earthquake, opened the ground to the depth of forty-five feet, and in one of the openings a river appeared of the purest water. Where the Count Baretto's house stood, was a cavity more than sixty feet deep, from which a thick smoke

rose. Four leagues [12 miles] from thence, the torrent was so great, that none of the inhabitants within its reach escaped. All the crops of corn and growing fruits were carried away. Three thousand persons, and 11,700 head of cattle, are said to have perished in the flood.<sup>146</sup>

On 27 September 1791, reports were received of great damage done to the island of *Cuba*, by a storm.<sup>128</sup>

In several parts of *England* in June, there were violent hailstorms.<sup>41, 56, 57</sup>

Frost and snow, with hail, struck different parts of *England* at Midsummer [around 21-24 June].<sup>2, 41, 43</sup>

On 18 July 1791 in *England*, there was a great hailstorm in Berkshire, Gloucestershire, and Wiltshire.<sup>93</sup>

The summer of 1791 was considerably hot. The summer in Paris, *France* was characterized by:

Hot days                                      48 days

Very hot days                                9 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:

Verona, *Italy*                                ( 95.7° F, 35.4° C) in August

Paris, *France*                                ( 93.4° F, 34.1° C) on 15 August

London, *England*                            ( 80.1° F, 26.7° C) on 7 June

In Burgundy, *France*, the grape harvest began on 19 September. The quantity of wine was low but the quality was very excellent.<sup>62</sup>

On 3 August 1791 in *England*, there was a hailstorm in Leicestershire.<sup>93</sup>

In Thornton, (Leicestershire) *England* on the 3<sup>rd</sup> of August, there was a hailstorm that did great damage.<sup>57</sup>

In September 1791 in Naples, *Italy*, there was a hailstorm in Calabria. The hailstones weighed a pound. Vines were destroyed.<sup>93</sup>

In Calabria, (Naples) *Italy* in September, there was a violent hailstorm; stones weighed one English pound, which destroyed all hopes of producing a vintage of wine.<sup>41, 43, 56, 57</sup>

On 22 October 1791 in *England*, there was a hailstorm in Kent and Sussex.<sup>93</sup>

In Sussex, *England* in October, there was a severe hailstorm.<sup>57</sup>

A hailstorm struck Sussex, *England* in October, the hailstones were four inches in circumference.<sup>41, 43, 56</sup>

A storm struck the church of Speldhurst, (Kent) *England* on October 25. Lightning destroyed the church, and the church bells were melted. Other damage was done at Raynham.<sup>41, 43, 56</sup>

On 26 October 1791 in *England*, there was a hailstorm in Cornwall.<sup>93</sup>

In *England*, the river Don, near Doncaster, and the rivers Derwent, and Trent all greatly overflowed on November 20, 1791.<sup>41, 43, 47</sup>

In northern *Italy*, there were floods of great extent at Placentia in November.<sup>41, 43, 47</sup>

In the three Danish islands [now the *Virgin Islands* of St. Thomas, St. John and St Croix], a want of rain [drought] prevailed there for about four years [1788-1791] and killed a great number of Negroes.<sup>146</sup>



[In 1791, there was a famine in *Pakistan* that does not appear to be weather related. In Kach [*Pakistan*] there was a famine caused by innumerable black ants which swarmed in almost all parts of the country, and destroyed vegetation.<sup>57</sup>]

In 1791, there was a famine in Cutch [Kutch district in western *India*] caused by black ants.<sup>179</sup>

In 1791 during the period between 3 February and 4 March, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou. During the period 2-30 June, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Ying-shan. During the period between 27 October and 25 November, floods struck Shantung (now Shandong province) on the east coast of *China* at Chi-mo. During the period between 26 November and 24 December, floods struck Hupeh province at Pao-k'ang. At Pao-k'ang, houses and fields were damaged by the floodwaters.<sup>153</sup>

In 1791 during the 4<sup>th</sup> moon on the 5<sup>th</sup> day in the vicinity of Shanghai, *China*, there was a severe hailstorm.<sup>166</sup>

*Also refer to the section 1789 A.D. – 1791 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1791 / 1792 A.D.** In *England* in December 1791, very cold weather and snow hit *Italy* and *Spain*.<sup>2, 41, 43</sup>

In Selborne, *England* in November 1791, the weather was very wet and stormy. In December it was frosty. There was some hard frost in January 1792, but the weather was mostly wet and mild. In February, there was some hard frost and a little snow. March was wet and cold.<sup>70</sup>

The winter of 1792 was unusually mild in *France*. However, spring and summer were severely cold, which often kept them constantly below normal temperature.<sup>79</sup>

On 27 January 1792, there was a storm at Plymouth, *England*, which inundated the town, and the sea made a breach over the Eddystone lighthouse.<sup>128</sup>

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**1792 A.D.** In 1792, there were several good crops of wheat at Parramatta in New South Wales, *Australia* in spite of the drought.<sup>103</sup>

In Waterford, *Ireland*, there was a great storm on April 4<sup>th</sup>.<sup>41, 56</sup>

In 1792, there was a great flood on the island of St. Kitts in the *West Indies*.<sup>144</sup>

Before 11 April 1792, a great flood took place at St. Kitts in the *West Indies*. In the town of Basse Terre, heavy rainfall and violent gusts of flying showers over the entire night caused streams to begin to overflow. The next day, the storm increased. The currents began to carry away the Negro houses with their inhabitants. The storm continued into the night and finally ended in the morning. In one plantation, two women with two children were lost. In another estate, a woman, her husband and their 4 children along with a blind woman stood in the water, imploring God to help them. They were preserved. In College Street, the torrents of rain carried away fences, walls and steps, and in some places tore down the houses. The English church and the Methodist chapel were filled with mud and water. Several houses were carried into the sea, with all their furniture and dashed to pieces. The strongest walls were unable to withstand the vehemence of the main current and the oldest inhabitants could not remember so formidable and destructive an inundation, whereby so many lives were lost. In the town of Old Road, some houses had been washed into the sea, and on the north side much injury had been done.<sup>146</sup>

On 12 April 1792 in Kent, *England*, there was a great hailstorm between Gravesend and Chatham, extending over a district of 2 miles only.<sup>93</sup>

In Worcestershire in the West Midlands *England*, there were extended floods near Broomsgrove on 13 April.<sup>47</sup>

In different parts of Kent, *England* on April 13, there was a great storm.<sup>41, 56</sup>

On 18 April 1792, the city Bromsgrove in *England* was much injured by a waterspout.<sup>128</sup>

On 23 June 1792 in *England*, there was a hailstorm in Northumberland.<sup>93</sup>

There was a storm in the north of *England* on July 16<sup>th</sup>.<sup>41, 56</sup>

On 17 July 1792 in *England* there was a hailstorm in Lancashire.<sup>93</sup>

In 1792 in *Ireland*, there was a hailstorm in the neighborhood of Dublin. Hailstones of uncommon dimensions fell, accompanied by awful claps of thunder.<sup>93</sup>

The maximum temperature during the summer in Bordeaux, *France* was 99.3° F (37.4° C).<sup>62</sup>

The weather of 1792 in southern *France* produced excessive rains, cold, stinking fogs, storms and late frosts.<sup>79</sup>

In 1792 in southern *France*, there were excessive rains, foul mists, storms, early frost and late frost along with great agitation of the atmosphere.<sup>79</sup>

On 1-2 August 1792, a hurricane struck the *Lesser Antilles*. Many lives were lost in St. Kitts and Antigua in the *West Indies*. There was a great loss of life from ten ships in St. Barthélemy [or St. Barts] in the *Leeward Islands*. There were only two survivors from a Spanish brig sunk between St. Kitts and St. Eustatius.<sup>141</sup>

On 1 August 1792, several plantations at Antigua in the *West Indies* were destroyed by a hurricane. Most of the other islands also suffered.<sup>146</sup>

In Lancashire, *England*, there were great floods in August.<sup>43, 47</sup>

On 10 September 1792, reports were received that a hurricane at *Antigua* destroyed many estates.<sup>128</sup>

In 1792, there was a famine at Orissa in *India*.<sup>156</sup>

In 1792, there was a famine in Rajamundry [now Rajahmundry], Ellore, etc. in *India* in which one half of the inhabitants perished.<sup>182</sup>

In 1792 during the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tsinan, Chan-hua and Huang. During the period between 8 August and 8 November, a drought engulfed Hopei (now Hebei province) in northern *China* at Hsing-t'ai, Wu-ch'iang, Nan-kung, Ch'ing-yün, Ching-hai [‘Ching’, the word ‘hai’ possibly left off by mistake], Li, Wang-tu and Yüeh-t'ing. During the period between 14 November 1792 and 11 January 1793, floods

struck Kiangsi (now Jiangxi province) in southern *China* at Ch'ing-chiang, Chi-an, Lin-ch'uan and Kiukiang.<sup>153</sup>

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**Winter of 1792 / 1793 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1792 occurred on 23 November. It snowed for two days; drifted very much; roads impassable.<sup>116</sup>

The winter of 1792-93 produced excessive moisture in *France*.<sup>79</sup>

The night of 6 December 1792 will long be remembered as one of the stormiest nights in *England*.<sup>128</sup>

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**1793 A.D.** A severe drought struck Philadelphia, Pennsylvania in the *United States* in September. Lakes, streams, springs and wells, that had never been known to be dry, were then without water. Individuals in the country hauled water from the Delaware and Schuylkill Rivers in casks up to twenty miles. The earth was literally like powder and dust, except clay land, which baked as hard as a pine board.<sup>1</sup>

In Whitehaven, *England* in March, there was a storm, which did great damage, when the tide rose six feet above its usual height.<sup>41, 43, 56</sup>

A great storm struck *England* in the night of the 2<sup>nd</sup> of March 1793. It destroyed one of the towers at Sheffield manor.<sup>59</sup> [Sheffield manor is located in Sheffield, South Yorkshire.]

A violent storm of hailstones, which measured 3½ inches in circumference, struck *Jamaica* on April 25, 1793.<sup>41</sup>

In 1793 in *France*, a cold and rainy spring suddenly was followed by excessive prolonged heat. The violent heat of summer was abruptly replaced by very severe winter-like weather. The [grape] vines especially suffered and they froze, in all of *France* on the night of 30 to 31 May 1793. This caused an almost dearth of wine.<sup>79</sup>

The summer of 1793, despite its dryness, spawned five or six disastrous storms in *France*. A thunderstorm with hail prematurely appeared on the 1<sup>st</sup> and 2<sup>nd</sup> of May. A series of thunderstorms succeeded each other in July on the 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 13<sup>th</sup> and 17<sup>th</sup>. Thunder, wind, hail and floods ravaged the land, destroyed the crops, toppled buildings, and damaged the herds of livestock. On July 8<sup>th</sup> at Blincourt, near Senlis, there were hailstones as large as eggs. The wind brought down over 120 houses, and the floods carried away the cattle, furniture, women and children. At Puisieux, above Chambly, flash flood waters beyond 6.6 feet (2 meters) forced the inhabitants to flee in haste over the roofs of their houses. The ravages of this storm desolated in a similar manner, in less than twenty-five minutes, the cities and villages of Maïssel, Bougueval [now Bougival], Ermis, Neuilly-en-Thelle, Dieudonne, Foulangues, etc. The storm of July 10<sup>th</sup> produced hail and rain in the suburbs Ablon and Corbeil [of Paris]. The storm of July 17<sup>th</sup> headed to the north and destroyed the crops from Saint Denis to Saint-Germain-en-Laye.<sup>79</sup> [Blincourt is near Senlis and near Paris. Puisieux, above Chambly is in northern *France*. Neuilly-en-Thelle is in northern *France*. Dieudonne is in the Picardy area in northern *France*. Foulangues is in northern *France*.]

The summer of 1793 was very remarkable for the extraordinary heat, which was without precedence since the last century. The heat came in July and August. The summer in Paris, *France* was characterized by:

Hot days	36 days
Very hot days	9 days
Extremely hot days	6 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Valence, <i>France</i>	(104.0° F, 40.0° C) on 11 July
Paris, <i>France</i>	(101.1° F, 38.4° C) on 8 July
<i>Ibid.</i>	( 99.1° F, 37.3° C) on 16 August
Chartres, <i>France</i>	(100.4° F, 38.0° C) on 8 August
<i>Ibid.</i>	(100.6° F, 38.1° C) on 16 August
Verona, <i>Italy</i>	( 96.1° F, 35.6° C) in July and August
London, <i>England</i>	( 89.1° F, 31.7° C) on 16 July

In addition to the intense heat of the summer, the year held other strange weather events. In *France* in May and June of 1793, the weather was moist and cloudy and it rained often. The temperature remained cool. During these two months many homes were heated with indoor fires. In Vienna, *Austria*, between 30 May and 5 June there was extraordinary cold. There was snowfall on the mountains. Towards the end of June, heavy wagons could cross on the frozen Enns River in *Austria*.<sup>62</sup>

The great heat began on 1 July in Paris, *France* and grew very quickly. The sky was stable during that period, blue, clear and without clouds, the wind was always north, mostly it was calm and the barometer remained at a very strong low. The hottest days were on 8 and 16 July. On 8 July, the sky began to cloud up and rain and thunder rolled in. On 9 July at 4:30 in the afternoon, a terrible storm devastated Senlis, *France* and its surroundings. Hail the size of eggs destroyed the crops. Violent winds knocked over more than 120 homes. A tremendous rainstorm followed. Water collects in the fields and tore away animals, men, women and children. In Bonneval, *France*, an unhappy mother after her strength was exhausted was carried away by currents of water. This occurred after they had rescued her nine children. The National Assembly provided disaster relief of 30,000 livres. Later in a meeting of 8 August, it was decided that the Minister of the Interior should provide 6 million livres to support the owners of the devastated estates.<sup>62</sup>

In *France*, the heat was very great during the whole month of July and a good part of the August. On 7 August, the heat was particularly remarkable; overwhelming, and clear skies. The wind from the northeast felt so burning hot that they seemed to come from a brazier, or from the mouth of a limekiln. Even in the shade it was so hot, as if directly exposed to the scorching rays of the sun. In all the streets of Paris, *France*, the heat was painful, and this effect was also in the countryside as well. This stifling heat paralyzed respiration, and 7 August was felt more painful than on 8 July, when the thermometer had risen to 101.1° F (38.4° C). Even though on 7 August, the thermometer had only risen to 97.3° F (36.3° C). This was because of the suffocating state of the atmosphere.<sup>62</sup>

In Valence, *France* the heat came on very suddenly. The temperature readings in the shade were: 97.7° F (36.5° C) on 7 July; 99.5° F (37.5° C) on 8 July; 102.9° F (39.4° C) on 9 July; 101.8° F (38.8° C) on 10 July; 104.0° F (40.0° C) on 11 July; 101.8° F (38.8° C) on 12 July; 93.9° F (34.4° C) on 13 July; 99.5° F (37.5° C) on 14 July; 92.8° F (33.8° C) on 15 July; 91.6° F (33.1° C) on 16 July; 100° F (37.8° C) on 17 July; and 90.5° F (32.5° C) on 18 July. From 13 June, no rain fell in this area of *France*. The soil was so dry that most low growing plants and even many young trees were destroyed.<sup>62</sup>

This pernicious heat stretched across *France* and a great part of *Europe*. The wind was blowing fairly constant in the direction from north to south, the sky was completely pure and clear. Although the sun was burning hot, the edges were still without undulation, and it was during the whole time of the heat wave that no spots were observed on its disk [no sunspots].<sup>62</sup>

The drought was visible in the end of July. The water level of the Seine River in late August and mid-September fell to its lowest level duplicating the year 1719. In Paris, *France* the annual rainfall was measured as only 331 millimeters (13 inches). In the countryside, the chestnut, apple, nut and cherry trees, the hazels, the honeysuckle, and the grapevines had burnt leaves. The fruits were scarred by the heat. The lack of vegetables was very noticeable; and when they could be found in the marketplace, rose to enormous prices. The parched, cracked earth became so hard that it could not be turned by a plow or a spade. In the garden of the Luxembourg castle showed the soil to lack the slightest trace of moisture to the depth of a meter (39 inches). [There is a Luxembourg palace in Paris.] Diggers charged with digging a new well in a very exposed place to the sun's heat, found the soil dry to a depth of 1.6 meters (63 inches). On 1 September, the trees of the Royal Palace were almost completely stripped of their leaves. One hundred and fifty of these trees were quite bare. They were cracked by the drought and the heat; and the bark and the branches seemed dead.<sup>62</sup>

In *Jamaica* on 2<sup>nd</sup> of July, hailstones as large as pigeon's eggs.<sup>57</sup>

On 2 July 1793 in *Jamaica*, there was a hailstorm. Hailstones were as large as pigeons' eggs.<sup>93</sup>

At Savannah la Mar, in *Jamaica*, hailstones as large as pigeons' eggs fell on June 2.<sup>41, 43, 56</sup>

At Thornton, in Leicestershire *England* on August 3, there was a hailstorm. The hailstones measured from 4 to 6½ inches in circumference, and did great damage.<sup>41, 43, 56</sup>

On 7 August 1793 in *England*, there was a hailstorm in Leicestershire.<sup>93</sup>

On 13-16 August 1793, a hurricane struck the *Virgin Islands* causing 28 deaths. [*The London Times* reported the loss of 28 of 42 slaves, with additional loss of some crew on board the *Bristol*. *Lloyd's List* indicates only 10 men saved during a period when slaves were sometimes not included in the statistics. In addition, *Lloyd's List* indicates, "Three vessels, from Africa with slaves, are lost [lost] in the West Indies, in the late Hurricane."]<sup>141</sup>

In August 1793, considerable damage was done by a hurricane at St. Christopher's [St. Kitts] in the *West Indies*. On the evening preceding the storm, there were near thirty sail at anchor in the roads, but in the morning none were to be seen, except those stranded at different places along the coast.<sup>146</sup>

In Paris, *France*, at 11 o'clock in the morning on 17 August, a terrible storm rose up that lasted until midnight. The wind was blowing from the southwest and during the entire time with unprecedented ferocity. Several makeshift stalls, which were on the bridges of Paris, were overturned and many trees suffered greatly from wind damage.<sup>62</sup>

In 1793, the rains in New South Wales, *Australia* came too late to save the corn. August wheat was quite yellow.<sup>103</sup>

The drought of 1793 in *France* lasted four months. The first two months occurred in May and June and were characterized by severe cold. The last two months, July and August, were characterized by fiery heat.<sup>79</sup>

The heat in the year 1793 broke out suddenly. The months of May and June were very cold. The temperatures were cold enough to freeze ice during these two months; a lot of snow fell on the Alps and other mountains. In Lower *Austria*, fully loaded carts cross a frozen river at the end of June. The great heat began in Paris, *France* on 1 July; and at Montmorency, *France* after 4 July. The temperature increased so rapidly that by the 8<sup>th</sup> it was already producing peak temperatures. The maximum heat

observed was 101.1° F (38.4° C) on July 8 at the Royal Observatory of Paris, *France* and 104° F (40° C) on July 16 at the Observatory to the Navy [this observatory was located in the Hotel de Cluny in Paris]. During the hot weather, the wind remained to the north, the sky was almost always beautiful, clear and cloudless, and the barometer was kept constant. Less than four times in August was the barometer reading over 758 millimeters.<sup>79</sup>

This summer in *France* produced very hot, very dry days punctuated by violent thunderstorms. The weather was heavy and oppressive. The temperature differed little from day to night and morning to evening. Objects exposed to the sun warm to such a degree that they were hot to the touch. Men and animals died of asphyxiation. Vegetables and fruits were roasted and eaten by the caterpillars. Furniture and woodwork creaked and doors and windows buckling. Meat, freshly killed, spoiled quickly. Individuals suffered from incessant sweating of skin. The human body swam continuously in a bath of sweat, which was very inconvenient. Some individuals were becoming macerated. [Maceration of the skin occurs when it is consistently wet. The skin softens, turns white, and can easily get infected with bacteria or fungi.] These effects primarily became visible on July 7<sup>th</sup>. The north wind came and made this day so extraordinary hot that air seemed to exhale a fiery inferno or mouth of a limekiln. The heat was stifling, ruled by a very clear sky. The heat came in intermittent bursts, and produced an impression even in the shade equal to an exposure to the most ardent rays of the sun. It is felt with equal intensity in all the streets of Paris and the countryside. The heat took away the breath and produced extreme exhaustion. Even when the temperature reached 104° F (40° C) on July 16 it could not compare to what was felt on July 8<sup>th</sup>. The high temperature of this summer ended during the evening of August 17 by the arrival of a terrible storm that lasted all day.<sup>79</sup>

In Verona, *Italy*, the heat from the sun when the temperature reached 96.1° F (35.6° C) was so suffocating that many reapers were killed in the field.<sup>62</sup>

In Burgundy, *France*, the grape harvest began on 23 September. The wine was plentiful, but of mediocre quality. A cold rainfall struck which harmed the quality of the wine. In the area around Toulouse, the summer was dry and hot and the harvest of maize was entirely destroyed. The year of 1793 was known as a year of extraordinary scarcity in *France*.<sup>62</sup>

In 1793 during the period between 5 February and 6 May, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Ch'ing-p'u and Kweichow (now Guizhou province) in southwestern *China* at Kuei-ting. At Kuei-ting, houses were damaged by the floodwaters. Also during the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Pao-ting, Tung-kuang and Ta-ming. During the period between 12 March and 9 May, a drought engulfed Kwangsi (now Guangxi province) in southern *China* along the border with *Vietnam* at Lu-ch'uan. During the period between 10 May and 7 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang and Hupeh (now Hubei province) in central *China* at Sui and Huang-an. During the period between 7 August and 4 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hai-yen and Hopei province at Ta-ming. At Hai-yen, houses were damaged by the floodwaters. Also during the period between 7 August and 4 September, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tê-p'ing.<sup>153</sup>

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**Winter of 1793 / 1794 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1793 occurred on 29 October. It snowed all day; very cold.<sup>116</sup>

During the winter of 1793-94, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 81 days.<sup>202</sup>

The winter of 1793-94 in *France* was almost as rigorous as the winter of 1788-89.<sup>79</sup>



Almost universally throughout *Great Britain* on January 16, storms struck and did great damage.<sup>41, 43, 56</sup>

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**1794 A.D.** In March 1794 a tornado swept through the southwestern part of Bradford County, extending into Sullivan County, Pennsylvania in the *United States*. It cut a path a mile [1.6 km] in width and left scarcely a tree standing.<sup>178</sup>

On 3 June 1794 in *England*, there was a great hailstorm in Berkshire.<sup>93</sup>

On 11 & 12 June 1794 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>

On 19 June 1794, a tornado struck New England in the *United States*. It passed through Poughkeepsie, New York and then the towns of New Milford, Newtown, Watertown, Waterbury, Northford and Branford in Connecticut. Those persons who were carried up by the wind into the cloud and yet escaped with their lives said that it was very dark as night during the three or four minutes they were in it, and that the noise was deafening and awful. The tornado left a path of destruction. Houses, barns, and other buildings were blown to pieces, a number of cattle killed, and several human lives were lost. Strong oaks, sturdy maples and elastic walnuts were torn up by the roots or twisted off leaving stumps from 3 to 15 feet [0.9-4.6 meters] in height.<sup>199</sup>

On 22 June 1794, a violent tornado struck New Milford, Connecticut in the *United States*.<sup>174</sup>

On 27 June 1794, a hurricane struck *Jamaica*. The Prize Ships from St. Domingo to Jamaica, met with a severe gale of wind, one of which was totally lost near Kingston.<sup>141</sup>

On 6 July 1794 in *England*, there was a great hailstorm at Albourne (Wilts). Some of the hailstones that fell measured 5 inches in circumference.<sup>93</sup>

On 6 July 1794, a violent storm of thunder and lightning did great damage in the country [*England*].<sup>128</sup>

On 30 July 1794, a hurricane struck *Jamaica* and lives were lost.<sup>141</sup>

In 1794 the month of July was very hot in Paris, *France*. In Burgundy, *France*, there was intense heat and frequent rains. The grape harvest began early, on 15 September. The wine was plentiful and of pretty good quality. The highest temperature was observed in Verona, *Italy* in July at 93.2° F (34.0° C); in Paris, *France* on 30 July at 86.9° F (30.5° C); and in London, *England* on 13 July at 84.0° F (28.9° C).<sup>62</sup>

On 7 August 1794 in London, *England*, there was a great storm of rain and hail, causing much damage.<sup>93</sup>

On 27-28 August 1794, a hurricane struck *Cuba* causing more than 100 deaths.<sup>141</sup>

In *Great Britain* on the 6<sup>th</sup> of October, there was a great storm, which prevailed throughout; several hundred sail of shipping destroyed.<sup>57, 90</sup>

A most violent storm occurred on the eastern coast of *England*, when much damage was done to the shipping on October 6<sup>th</sup>.<sup>41, 56</sup>

A most violent storm of rain in Norfolk, *England* in November, inundated many towns, particularly Norwich.<sup>41, 43, 56</sup>

A most violent storm struck Cumberland in northwestern *England* on December 2, 1794.<sup>41</sup>

In 1794, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

In 1794 during the period between 31 March and 28 April, floods struck Shantung (now Shandong province) on the east coast of *China* at Wu-ch'êng; Hopei (now Hebei province) in northern *China* at Pao-ting, Li and Fu-ning; and Hupeh (now Hubei province) in central *China* at Hsiang-yang, Kuang-hua, I-ch'êng and Huang-an. Also during the period between 31 March and 28 April, a drought engulfed Shantung province at Wên-têng and Jung-ch'êng. During the period between 8 August 1794 and 5 February 1795, a drought engulfed Shantung province at Huang.<sup>153</sup>

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**Winter of 1794 / 1795 A.D.** *Scotland* was pounded by a massive snowstorm. In one single night, snow fell to the depth of eight or ten feet (2.4-3.0 meters), and in some places the loftiest trees were entirely covered. By this one night's storm seventeen shepherds lost their lives, and thousands of sheep, besides other animals were destroyed. One farmer alone lost fourteen hundred sheep. After the storm had somewhat disappeared; there were found collected together (by its violence) in one spot, the dead bodies of two men, one woman, forty-five dogs, three horses, nine black cattle, one hundred and eighty hares, and one thousand eight hundred and forty sheep.<sup>30</sup>

A London newspaper said that on 1 January 1795, the cold was so intense in *England*; that the River Thames froze over in ten minutes while the tide was turning.<sup>1</sup>

In 1795 in Paris, *France*, there were 42 days of frost.<sup>58, 80</sup>

The cold and snow of 1795 killed the olive trees in *France*. In Montpellier, it froze continuously from January 15 to 26. The coldest day was on January 17<sup>th</sup> when the temperature dropped to 15.8° F (-9° C). In Paris, the thermometer was -10.3° F (-23.5° C) on January 25, and there was forty-two consecutive days of frost.<sup>79</sup>

During the winter, the Seine River in *France* was frozen at the Bridge "Pont de la Tournelle" in Paris from 25 December 1794 until 28 January 1795. Wagons drove near Liege, *Belgium* on the Meuse River. The Zuiderzee was frozen and the sound was ice covered.<sup>62</sup>

[One source lists this winter as 1795-96] During the winter of 1795-96 in *England*, the winter was very severe; Thames frozen. The Antiquarian Society of Newcastle recorded that the ice on the Tyne was 20 inches thick.<sup>47, 93</sup>

[In *England*] there was a frost from 24 December 1794 to 14 February 1795 with the intermission of one day's thaw that occurred on 23 January 1795.<sup>90</sup>

There were great floods throughout *England* caused by the melting snow in February 1795. A great part of the bridges were either damaged or destroyed.<sup>41, 43, 56</sup>

The winter of 1794-95 in *Europe* was remarkably long and severe. In Paris, *France*, there were 42 frost days in succession. On 25 January, there was the greatest cold ever seen in Paris. The thermometer dropped to -10.3° F (-23.5° C). In London, *England*, the lowest temperature on the same day was 8.0° F (-13.3° C). On the banks of the Rhône River, near Geneva, *Switzerland* at midnight the temperature fell to 6.8° F (-14° C). The Main, the Scheldt, the Rhine and the Seine rivers were frozen so thick, that they were crossed by wagons and army detachments in several places. The Thames River, despite the height of the floodwaters in the first days of January, froze in the neighborhood of White Hall in London, *England*. The French General Jean-Charles Pichegru sent a detachment of cavalry and light artillery into

North *Holland* on 20 January, with orders directing the cavalry to travel to Texel, to approach the warships frozen at anchor, surprised Holland [now *the Netherlands*] and take possession of them. The French cavalry sat at a gallop on the ice, came to the ships, they called for their surrender, and took possession of them without a fight and the marines took prisoners. In the south of *France* and *Italy*, the winter was severe, and the cold lasted until the beginning of spring. The thaw caused great flood damage, especially on the banks of the Rhine River.<sup>62, 70</sup>

It is said that in the year 1795, that the King of Denmark came to Venice, *Italy* and froze the Lagoons.<sup>81</sup>

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**1795 A.D.** In Retford, Nottinghamshire, *England*, there were great floods, which caused much damage to the town; and in other parts of the country caused by the melting of snow.<sup>47, 92</sup>

On 26 February 1795, there was an awful storm of wind and rain at Norfolk Island, *Australia*. Large pines 180 to 200 feet (55 to 61 meters) in height and 20 to 30 feet (6 to 9 meters) in circumference were blown to the ground.<sup>103</sup>

In 1795 in New South Wales, *Australia*, there was 5 feet less water at Windsor in April than in February, owing to the previous dry weather since August 1794.<sup>103</sup>

On 18 May 1795 in *England*, there was a great hailstorm in Essex.<sup>93</sup>

In June 1795 in *England*, there was a great hailstorm in Wiltshire. This storm caused a great number of newly shorn sheep to perished from the cold to which they were exposed. The storm also struck Herefordshire and Middlesex, *England* and Monmouthshire, *Wales*.<sup>93</sup>

On 12 June 1795 in *England*, there was a hailstorm in Essex and Herts [abbreviation for Hertfordshire], which suffered severely.<sup>93</sup>

In Essex and Herts, *England* on 12<sup>th</sup> of June, there was a storm of hail, which did great damage.<sup>41, 57</sup>

On 2 August 1795, a hurricane struck North Carolina and Virginia in the *United States*. A fleet of eighteen Spanish ships, sailing from Havana, Cuba to Spain, was struck off Cape Hatteras, North Carolina, and some of these ships were lost. A ship sank off Cape Charles, Virginia, with a total loss of life.<sup>141</sup>

On 5 August 1795 in *England*, there was a hailstorm in Lancashire.<sup>93</sup>

On 21 August 1795 in *England*, there was a hailstorm in Surrey.<sup>93</sup>

In *England* in 1795, the scarcity of food was severely felt.<sup>57, 91</sup>

In 1795, there was a very severe famine felt in *England*.<sup>90</sup>

A storm struck different parts of *England*, particularly in the Channel and in London on November 4, 1795.<sup>41</sup>

During the period between 8 August 1794 and 5 February 1795, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Huang. Then in 1795 during the period between 5 February and 6 May, a drought engulfed Shantung province at Tsou-p'ing, Shou-kuang, Ch'ang-yüeh and Chu-ch'êng. During the period between 17 June and 15 July, a drought engulfed Shantung province at P'êng-lai, Huang, and Ch'i-hsia; and Chekiang (now Zhejiang province) on the east coast of *China* at

Chiang-shan and T'ang-ch'i ["Ch'i-t'ang", possible that the word order is inverted]. Also during the period between 17 June and 15 July, floods struck Chekiang province at Li-shui; Kiangsi (now Jiangxi province) in southern *China* at Yü-shan and Fên-i; and Hupeh (now Hubei province) in central *China* at Ch'ien-chiang, Mien-yang and Sung-tzū. At Sung-tzū, the dikes were damaged. During the period between 8 August and 8 November, a drought engulfed Shantung province at Wên-têng.<sup>153</sup>

On 19 January 1796, the fleet of Admiral Christian returned to port, having suffered storms for a month. They sailed with 200 sails, but returned with only fifty.<sup>128</sup> [Admiral Hugh Christian set sail from *England* to the West Indies in November 1795. The storm struck the English Channel on 18-19 November 1795].

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**1796 A.D.** On June 7, a storm at Petersburg, *England*, destroyed upwards of 90 vessels and a large magazine of naval stores.<sup>41, 43, 56</sup>

On 16 June 1796 in *England*, there was a hailstorm in Lancashire.<sup>93</sup>

The summer of 1796 was, especially in Burgundy, *France*, cold and rainy. The grapes were harvested on 7 October. The yield was very low, and the quality of the wine poor. The maximum temperature in Paris, *France* did not rise above 85.1° F (29.5° C). In the south, however, the summer was dry and warm, as well as during a large part of autumn.<sup>62</sup>

In October, the *Bahama* Isle received immense damage among the shipping by a storm.<sup>41, 56</sup>

On 5 November 1796 in *England*, there was a severe hailstorm at Norwich, which appeared impregnated with lightning. "An awful and singular hailstorm occurred at Norwich. Two very vivid flashes of lightning illuminated the southern and northern hemispheres, succeeded by heavy peals of thunder, while the hail, which fell profusely, appeared impregnated with fire."<sup>93</sup>

In December 1796, there was a heavy hailstorm or fall of ice on the Hawkesbury River in *Australia*. The produce of four farms were completely destroyed; some of the frozen flakes [hailstones] found on the second day were 8 inches in length.<sup>103</sup>

In 1796 during the period between 5 February and 6 May, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at P'u-chiang. During the period between 6 May and 8 August, a drought engulfed Shensi (now Shaanxi province) in central *China* at Lo-ch'uan and Hêng-shan. During the period between 5 June and 4 July, a drought engulfed Hupeh (now Hubei province) in central *China* at Ku-ch'êng and Ma-ch'êng. During the period between 8 August and 8 November, a drought engulfed Hopei (now Hebei province) in northern *China* at Chi. [Chi is located at longitude 117.24° East and latitude 40.03° North.]<sup>153</sup>

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**Winter of 1796 / 1797 A.D.** 25 December 1796 was remembered as the most severe (coldest) day in the memory of man.<sup>2, 41, 42</sup>

In December 1796, the temperature [in London, *England*] fell to 5° F (-15° C).

During all of December 1796, there were intense frosts [in *England*].<sup>90</sup>

On 3 January 1797, Bois-le-Duc, in Holland [now *the Netherlands*] was inundated.<sup>128</sup>

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**1797 A.D.** In 1797 in New South Wales, *Australia*, there were heavy brush fires in January. Flinders and Bass experienced signs of drought at Bateman's Bay and Western Port.<sup>103</sup>

In London, *England* on the 6<sup>th</sup> of May, hailstorm; did great damage to the gardens round Metropolis.<sup>57</sup> The stones measured 1½ inches in circumference.<sup>41, 43, 56</sup>

On 6 May 1797 in London, *England*, there was a hailstorm that did great damage in the suburbs; and on the same day at Lewes (Sussex).<sup>93</sup>

On 5 June 1797 in *England*, there was a severe hailstorm.<sup>93</sup>

In Lewes, (Sussex) *England* on the 5<sup>th</sup> of June, there was another hailstorm; stones weighed from 4 to 7 ounces.<sup>57</sup> The hailstones measured 3 inches in circumference and some weighed three ounces.<sup>43, 56</sup>

On 5 August in *England*, there was a hailstorm in Sussex.<sup>93</sup>

Major storms reigned in *France* in 1797.<sup>79</sup>

In 1797 during the period between 26 May and 24 June, a drought engulfed Hupeh (now Hubei province) in central *China* at Chiang-ling.<sup>153</sup>

In 1797, floods struck many regions of *China* including:<sup>153</sup>

— During the period between 25 June and 23 July, floods struck Hopei (now Hebei province) in northern *China* at Liang-hsiang, Tientsin, Ching-hai, Ch'ing and Ts'ang; Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin; and Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing.

— During the period between 22 August and 19 September, floods struck Hopei province at Yüeh-t'ing; Chekiang (now Zhejiang province) on the east coast of *China* at Yüeh-ch'ing [possibly a misprint, "Li-ch'ing"]; and Kiangsi (now Jiangxi province) in southern *China* at Ning-tu. At Ning-tu, 20,175 house-sections were damaged by the floodwaters and 4,392 persons were drowned.

**Winter of 1797 / 1798 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1797 occurred on 17 November. Exceeding cold for the season; snowed considerably.<sup>116</sup>

**1798 A.D.** In Halifax, Nova Scotia, *Canada*, on September 25, a storm did 100,000*l.* damage.<sup>41, 56</sup>

The spring and summer of 1798 were very hot and dry in the south of *France*. The harvest was very satisfactory having been spared from the hailstorms. The fruit was plentiful and of excellent quality. The summer in Burgundy was also hot and favorable. The grape harvest began on 15 September. The yield was low, but of excellent quality. The highest temperature was observed in Paris, *France* on 1 August at 90.9° F (32.7° C); and in London, *England* on 28 June at 86.0° F (30.0° C).<sup>62</sup>

In 1798-99, there was a severe drought in *Australia*. The drought destroyed the wheat and maize crops.<sup>101</sup>

In 1798 in New South Wales, *Australia* in September, the pastures and gardens needed rain. There were brush fires in December. The thermometer read 107° F (41.7° C) in the shade at Windsor.<sup>103</sup>

In 1798 during the period between 6 May and 8 August, floods struck Hupeh (now Hubei province) in central *China* at Ao-ch'êng and Hopei (now Hebei province) in northern *China* at Wên-an. During the period between 16 May and 13 June, a drought engulfed Hupeh province at Huang-an. During the period between 14 June and 12 July, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Ch'ing-p'u. During the period between 13 July and 11 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Wên-têng and Jung-ch'êng.<sup>153</sup>

**Winter of 1798 / 1799 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1798 occurred on 2 November. Last night it snowed a good deal.<sup>116</sup>

The Delaware River near Philadelphia, Pennsylvania in the *United States* was closed by ice from 22 January until past the middle of March.<sup>1</sup>

In the *United States*, the winter was known as the Long Winter of 1798-99. The winter began in New York City on 20 November 1798 when 18 inches (0.5 meters) of snow fell on New York City. Up to 3 feet (0.9 meters) of snow fell over the interior of New England. Rough, wintery weather struck over the next 5 months. On the second week of March 1799 there were 3 feet (0.9 meters) of snow on the ground in Washington County, Pennsylvania near Pittsburg. At the same time, there were 5 feet (1.5 meters) of snow covered the ground near Lake Erie. Snowflakes continued to fall in April and May in New England.<sup>27</sup>

The winter of 1798-99 in New England in the *United States* was long and severe. On 17 November 1798, a severe snowstorm struck the region. The storm came to an end 5 days later. The storm blew with the force of a gale. Great quantities of snow fell during the storm. All the roads were impassible afterward. Mail carriers had to resort to riding through the fields. Many houses were so deeply buried by the snow that the families, which lived in them, found it difficult to escape without tunneling through the drifts. The storm caused considerable damage along the coast. Many vessels were wrecked on the Cape, and seven of them were broken to pieces and all onboard perished.<sup>199</sup>

Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>

In 1799 the temperature in Florida in the *United States* was very low.<sup>115</sup>

In 1798 in Paris, *France*, there were 32 days of frost.<sup>58, 80</sup>

The *Baltic Sea* froze.<sup>37</sup>

During the winter of 1798-99, the *Baltic Sea* was completely covered with ice.<sup>68</sup>

During the winter, the Seine River in *France* was frozen at the Bridge "Pont de la Tournelle" in Paris from 29 December 1798 until 19 January 1799. The Rhine River and the Meuse River were also frozen.<sup>62</sup>

The winter of 1798-99 in *Europe*, produced severe cold weather. In Paris, *France*, there were 32 frost days in succession. The Seine River was frozen completely from 26 December 1798 to 19 January 1799 from the Pont de la Tournelle to the Pont Royal. On 9 January, a man tried to cross the river near Pont-Neuf but the ice gave way under his feet and he fell into the water. The lowest temperature observed, was on 10 December 1798 at 0.3° F (-17.6° C). The Meuse, the Elbe and the Rhine rivers were frozen solid as the Seine River. On the Meuse River, carriages rode across on the ice. At The Hague and at Rotterdam in *the Netherlands* stalls and all sorts of plays were set up on the ice [frost fair]. At Mainz (Mayence) *Germany*, the Dragoon Regiment crossed the frozen Rhine River on the ice, because the bridge between Mainz-Kastel (Wiesbaden, *Germany*) had been destroyed. In all of Liguria, *Italy* the weather was very severe. It froze all the rivers and destroyed the orange trees. In *Provence*, the olive trees were severely damaged. In Languedoc, the cold destroyed a "great portion of the seed."<sup>62, 70</sup>

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**1799 A.D.** In France there was a flood. On 4 February 1799, the Seine River in Paris, *France*, at the bridge "Pont de la Tournelle" reached a height of 6.97 meters (22.9 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>



In March 1799 in *Australia*, the Hawkesbury River flooded. Animals and stacks of wheat were swept away. One man drowned. Many settlers spent the night clinging to their roofs of their homes.<sup>101</sup>

In March 1799, there was a major flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 50 feet (15.25 meters) above the water mark at Windsor. The whole village at the site of what is now Windsor was washed away. Because this was the colony's major farming center, the flood caused great shortages and hardship.<sup>99, 109</sup>

On 18 March 1799, the river, by great land floods, overflowed at Bath, *England*.<sup>128</sup>

After the severe winter of 1798-99, the summer of 1799 in Burgundy, *France* was rainy and cold. The grape harvest began late on 10 October. The yield was plentiful, but the wine was only of very mediocre quality. Nonetheless there was in the south after a rainy spring, hot days. In Paris, the maximum temperature occurred in August when it rose to 86° F (30° C).<sup>62</sup>

On 15 July 1799, a destructive hailstorm struck Connecticut in the *United States*. The storm passed over Litchfield County, crossed the Connecticut River near its mouth, and then struck Lebanon, Bozrah and Franklin. As the hailstorm hit, it sounded like bricks being thrown upon the roofs of houses. The hailstones measured from 2 to 3 inches [5-8 centimeters] in diameter, and from 4 ¼ to 6 inches [11-15 centimeters] in circumference. Banks of hail 5 or 6 inches [13-15 centimeters] deep remained on the ground a week later. The hail not only destroyed the windows but also the sashes. The shingles of the roofs were split and broken off. Crops and trees were destroyed. Some pigs, four months old, and a number of sheep were killed by the hail. Geese, turkeys and other domestic fowls met the same fate. Many birds were found dead in the fields and gardens. Some cows were so wounded that their backs were bloody.<sup>199</sup>

On 16 August 1799 in *England*, there was a great hailstorm in Gloucestershire and Somersetshire.<sup>93</sup>

On 23 September 1799, a hurricane struck offshore *Jamaica* causing 27 deaths.<sup>141</sup>

In 1799 in Hindostan [variant of Hindustan], there was a famine in the district of Midnapore [West Bengal, *India*].<sup>91</sup>

In early 1799, there was considerable distress due to scarcity in the district of Dindigul in the state of Tamil Nadu, *India*.<sup>188</sup>

In 1799 during the period between 6 March and 4 April, floods struck Hopei (now Hebei province) in northern *China* at Li. During the period between 6 May and 8 August, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chiang-shan. During the period 1-30 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Ch'ang-ch'ing.<sup>153</sup>

In 1799 in New South Wales, *Australia*, there were bushfires; drought; the grass burnt up and cattle were in great distress.<sup>103</sup>

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**Winter of 1799 / 1800 A.D.** In January snow fell over most of the *United States*, including the Carolinas, Georgia and New Orleans. There was a great scarcity of fuel, and much suffering among the poor.<sup>1</sup>

In 1800, the weather in South Carolina and Georgia in the *United States* was uncommonly cold. During the beginning of the year in January and February, there were several snowfalls. The grounds of the lower country were covered six inches with snow and those in the upper country were two or three feet

deep. In the upper country, the snow lay several weeks. Sleet, at this time, loaded the trees with ice, from Broad river toward the Savannah, a space of 10 or 15 miles, and made great devastation of the forests. A letter from Savannah, dated 11 January, states that the evening before, there was “a heavy fall of snow and a severity of cold never before known” in that state; and that “the depth of snow was from two to three feet.” A letter from Midway, Georgia dated 17 February indicated the snow had been three feet deep in some places and from 16 to 18 inches deep on the level.<sup>174</sup>

In the *United States*, early settlers routinely waited till winter to cross the frozen Mississippi River in their wagon trains. In 1799, George Frederick Bollinger led a group of early pioneers from North Carolina to establish early settlements in Missouri. They hoped to cross their largest obstacle, the Mississippi River, on the ice, frozen solid in mid-winter. They arrived on the east bank of the Mississippi River opposite St. Genevieve in late December, pitched camp and explored potential river crossings. St. Genevieve is located about a hundred miles downstream from St. Louis. Daily the thickness of the ice was measured and then on December 31, a chopped hole in the ice indicated thickness well over two feet (0.6 meters). The next day the settlers successfully drove their heavy loaded wagons across the river.<sup>15</sup>

During the winter of 1799-1800, the Seine River in *France* was frozen at the Bridge “Pont de la Tournelle” in Paris from 21 December 1799 until 14 January 1800.<sup>62</sup>

The winter of 1799-1800, there were 49 frost days in Paris, *France*, including 15 in succession, from 19 December 1799 to 2 January 1800. Record lows were observed in Paris on 31 December and on 30 January at 8.4° F (-13.1° C). The Seine River at the Pont de la Tournelle was covered with ice from 29 December 1799 to 14 January 1800. At Moens [now Prévessin-Moëns] in eastern *France* the temperature fell to 8.4° F (-13.1° C) on 1 January. In London, *England* on 31st December the temperature was 17.1° F (-8.3° C). In the *Southern Europe*, the winter was severe only during month of December. The grain was damaged by the December frost, which occurred before the snow fell. The fig trees froze, and most died off.<sup>62</sup>

The winter of 1799 in *France* caused much suffering to olive trees. The cold in Paris, arrived December 31 with a cold temperature of 8.4° F (-13.1° C).<sup>79</sup>

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**1800 A.D.** In January 1800, there were riots in various parts of *England* on account of the high price of bread. On 15 September, there were again riots in various parts of *England* on account of the high price of bread.<sup>128</sup>

In March 1800, there was a serious flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 40 feet (12.2 meters) above the water mark at Windsor. This was at the same site as the flood a year earlier. Again, crops and the whole village were washed away. After this flood, the settlement was moved to the current location of the city of Windsor.<sup>99, 109</sup>

In *China*, there were great floods.<sup>41, 43, 47</sup>

The summer of 1800 was remarkable for very high heat, which extended over a large part of *Europe*. Between 6 July and 21 August, the temperature in Paris, *France*, five times reached 90.3° F (32.4° C). The summer in Paris was characterized by:

Hot days	25 days
Very hot days	5 days
Extremely hot days	2 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The temperature in Paris was: 88.5° F (31.4° C) on 3 August; 88.7° F (31.5° C) on 4 August;

89.4° F (31.9° C) on 11 August; 84.2° F (29.0° C) on 12 August; 84.0° F (28.9° C) on 13 August; 86.0° F (30.0° C) on 14 August; 94.3° F (34.6° C) on 15 August; 90.7° F (32.6° C) on 16 August; 97.9° F (36.6° C) on 17 August; 95.9° F (35.5° C) on 18 August; 82.2° F (27.9° C) on 19 August; and 80.8° F (27.1° C) on 20 August.

The high temperatures observed during the summer were:<sup>62</sup>

Island of Philae, <i>Egypt</i>	(109.6° F, 43.1° C)
Bordeaux, <i>France</i>	(101.8° F, 38.8° C) on 6 August
Nancy, <i>France</i>	(101.8° F, 38.8° C) on 18 August
Rouen, <i>France</i>	(100.4° F, 38.0° C) on 18 August
Montmorency, <i>France</i>	(100.2° F, 37.9° C) on 18 August
Limoges, <i>France</i>	( 99.5° F, 37.5° C)
Paris, <i>France</i>	( 95.9° F, 35.5° C) on 18 August
Moens, <i>France</i>	( 95.0° F, 35.0° C) on 18 August
London, <i>England</i>	( 88.0° F, 31.1° C) on 2 August
Bath, <i>England</i>	( 75.0° F, 23.9° C) on 3 August
Edinburgh, <i>Scotland</i>	( 72.5° F, 22.5° C) on 2 August

The summer of 1800 was extremely dry in northern *France*. This drought began June 15 and grew more severe on June 23. The drought went on doggedly, with a few short rains, until 13 August. From June 5 to August 18 at Montmorency, *France*, there was only 1 inch (26 millimeters) of rainfall. Half of this rainfall came from a single rainstorm. For nearly two months, the prevailing winds came from the north and especially the northeast. The sky was almost constantly serene. Most of the ponds and the sources of water [springs, creeks] dried up. Many plants died. The Seine River [at the bridge “Pont de la Tournelle”] on August 20 dropped to 6.9 inches (176 millimeters) lower than the zero mark [the low water mark of] the year 1719. This river water level was the lowest observed in sixty-eight years.<sup>79</sup>

In *Germany* during the month of April, the weather was very hot. But in July in Düsseldorf in west-central *Germany*, there were frosts. There were terrible droughts in the north, and south. In Montmorency, *France* only 26 millimeters (1 inch) of rain fell from 5 June to 18 August. Many fires began in August. In *France*, an entire village in the forest of Haguenau, a part of the Black Forest, was destroyed by fire. Countless locusts descended on Strasbourg, *France* and nearby districts. On the night of 20 July, lightning struck the old Augustinian convent in Paris, and set it ablaze. Many cases of hydrophobia [rabies] were observed in the south of *France*.<sup>62</sup>

A very rigorous and wet winter of 1800 was followed by a wet spring that was quite cold. Hot dry weather suddenly began May 2<sup>nd</sup>, and stopped almost as abruptly on May 9<sup>th</sup>, and resumed again on June 5<sup>th</sup>. The heat became very lively from July 15 to August 19 with the thermometer generally between 77° F (25° C) and 96.8° F (36° C). The peak temperature was recorded on August 18, with a reading of 95.9° F (35.5° C) at the Royal Observatory, and 99.7° F (37.6° C) at the Naval Observatory in Paris, *France*.<sup>79</sup>

In Burgundy, *France*, the year was rainy and cold. The grape harvest only began on 25 September. The yield of wine was quite insignificant, and only of mediocre quality. This was also the case in the rest of the south of *France*. The grain harvest was poor.<sup>62</sup>

In the year 1800 in Bradford County, Pennsylvania in the *United States* locusts appeared and devoured every green thing before them. At first a worm that worked itself out of the earth in vast numbers appeared. The ground was alive with them. A shell next formed, which after a little time, opened on the back and the locust came out with wings and legs, resembling the grasshopper, but much larger. They soon flew to the trees and bushes in multitudes and devoured the foliage, but passed away the same season. They also swarmed throughout the wilderness in 1795, 1814, 1829 and 1846.<sup>178</sup>

On 10 August 1800, a person by accident set fire to Radnor forest in *Wales*, or sheep-walk; and owing to the weather being dry, it burned for several miles in circumference.<sup>128</sup>

On 14 August 1800, Newberg [Neuburg, *Germany*], in the Palatinate, totally burned; 10,000 acres of forest of Salzburg, *Austria* destroyed by fire.<sup>128</sup> [Neuburg is located in Bavaria in southern *Germany*. Salzburg is in central *Austria* on the northern boundary of the Alps.]

In *England*, there was no rainfall for seventy-four days, when on Tuesday morning, 19<sup>th</sup> August, “a glorious rain came down.”<sup>47</sup>

On 19 August 1800 in *England*, there was a hailstorm in Oxfordshire and Bedfordshire. Irregular pieces of ice fell. Hares and partridges were killed in the fields.<sup>93</sup>

In Oxfordshire and Bedfordshire, *England* on the 19<sup>th</sup> of August, there was a hailstorm at Heyford (Oxen, abbreviation form of Oxfordshire); irregular pieces of ice the size of hen’s eggs fell. In Bedfordshire, the same storm produced hailstones eleven inches in circumference that killed hares and partridges in the fields.<sup>56, 57</sup>

At Heyfords in Oxfordshire, *England* on August 19, 1800, a hailstorm produced irregular pieces of ice the size of a hen’s egg. The same storm did damage to Bedfordshire where hailstones fell of 11 inches circumference and killed the hares and partridges in the fields.<sup>41, 43</sup>

On 19 August 1800, a hailstorm struck *England*. The hailstones consisted of balls of ice that were from six to nine inches in circumference. The storm was 1 ½ miles wide and traveled 15 miles from Fenny Stratford in Buckinghamshire and passed into Bedfordshire.<sup>196</sup>

On 22 August 1800 in *England*, there was a storm of great severity (after a very hot afternoon) at Woburn and other parts of Bedfordshire. Some of the stones measured 9, 10, and 11 inches in circumference.<sup>93</sup>

On 10 September 1800 in *England*, there was a hailstorm in Lincolnshire and Rutland.<sup>93</sup> [Lincolnshire is a county in eastern *England*. Rutland is a county in central *England*.]

On 15 September 1800, there was a great storm of thunder and lightning throughout *England*.<sup>128</sup>

In the *West Indies* in October, there was great destruction from flooding at St. Domingo; 1,400 lives lost.<sup>41, 43, 47, 56</sup>

On 9 October 1800, a hurricane struck the southwest *Atlantic Ocean*. The ship *Galgo* was upset during a squall in latitude 21, longitude 61 West. Twenty-five individuals were saved.<sup>141</sup>

In *England* on the 3<sup>rd</sup> of November, a great storm inflicted serious damage in various parts, and especially in London.<sup>41, 57</sup> [Other sources places this event on 8 November.] On 8 November 1800, a storm did vast damage in London, and throughout almost the whole of *England*.<sup>43, 90</sup>

In the end of the year 1800, the Rhine River in *Germany* flooded.<sup>175</sup>

In 1799-1801, there was a famine in the Bombay Presidency and Madras Presidency in *India*.<sup>156</sup>

In 1800, floods struck Yunnan province in southwest *China* at Chin-ning and Hopei (now Hebei province) in northern *China* at Pa, Ho-chien, Jên-ch’iu, Lung-p’ing and Ting. During the period between 5 February and 6 May, a drought engulfed Hupeh (now Hubei province) in central *China* at Chin-chiang.

During the period between 6 May and 8 August, a drought engulfed Shensi (now Shaanxi province) in central *China* at An-k'ang.<sup>153</sup>

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**Winter of 1800 / 1801 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1800 occurred on 21 November. Snowed hard all day; storm very severe. November 23, snowed some; believe the snow is a foot deep; very good sleighing.<sup>116</sup>

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**1801 A.D.** Beginning on 18 March 1801, a 4-day rainstorm pounded New England in the *United States* resulting in a flood. At Groton, Massachusetts, the flood was very severe. In the southeastern portion of Vermont, mills, bridges and other property washed away or were destroyed, valued at more than \$200,000. [In present currency, that would be equivalent to \$3 million in damages based on the Consumer Price Index (CPI) inflation rates.] In Connecticut on the Farmington River, fourteen bridges, seven gristmills, five sawmills, two clothiers' shops and works, one dwelling house, and two barns were carried away and destroyed.<sup>199</sup>

The maximum temperature during the summer in Mons, *Belgium* was 97.3° F (36.3° C) on 15 July.<sup>62</sup>

On 16 July 1801 in *England*, there was a hailstorm in Oxfordshire.<sup>93</sup>

On 22 July 1801, the *Bahama* Isle received immense damage from a storm and inundation.<sup>41, 56, 128</sup>

In December 1801, the Rhône River produced floods at Lyon, *France*. Docks and adjacent streets, the neighborhood of Brotteaux and the suburb of Guillotière disappeared beneath the river. The height of the water on the river reached the water level of the flood of 1756, one of the strongest outbursts. The rainfalls exceed the average annual amount. In particular, Viviers, where this quantity [annual rainfall] equalled 35.8 inches (910 millimeters). 51.3 inches (1,302 millimeters) more fell than had fallen per year in 46 years. The rains of 1801 occurred primarily in the season of autumn. On September 6 at Viviers, 14 inches (356 millimeters) of rain fell in eighteen hours. This is the highest 18-hour rainfall within 46 years of observations.<sup>79</sup>

In Holland [now *the Netherlands*] and *Germany* in November, there was great damage on the seacoast from flooding.<sup>41, 43, 47, 56</sup>

On 21 November 1801, there were inundations on the coast of Holland [now *the Netherlands*] and *Germany*.<sup>128</sup>

On 21 November 1801, there was a great storm in Devonshire, *England* and in the *Baltic*.<sup>128</sup>

A storm struck Devonshire, *England* and the *Baltic* in November.<sup>41</sup>

In the *United Kingdom* in 1801, there was a great scarcity. Flour obtained from *America*. Committees of both Houses of Parliament were appointed to inquire into means of supplying food.<sup>57, 91</sup>

In 1801, there was a famine felt throughout the kingdom [*Great Britain*].<sup>90</sup>

In 1801, *England* suffered a scarcity. For 5 years, the harvests (with the exception of 1796) had been unfavorable.<sup>188</sup>

In 1801, many regions of *China* experienced flooding including:<sup>153</sup>  
 — During the period between 5 February and 6 May, floods struck Shantung (now Shandong province) on the east coast of *China* at Yü-ch'êng, Ch'ang-ch'ing, Kuan-ch'êng and Huang; Hopei (now Hebei

province) in northern *China* at Jên-ch'iu, Ching-hai and P'ing-hsiang; and Sinkiang (now Xinjiang province) in far northwestern *China* at Chên-hsi. At Chên-hsi the dikes were damaged.

— During the period between 11 July and 8 August, floods struck Hopei province at Wu-ch'ing, Cho, Chi, Ch'ang-p'ing, P'ing-ku, Wu-ch'iang, Yü-t'ien, Ting, Nan-yüeh, Wang-tu, Ta-hsing, Wan-p'ing, Hsiang-ho, Mi-yün, Ta-ch'êng, Yung-ch'ing, An-tz'ü, Fu-ning and Nan-kung; Chahar province (now eastern *Inner Mongolia*) at Wan-ch'üan; and Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua. [Chi is located at longitude 117.24° East and latitude 40.03° North.]

— During the period between 9 August and 7 September, floods struck Chekiang province at Hsin-têng, I-wu and Chin-yün.

In 1801 during the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Chang-ch'iu. During the period between 6 May and 8 November, a severe drought engulfed Shantung province at Jung-ch'êng. Plants withered.<sup>153</sup>

**Winter of 1801 / 1802 A.D.** The Meuse River, the Rhine River in *Germany*, and the Saône River in *France* froze.<sup>62</sup>

In January 1802, southern *France* experienced cold temperatures that dropped down to 13.5° F (-10.3° C).<sup>79</sup>

The winter of 1801-02 in *Northern Europe* was very severe. The Maas (Meuse), the Waal and the Rhine rivers were frozen. The River Thames had ice. The Saône River was frozen at Dijon, *France*. The lowest temperatures observed during the winter were:

Moens, <i>France</i>	( 0.5° F, -17.5° C)
Paris, <i>France</i>	( 4.1° F, -15.5° C) on 16 January
Avignon, <i>France</i>	(13.3° F, -10.4° C) on 17 January
Maastricht, <i>the Netherlands</i>	(13.5° F, -10.3° C) on 15 January
London, <i>England</i>	(16.0° F, -8.9° C) on 16 January

In *France* the snowmelt in the spring thaws produced large floods.<sup>62</sup>

In *France* there was a flood. On 3 January 1802, the Seine River in Paris, *France*, at the bridge “Pont de la Tournelle” reached a height of 7.32 meters (24.0 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

On 21 January 1802, there was a great storm at Liverpool, Manchester, Chester, and Whitehaven, *England*.<sup>128</sup>

The winter of 1801-02 in general was very mild in New England in the *United States*. On the Merrimack River, the ice broke up on 24 January. On 28 January 1802, the temperature at Salem, Massachusetts was 60° F [16° C]. It was one of the warmest January's that people remembered. Then on 21 February, a great snowstorm struck. The storm lasted nearly a week. It covered the earth with snow and sleet to a depth of several feet. Intense cold prevailed which caused much suffering. The sleet froze on the snow, forming a thick hard crust. The depth of the snow was so great that people could no longer see the roads, so they drove their sleighs on the crust of the snow across the fields and pastures. They drove over fences and walls buried in the snow.<sup>199</sup>

— This storm proved disastrous to the vessels along the coast of Massachusetts. A schooner went ashore at Plum Island. A brig [a sailing vessel with two square-rigged masts] and a sloop were cast away at Cape Ann. A ship and a schooner were wrecked on Chelsea Beach. A brig *Eliza* was driven ashore near Boston. Two other schooners also went ashore near Boston. Two pilot boats were driven ashore in the Bay of Braintree. A schooner was wrecked on Cohasset Rocks. The ship *Florenzo* was driven ashore at Marshfield. Several ships were driven ashore on Cape Cod, including a schooner that was driven ashore



at Sandwich. Three full-rigged ships, *Ulysses*, *Brutus* and *Volusia*, were also driven ashore on the Cape during the storm.

### 1802 A.D. – 1807 A.D. India. Famine

In *India* during 1802-04, there was a famine in the Nizam's dominions (Bombay Presidency). "This famine was caused in the several districts affected by it by four distinct causes, which operated apparently about the same time. In Kach [in *Pakistan*], the crops are said to have been destroyed by locusts. In Pahlumpur [Palampur], Rerva Kanta, Surat, Guzerat [Gujerat], Hyderabad, Belgaum, and Rutnagherry [Ratnagiri], the famine is stated to have been caused by want of rain. Candeish was overrun by the armies of Holkar; and the Pindaree bands sacked and burned villages in every direction, even destroying the grain standing in the fields; and the same fate attended the districts of Ahmednagar, Poona [Pune], and Sholapur [Solapur]; whilst the influx of starving people from other districts into Sattara [Satara], Kolapur [Kolhapur], Dharwar [Dharwad], and Colaba, caused a scarcity of food in those districts."<sup>57</sup> [The Bombay Presidency during this time, included much of northwest, western and central *India*. Palampur is in the northern tip of *India*. Reva Kantha is in Gujarat State in western *India*. Surat is in western *India*. Guzerat [Gujarat] is in western *India*. Hyderabad is in southeastern *India*. Belgaum is in southwestern *India*. Rutnagherry [Ratnagiri] is in western *India*. Candeish now called Khandesh is in west-central *India*. Ahmednagar is in central *India*. Poona [Pune] is in central *India*. Sholapur [Solapur] is in central *India*. Sattara [Satara] is in western *India*. Kolapur [Kolhapur] is in western *India*. Dharwar [Dharwad] is in southwestern *India*. Colaba is now part of Mumbai in northwestern *India*.]

In northern *India*, there was a total failure of rain in the "ceded districts" of Allahabad. "Not a shower fell after the 12<sup>th</sup> August, 1803, and in September hot winds were blowing just as in May or June, and scorched up the crops. The winter rains also failed. This drought was followed by heavy hailstorms early in 1804."<sup>47</sup>

In 1803 in Khandesh (Hindustan, now called *India*), a famine carried off a large number of the population.<sup>91</sup>

In 1803, there was a famine in the Northwest Provinces and Bombay in *India*. The famine severely impacted the Northwest Provinces till the autumn of 1804. It appears this dearth was partly due to the shortsighted policies of the British Government. The government imposed heavier rates of revenue [taxes] on the population at the same time a drought was occurring. This was more than what the population could bear.<sup>156</sup>

In 1803, there was a famine in Cutch [Kutch district in western *India*] caused by locusts. During the same year, there was a minor famine in Bombay [now Mumbai, *India*], Hyderabad [in southern *India*], Northern Madras [now northern Chennai] and the North-Western Provinces.<sup>179</sup>

In 1803, there was a famine in Bombay [now Mumbai, *India*].<sup>182</sup>

In 1803-04, there was a scarcity centered in the Buab [river region] of *India* partly caused by drought and partly due to the interruption of [animal] husbandry by the contending armies.<sup>181</sup>

In 1804, there was a famine in Kandeish [now Khandesh, *India*].<sup>182</sup>

Towards the end of 1804, due to an unfavorable season, there was scarcity in the Tanjore [now Thanjavur] and South Arcot districts in the state of Tamil Nadu in *India*. In early 1805, the distress became severe. During the end of 1805, the famine, due to a general failure of the crops, spread through all parts of the Madras Presidency. The dearth was most severe in the districts of North Arcot, Nellore, and Chingleput, though it was also felt to a lesser degree in the Ceded Districts, South Arcot, Tanjore and

Trichinopoly. The scarcity ended in October 1807. The mortality rate in Madras [now Chennai] in 1807 was 5 times the rate of 1805.<sup>188</sup>

In *India* during 1804-07, there was scarcity in the Bombay Presidency, following the unfavorable season of 1804. This caused severe pressure on the poorer classes. "In the latter part of the following year a general failure of crops appears to have occurred in most parts of the presidency, and the scarcity caused thereby had not passed over until October 1807."<sup>57</sup>

In 1805-06, there was a minor famine in Deccan in southern *India*.<sup>179</sup>

In 1807, there was a minor famine in southern *India*.<sup>179</sup>

In 1807, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

**1802 A.D.** In *England*, there were great floods; much damage to shipping.<sup>47, 92</sup>

In Dublin, *Ireland* during January and February, there was a great overflow of the River Liffey causing immense damage.<sup>47, 56, 92</sup>

On 21-23 February 1802 a most boisterous winter storm traveled from South Carolina to Maine in the *United States* at a rate of about 100 miles in a hour.<sup>204</sup>

On 14 April 1802, an inundation at Lorca, a city of Murcia, in *Spain*, was destroyed by the bursting of a reservoir, which inundated more than 20 leagues (60 miles, 97 kilometers), and killed 1,000 persons, besides cattle.<sup>47, 90, 92</sup>

On 18 July 1802, there was a violent storm, which did considerable injury in the North of *England*.<sup>128</sup>

On 10 August 1802 in *England*, there was a hailstorm in Leicestershire and Warwickshire.<sup>93</sup>

A storm struck the north of *England* on August 18, 1802.<sup>41</sup>

On 24 August 1802 in *England*, there was a great storm in Durham and Northumberland.<sup>93</sup>

On 28 August 1802 in *England*, there was a hailstorm in Northumberland.<sup>93</sup>

On 2-3 December 1802, there was an inundation in Dublin, *Ireland*, and parts adjacent.<sup>43</sup>

On 2-3 December 1802, an inundation of the River Liffey, did immense damage in Dublin, Ireland.<sup>90, 128</sup>

In 1802 in *Southern Europe*, there were great rainstorms.<sup>47, 92</sup>

The summer was in *the North, the East*, and a portion of *the South of Europe* very hot and very dry. In Holland [now *the Netherlands*] and a part of *Jutland*, the heat was extremely abnormal. The highest observed temperatures during the summer were:<sup>62</sup>

Avignon, <i>France</i>	(100.6° F, 38.1° C) on 14 August
Vienna, <i>Austria</i>	( 98.4° F, 36.9° C) on 10 & 11 August
<i>Ibid.</i>	(100.0° F, 37.8° C) on 14 August
Paris, <i>France</i>	( 97.5° F, 36.4° C) on 8 August
Verona, <i>Italy</i>	( 96.1° F, 35.6° C) in August
Turin, <i>Italy</i>	( 95.0° F, 35.0° C) on 21 August

Maastricht, <i>the Netherlands</i>	( 95.0° F, 35.0° C ) on 9 August
Geneva, <i>Switzerland</i>	( 94.1° F, 34.5° C )
Moens, <i>France</i>	( 90.5° F, 32.5° C ) on 9 August
London, <i>England</i>	( 81.0° F, 27.2° C ) on 30 August

The drought from the previous year carried over into 1802 to haunt *Europe*. The plants were burned, the grass withered to the roots and the fruits of summer and even winter were threatened. It robbed the trees of their leaves, and only the grapes retains its green tendrils.<sup>62</sup>

In London, *England*, the second driest years in the 23-year period [1797-1819] occurred in 1802 with 18.43 inches of rainfall.<sup>175</sup>

In Burgundy, *France*, the grape harvest began on 20 September. The yield was low, because the freeze that occurred on 16 and 17 May; which had hurt the vines greatly. But the quality of the wine was excellent. The grain harvest was poor and the grain was very dear. In *England*, the harvest was one of the richest that had ever been seen in that country.<sup>62</sup>

In 1802, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period 2-30 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at I-wu. Crops were damaged by the floodwaters.

— During the period between 31 May and 29 June, floods struck Chekiang province at Ting-hai. Crops were damaged by the floodwaters.

— During the period between 29 July and 27 August, floods struck Hupeh (now Hubei province) in central *China* at Han-ch'uan, Mien-yang, Chung-hsiang, Ch'ien-chiang, T'ien-mên, Kung-an, Sung-tzū, Chiang-ling, Ching-shan and Chien-li; and Chekiang (now Zhejiang province) on the east coast of *China* at Hsin-têng. At Ching-shan, houses and granaries were damaged by the floodwaters. In Hsin-têng, over 17,000 house-sections were damaged.

In 1802, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period 2-30 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping.

— During the period between 31 May and 29 June, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua, Chiang-shan and Ch'ang-shan.

— During the period between 30 June and 28 July, a drought engulfed Hupeh (now Hubei province) in central *China* at Ao-ch'êng, Hanyang, Huang-kang [possible misprint, "Huang-ch'uan"], Hsien-ning, Huang-kang and An-lu.

— During the period between 28 August and 26 September, a drought engulfed Chekiang province at Hsüan-p'ing and Ch'êng: and Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang and Ch'ing-chiang.

*Also refer to the section 1802 A.D. – 1807 A.D. for information on the famine in India during that timeframe.*

**Winter of 1802 / 1803 A.D.** In December 1802, in the *United States*, a violent snowstorm struck the Philadelphia area dropping one foot of snow. The winds blew this snow into banks of considerable height, which obstructed the roads. The storm was very severe in the North and East and snow fell to great depths.<sup>1</sup>

Beginning on 14 March 1803, a most severe snowstorm dumped fifteen inches (0.4 meters) of snow in Philadelphia, Pennsylvania and vicinity in the *United States*; and twenty inches (0.5 meters) in Baltimore and Washington D.C. Snow fell to great depths in the Northern, Western and Eastern U.S.<sup>1</sup>

During the winter of 1802-03 in Bradford County, Pennsylvania in the *United States*, there were a couple late May snowfalls. On 4 & 5 May 1803, snow fell to a depth of 6 inches [15 cm]. On 8 May, snow fell to a depth of 6 inches [15 cm].<sup>178</sup>

The Meuse River was frozen. The Seine River in *France* was frozen at the Bridge “Pont de la Tournelle” in Paris from 17 January until 17 February 1803.<sup>62</sup>

On 1 January 1803, there was a violent whirlwind at Falmouth, *England*, which stripped the roof of every house. On 5 January at Plymouth, *England*, a whirlwind passed over the town, and did extensive damage.<sup>128</sup>

The winter of 1803 came rather late, but was very severe. The Meuse, the Elbe and the Seine rivers froze. The Seine River was covered with ice from 17 January to 17 February 1803. In Holland [now *the Netherlands*] and *Germany* several travelers froze to death, and all ports were blocked by ice. The *Sound* was frozen; on 30 January more than 6,000 people crossed over on the ice. In *Austria*, the snow blocked the roads. The lowest temperatures observed during the winter were:<sup>62</sup>

Moens, <i>France</i>	( 2.7° F, -16.3° C) on 12 February
Brussels, <i>Belgium</i>	( 3.9° F, -15.6° C) on 11 February
Maastricht, <i>the Netherlands</i>	( 3.9° F, -15.6° C) on 11 February
Paris, <i>France</i>	( 9.5° F, -12.5° C) on 12 February

During the winter of 1802-03 in *France*, the weather was very mild during the month of December 1802 and the first ten days of January 1803. The temperature fell abruptly from 11 to 16 January. A thaw occurred from 17 to 24 January. Frost reappeared from 25 to 31 January. This was followed by a thaw that ended on 4 February. The frost resumed from 4 to 13 February. Then it was extremely mild until 3 March. Frost began on March 3 with heavy snow and this continued for ten days. The temperature rose after March 14 and remained soft and quite warm for the rest of the month. In April and May, a sharp wind blew in very cold and very dry air. There were even frosts and ice on April 30<sup>th</sup>, and on May 14<sup>th</sup>, 15<sup>th</sup>, and 18<sup>th</sup>. Cold rains followed this cold dry spell and lasted from May 20<sup>th</sup> to June 3<sup>rd</sup>, except 28<sup>th</sup> and 29<sup>th</sup>, where the air is suddenly softened to cool soon after to June 8<sup>th</sup>. From 8 to 20 June, the heat proved strong enough. But on 21 June, the cold and bitter wind returned. There was still frost on the 21<sup>st</sup>.<sup>79</sup>

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**1803 A.D.** The River Thames went dry in London, *England* and people were able to cross the river on foot.<sup>1</sup>

In *Russia*, in St. Catherine's Castle, unusual changes in temperature were observed. On 9 May the temperature stood at 25.2° F (-3.8° C). Two days later on 11 May, the temperature had risen to 86.0° F (30.0° C).<sup>62</sup>

In 1803 in New South Wales, *Australia*, in March the drought was severely felt in all parts of the colony. On 29 May, there had been no rain except passing showers since July 1802.<sup>103</sup>

On 9 June 1803 in London, *England*, the Haymarket and several adjoining streets suffered terribly from a hailstorm. Windows were demolished wholesale. In no other part of London was any damage sustained by this storm.<sup>93</sup>

On 21 July 1803 in *England*, there was a hailstorm in Leicestershire.<sup>93</sup>

In 1803 in *France* after the long winter and cold spring, the weather suddenly turned warm. On the 28<sup>th</sup> of June, hot dry air suddenly burst out this year and lasted for 76 to 94 consecutive days [in various regions of *France*] except for a few brief interruptions on July 5<sup>th</sup>, August 1<sup>st</sup> and early October. Early

frost appeared on 1 November. This weather was succeeded with frost with intermittent high winds from the southwest, and mild rainy weather, with alternating periods of mild and cold weather until the end of the year.<sup>79</sup>

[In *France*], the summer of 1803 was remarkable for the sustained high heat and drought. The heat began in late June and lasted until the end of August. The drought was from 15 June to 1 October; all this time it only rained for 9 days. The wells and springs were dried up, and in some areas, individuals had to travel for 3 to 4 hours to fetch water. To water a horse for a day cost 1 franc, 50 centimes. The drought greatly damaged the grass, fruits, vegetables and the grapes. The Seine River in Paris, *France* fell to its lowest level ever seen. For more than 3 months, the water level on the river at the bridge de la Tournelle stood below 0; on 19 September it was 27 centimeters (10.6 inches) deep. The drought extended across *France* and much of *Europe*; except in Friuli in *Italy*, Carinthia in *Austria* and part of the Archduke *Austria*, where several rivers flooded out of their banks.<sup>62</sup>

The summer of 1803 in *France* produced extraordinary heat and dryness. The heat began on June 28 and it lasted almost without interruption until 11 September. At Montmorency, *France*, the maximum occurred on July 31, with a reading of 97.2° F (36.2° C) in the shade and 117.5° F (47.5° C) in direct sunlight in a secluded location. In Paris, the maximum also occurred on July 31 with a reading of 98.1° F (36.7° C). During this heatwave, the wind blew steadily from the northeast. The sky was cloudless. And the barometer was fairly fixed beyond its average height. Spontaneous fires consumed a large number of woods and forests.<sup>79</sup>

In *France* in 1803, it rained very little from June 4 to October 1. There was some rain during the beginning of October but then the drought again took hold and continued until November 9. Wells and springs dried up. In Paris, the small arm of the Seine remained almost dry and the water level indicated on 21 and 27 September, 9.5 inches (24 centimeters) below the zero water mark of 1719. In Montmorency, it rained only 9 days during those four months producing only that 1-inch (25 millimeters) of rainwater. Viviers produced about 8.5 inches (216 millimeters) of rainfall this year; which was less than average. In some departments of *France* there was no water to be had. One would have to travel three or four leagues (9 to 12 miles, 14.5 to 19.3 kilometers) to seek water. It would cost thirty sous to water a horse.<sup>79</sup>

The highest observed temperatures during the summer were.<sup>62</sup>

Avignon, <i>France</i>	(100.6° F, 38.1° C) on 16 August
Paris, <i>France</i>	( 98.1° F, 36.7° C) on 31 July
Alais, <i>France</i>	( 97.0° F, 36.1° C) on 3 August
Maastricht, <i>the Netherlands</i>	( 92.8° F, 33.8° C) on 1 August
Moens, <i>France</i>	( 89.4° F, 31.9° C) on 31 July
London, <i>England</i>	( 84.9° F, 29.4° C) on 2 July

In August 1803, a hurricane struck between *Jamaica* and *England* causing 121 deaths.<sup>141</sup>

In Burgundy, *France*, the weather was nice, but there was very little heat. The grape harvest began on 26 September. The yield was very plentiful and the quality of the wine fair. The south of *France* had less heat and drought than in the north; and the grain harvest was satisfactory. In *Switzerland*, *Italy* and *Hungary*, the summer was very good.<sup>62</sup>

Major storms reigned in *France* in 1803.<sup>79</sup>

In 1803 in *Australia*, there was a severe drought in New South Wales.<sup>101</sup>

In 1803 during the period between 5 February and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chiang-shan. Then during the period between 19 June and 18 July, floods struck Hupeh (now Hubei province) in central *China* at Sui. During the period between 8 November 1803 and 5 February 1804, floods struck Hupeh province at Yün-mêng; Shantung (now Shandong province) on the east coast of *China* at Tung-a, Liao-ch'êng, P'u-t'ai, Li-ching, Pin, Chan-hua, Fan and Kuan-ch'êng; and along the Yellow River. At Tung-a, houses and fields were damaged by the floodwaters.<sup>153</sup>

*Also refer to the section 1802 A.D. – 1807 A.D. for information on the famine in India during that timeframe.*

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**1804 A.D.** On 8 January 1804, a hurricane did considerable damage in Devonshire and Cornwall, *England*. At sea, several ships were lost and many damaged.<sup>128</sup>

On January 19<sup>th</sup> a violent hurricane of wind did great damage in Devon and Cornwall, *England*. Another storm on January 22, blew down a garden wall at Shenfieldplace, Kent, of 300 feet in length.<sup>41, 56</sup>

On 4 May 1804 in *England*, there was a great hailstorm in Cheshire and Lancashire.<sup>93</sup>

On 4 May 1804, there was a tremendous storm of rain took place in the neighborhood of Bath, *England*, by which roads were torn up, gardens destroyed, and considerable portions of land removed from their situation. The same night, a storm was experienced in Lancashire and Cheshire; the River Irwell was so swelled as to sweep away many buildings.<sup>128</sup>

On May 11, there was a great storm at Newfoundland, *Canada* and eighty vessels were lost.<sup>1</sup>

On 8 May 1804 in *England*, there was a hailstorm in Lancashire and in *Wales* at Montgomeryshire.<sup>93</sup>

In 1804, there was unprecedented exceedingly severe drought in the Midwest of the *United States*.<sup>111</sup>

In early 1804 in *India*, there were several hailstorms in Allahabad.<sup>57, 93</sup>

In June 1804, the island of Antigua, a Leeward Island in the *West Indies* scarcely did not have any rain during the previous 5 months. Individuals had to ride 3 miles to get water for their horses.<sup>146</sup>

In September 1804, at St. Christopher's [St. Kitts] in the *West Indies*, thirteen sail [sailing ships] were wrecked in a hurricane, which did great damage at all the windward islands.<sup>146</sup>

From 4-6 September a destructive hurricane struck the *West Indies*. At St. Kitts, one hundred and twenty vessels with many of their crews were lost. At Antigua, fifty-nine vessels were lost, and most of their crews perished. At St. Bartholomew [St. Barts], fifty vessels and many lives were lost. At St. Thomas, forty-four vessels with their crews were lost. At other islands, many vessels with their crews were lost.<sup>1</sup>

On 7 September 1804, Charleston, South Carolina in the *United States* was struck by a hurricane and high water that did much damage.<sup>124</sup>

On 7-9 September 1804, a hurricane struck Georgia, South Carolina and North Carolina in the *United States*. Most sources cite approximately 500 fatalities.<sup>141</sup>

During 3-9 September 1804 a great hurricane moved from the Caribbee [Caribbean] Islands, in the *Bahamas* and on the coast of Florida, Georgia and South Carolina in the *United States*. This storm was one of the most destructive storms within the memory of man. The hurricane overwhelmed and destroyed



a large number of vessels, cargoes and crews, both on the ocean and in the port, and caused great damage on shore. The storm caused the ocean to flood a great portion of the shoreline and the islands of Georgia and South Carolina. The following paragraphs describe the damage wrought by this hurricane: <sup>204</sup>

— On 3 September, the storm struck the island of *Martinique*. Many vessels quit their anchor and were driven ashore. A number of vessels were driven ashore at the island of *St. Croix* [*Santa Cruz*] in the Virgin Islands. Of the 32 sails [sailing vessels] at Guadeloupe in the island of St. Bartholomew [now *Saint Barthélemy*], only two successfully rode out the storm. On 4 September, every vessel was lost at Dominique [now the island of *Dominica*]. At the island of *St. Thomas*, the hurricane lasted 3 days and 42 sails of vessels were destroyed. At Tortola, *St. Kitts*, Antigua, four sails were driven ashore, a packet foundered at anchor and much damage was done to the estates in the mountains. At Eustatia, *St. Martin's* much property and many vessels were destroyed. There were four wrecks at Anegado [*Anegada*] in the Virgin Islands. On 4 September, the hurricane struck *Puerto Rico* and drove ashore every vessel at the west end. The hurricane was not felt in Demarara [now *Guyana*] nor on the island of *Grenada*, nor at Jeremie in St. Domingo [now *Haiti*]. The storm was felt at Matanzas [*Matanzas, Cuba*], but not much damage was done there.

— A ship commanded by Captain Smith was overtaken by the storm. The ship was thrown on its beam-ends and lost its foremast and bowsprit. The ship was rendered so leaky that it was abandoned on the 8<sup>th</sup> as a wreck. Another ship commanded by Captain Day was overtaken by the storm on the leeward side of *Tobago*. A ship commanded by Captain Beard encountered the storm on 3 & 4 September at Latitude 33° N., Longitude 74° W., where it was wrecked in the gale.

— On 4 September, the storm struck the *Turk Islands* in the Bahamas with extreme violence. On Turk Island, all the vessels were driven ashore except for two, which put out to sea. Most of these ships were total losses. On 5 & 6 September, the hurricane struck Nassau in *New Providence*. Around 30 sails of small craft were driven ashore, but there was not much damage to the square-rigged vessels.

— On the night of 5 September, the British armed ships *Theseus* and *L'Hercules* encountered the hurricane at Latitude 22° 12' N., Longitude 63° 44' W. They fought the storm for 2 days and its violence reduced them to the utmost distress. A ship commanded by Captain King encountered the gale on 6 September at sea in the Latitude of 21° 51' N. His vessel was thrown on her beam-ends. He was forced to cut away her mainmast. One of his men was washed overboard. On the night of 7 September, a ship commanded by Captain Mood encounter the hurricane to the east of Charleston, South Carolina. The storm threw his vessel on her beam-ends. Several of his crew were washed overboard. On the same night, a ship commanded by Captain Miller encountered the storm. The storm was so violent that it heaved his vessel on her side, as she was lying-to under her jib, to unstep her masts, and to tear up her deck. On the same night, another vessel commanded by Captain Andrews at Latitude 26° N., Longitude 77° W. encountered the storm. The ship was thrown on her beam-ends, her boom was broken in pieces, her main topsail and rigging carried away and two men washed overboard.

— In Florida, the hurricane was excessively hard. At St. Augustine, Florida, the tide rose to an uncommon height. Of the nine vessels in the harbor, only one successfully rode out the storm.

— The storm struck Savannah, Georgia on the morning of the 8<sup>th</sup>. The storm lasted 17 hours. The water rose 8-10 feet [2.4-3.0 meters] above the normal spring tides. Houses and stores were blown down by the wind or undermined by the water. Fences and trees were knocked down. Ships and vessels were stranded and left high and dry on the tops of the wharves. Wilmington Island and Skidaway Island suffered great damage. Fort Green on Cockspar Island was completely leveled. All the buildings were leveled and 13 lives were lost. The water rose 15-20 feet [4.6-6.1 meters] above the level of the fort. One of the national gunboats was carried about 8 miles [13 kilometers] from her mooring and landed in a cornfield on Whitemarsh Island. A cannon weighing 4,800 pounds [2,177 kilograms] was carried 30-40 feet [9.1-12.2 meters] from its original position by the storm. A 300-pound [136-kilogram] bar of lead was carried 100 feet [30 meters]. Cases of canister shot were carried from 100-200 feet [30-61 meters] and muskets were scattered all over the island. At Savannah, sand was blown into the upper stories of houses, 30 feet [9.1 meters] higher than the surface of ground. The rain that fell was impregnated with sea salt. In Georgia, St. Simon's Island and St. Catharine's Island and other islands along the coast suffered great damage

from the inundation of the crops and the many Negroes were drowned. At Sunbury, the bluff was transformed into a perfect beach by the storm and almost every chimney was leveled to the ground. The storm was felt 300 miles [483 kilometers] inland where the winds were strong enough to blow down the corn but not strong enough to blow down the trees.

— The hurricane pounded Charleston, South Carolina for 36 hours from 7-9 September. All but 3 or 4 vessels in the harbor escaped without injury. But the others were damaged or wholly lost. The entire wharves, from Gadsden's on the Cooper River, to the extent of South Bay, received considerable damage. Many houses were unroofed and many trees overturned. Many stores were washed away or blown down and much property lost. On Sullivan's Island, 15-20 houses were undermined by the water and carried away. Fort Johnson was completely destroyed. The breastwork and pallsadoes [palisades] of Fort Pinckney [now Castle Pinckney] were washed away. Fort Moultrie was underwater. At Jacksonburgh [now Jacksonboro], the bridge between Charleston and Georgetown was washed away and so many trees were blown down that it obstructed the stages [stage coaches] for several days. At May River, all the crops, cotton, and Negro houses, machines, etc. were completely swept away. The tide rose higher than the highest spring tide. On Hutchinson Island, many Negroes, and some white people were drowned. The same thing happened at Dawfousky [Daufuskie] and Broughton Islands. At Coosahatchie [Coosawhatchie], many trees were thrown across the roads and the bridges were carried away and the entire village was surrounded by seawater. In Prince William's parish, Beaufort district, the sea formed a junction through the streams of Pocotaligo, Stoney Creek, and Huspa Rivers, which turned Scotch Neck into an island. Water covered the plantations four feet [1.2 meters] deep from Sheldon to Motley. The rice and cotton crops were destroyed and many animals drowned. Nothing but the high ground was visible on the roads of Fishpond and Horseshoe savannas. The hurricane violently hit Georgetown on 8-9 September. Rain came down in torrents. The gale extended deep into the country to a distance of 250 miles [402 kilometers]. The winds at 100 miles [161 kilometers] from the coast blew down the forest trees in great numbers causing the roads to be impassable.

In September 1804, an extensive hurricane struck. It swept over the Windward Island [in the *Lesser Antilles*] on the 3<sup>rd</sup>; the *Virgin Islands* and Porto Rico [*Puerto Rico*] on the 4<sup>th</sup>; *Turks' Island* on the 5<sup>th</sup>; *the Bahamas* and gulf of Florida on the 6<sup>th</sup>; the coast of Georgia and the Carolinas in the *United States* on the 7<sup>th</sup>; the great bays of Chesapeake and Delaware, and the contiguous portions of Virginia, Maryland, and New Jersey on the 8<sup>th</sup>; and the states of Massachusetts, New Hampshire, and Maine on the 9<sup>th</sup>; being on the highlands of New Hampshire, a violent snow storm. This hurricane appears to have passed from Martinico [Martinique], and the other Windward Islands, to Boston, Massachusetts in about 6 days; a distance of more than 2,200 miles.<sup>228</sup>

On 9 October 1804, a tremendous storm of rain, accompanied with a violent easterly wind struck Boston, Massachusetts in the *United States*. The storm began in the morning and continued for 24 hours. It caused great damage to the shipping in Boston Harbor and in many other ports in New England.<sup>174</sup>

A strong storm struck New England in the *United States* on 9 October 1804. The southern part of New England received rain and the northern part received snow. The winds blew with such force that it blew down homes, barns, chimneys and trees. So many great oaks were destroyed by this storm that shipbuilding in Massachusetts declined [and after the great gale of 1815, it was entirely abandoned in many areas].<sup>199</sup>

— In Vermont, snow was 4 to 5 inches [10-13 centimeters] deep. But the winds created such large drifts that the roads were blocked. At Concord, New Hampshire, the snow was 2 feet [0.6 meters] deep. Snowfall in Massachusetts was between 5 and 14 inches [13-36 centimeters]. This was one of the earliest snowfalls experienced in eastern Massachusetts.

— The storm caused the death of a large number of cattle, sheep and fowls, especially at Walpole, Newbury, and Topsfield, Massachusetts. At Newbury, nearly a hundred cattle were killed. Many trees were destroyed. Many woodlands were leveled causing new landscapes to appear. Houses and other

buildings and hills that could not be seen before were now plainly visible.

— Buildings and chimneys were blown down or greatly damaged by the wind. The South Church and the Baptist church at Danvers, Massachusetts had their roofs torn off. At Beverly, the spire of the lower meetinghouse was broken off. At Salem, the dome and belfry of the Tabernacle Church were torn to pieces. At Charlestown, the roof of the Baptist church was blown off. A new brick building at the navy yard was damaged to the point that it had to be torn down. The tower at King's Chapel lost its roof, which was swept 200 feet [61 meters] away by the winds. The beautiful steeple on the North Church fell. — The great winds from this storm damaged shipping all along the coast from Rye, New Hampshire to Newport, Rhode Island. The lives of many seamen were lost. A sloop was upset and all hand lost in Vineyard Sound [Vineyard Sound is a stretch of the Atlantic Ocean which separates the Elizabeth Islands and the southwestern part of Cape Cod from the island of Martha's Vineyard, offshore from the state of Massachusetts]. The schooner *John Harris* was lost with all hands on board on the back of Cape Cod. A large ship *Protector* of about five hundred tons burden went ashore stern first, five miles [8 kilometers] south of Cape Cod lighthouse. Several vessels were driven ashore at Plymouth. Vessels from Marblehead and Manchester were driven out to sea and never seen or heard from again. The brig *Thomas* went ashore on Scituate Beach, Massachusetts. The sloops, *Hannah* and *Mary*, were driven ashore at Cohasset. Three other vessels went ashore at Cohasset and were wrecked. In Boston harbor, many were damaged when they were driven into the wharves. The *Laura* was nearly beaten to pieces at Long wharf. Two schooners at Salem harbor were driven ashore. A sloop and a schooner were lost near Fresh Water Cove in Gloucester. Several other vessels were wrecked on different parts of the Cape. The schooner *Dove* was wrecked on Ipswich Bar and everyone onboard perished. Near Rye, New Hampshire, an eastern vessel and a schooner *Amity* were wrecked.

On 5 November 1804, reports were received of a hurricane in the *West Indies* resulted in 244 ships lost in the English islands.<sup>128</sup>

On 1 November 1804 in *England*, there was a great hailstorm in Cornwall.<sup>93</sup>

During the summer of 1804, the temperature in Provence, *France* rose to 98.6° F (37° C).<sup>79</sup>

In 1804 during the period between 12 March and 9 April, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Lin-ch'ü. Then during the period between 10 April and 8 May, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang, Lin-ch'uan, Kan and Kiukiang. During the period between 6 May and 8 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Hanyang. During the period between 8 August and 8 November, a drought engulfed Kansu (now Gansu province) in northwest *China* at Ning.<sup>153</sup>

*Also refer to the section 1802 A.D. – 1807 A.D. for information on the famine in India during that timeframe.*

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**Winter of 1804 / 1805 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1804 occurred on 12 November. Yesterday and today, it has snowed considerably. November 14, it snowed pretty hard most of the day.<sup>116</sup>

The winter of 1804-05 was very severe in the *United States*. The weather was intensely cold in January. The temperature fell on 26 January and snow fell in Washington D.C., and a mixture of rain and snow at Georgetown, Maryland. The storm struck New York City in the evening and by 8 P.M. it reached Boston, Massachusetts. It reached Newburyport, Massachusetts on the 27<sup>th</sup>. The fall of snow was moderate in Washington D.C. but at New York and Massachusetts, the snow was uncommonly great. Many vessels were wrecked and lost on the coast of Massachusetts.<sup>204</sup>

From 1803 to 1806, Captains Lewis and Clark lead a transcontinental expedition to explore the greater Northwest in the *United States*. During the winter of 1804/1805, the explorers set up a winter base camp near the Big Knife River near what is today the town of Bismarck, North Dakota. The winter was bitterly cold. There were 6 days with temperatures of  $-31^{\circ}\text{F}$  ( $-35^{\circ}\text{C}$ ) or lower. These occurred in 1804 on December 12 ( $-38^{\circ}\text{F}$ ,  $-39^{\circ}\text{C}$ ), December 17 ( $-45^{\circ}\text{F}$ ,  $-48^{\circ}\text{C}$ ), December 18 ( $-32^{\circ}\text{F}$ ,  $-36^{\circ}\text{C}$ ), in 1805 on January 10 ( $-40^{\circ}\text{F}$ ,  $-40^{\circ}\text{C}$ ), January 11 ( $-38^{\circ}\text{F}$ ,  $-39^{\circ}\text{C}$ ), and January 13 ( $-34^{\circ}\text{F}$ ,  $-37^{\circ}\text{C}$ ). Compare this to the current low temperatures of Bismarck, North Dakota in which only one day in the past decade [from April 1999 to April 2009] fell below  $-30^{\circ}\text{F}$  ( $-34^{\circ}\text{C}$ ). On January 15, 2009, the temperature fell to  $-44^{\circ}\text{F}$ , ( $-42^{\circ}\text{C}$ ).<sup>16, 17</sup>

On 28 December 1804, the tide of the River Thames in *England* was higher than ever known, and did great damage to the cellars and warehouses.<sup>128</sup>

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**1805 A.D.** On 28 June 1805 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>

On July 6, a dreadful storm struck Kingston upon the River Thames in *England*.<sup>41, 56</sup>

On 6 July 1805, there was a dreadful storm at Kingston-upon-Thames [in southwest London] in *England*.<sup>128</sup>

The maximum temperature during the summer in Stockholm, *Sweden* was  $99.5^{\circ}\text{F}$  ( $37.5^{\circ}\text{C}$ ) on 12 July.<sup>62</sup>

On 30 July 1805 in *England*, there was a hailstorm in Northumberland.<sup>93</sup>

On 8 and 9 November an awful destructive storm struck the *British Channel*. Many vessels and several hundred lives were lost.<sup>1</sup>

On 28 and 29 December 1805 a very violent and destructive storm struck over most of the *United States*. The winds blew a complete hurricane. Many vessels were stove and sunk in the Delaware River, in New York and Boston.<sup>1</sup>

In Philadelphia, Pennsylvania in the *United States* during the winter of 1805, snow drifts reached thirty inches (0.8 meters) high, the price of a cord of oak wood—traditionally defined as a stack four feet high, four feet wide, and eight feet long—shot up to \$12. That was more than double the price per cord earlier that year. The city's working poor suffered the most under such conditions. The Philadelphia American Daily Advertiser reported that one family, "having expended all their wood, was under the direful necessity, in order to keep themselves from perishing, to burn their table, washing-tub, and many other articles of household furniture." Many froze to death in their own homes.<sup>18</sup>

In 1805 during the period between 27 June and 25 July, floods struck Hopei (now Hebei province) in northern *China* at Wên-an, An-hsin, Hsin-ch'êng and Pa. During the same time, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at Chang-ch'iu.<sup>153</sup>

*Also refer to the section 1802 A.D. – 1807 A.D. for information on the famine in India during that timeframe.*

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**Winter of 1805 / 1806 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1805 occurred on 26 October. It snowed most of the day.<sup>116</sup>

During the winter of 1805-06, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 45 days.<sup>202</sup>

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**1806 A.D.** On 17 January 1806, a lunar rainbow [also called a moonbow] appeared near Wakefield, England.<sup>128</sup>

In March 1806 in *Australia*, the Hawkesbury River flooded. Five people were drowned. Animals and stacks of wheat were swept away.<sup>101</sup>

In March 1806, there was a major flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 48 feet (14.64 meters) above the water mark at Windsor. Because the village was relocated in 1800, damage to it was not as severe as in the two previous floods, but all the crops were lost once again. Seven people were reportedly killed. One ship was believed lost at sea off the northern coast of Tasmania, *Australia* when overtaken by a storm while returning to Port Dalrymple, Tasmania, from the Bass Strait islands with a seal gang and seal skins.<sup>99, 109</sup>

There was a most destructive overflowing of the River Hawkesbury in *Australia* took place in March 1806; 6,000 bushels of com were destroyed, one hundred persons, men, women, and children, who had taken refuge on the roof of their houses and "on rafts of straw floating on the deluge," were saved by the exertion of one Mr. Arundell, a resident, and Mr. Biggers. The value of property destroyed amounted to £35,000; by this flood the colony was almost reduced to a famine. [In present currency, that would be equivalent to £2.5 million in damages based on the retail inflation price index.] On 24 September 1806, wheat rose to £4 a bushel, and the 2 pound loaf of bread to 5s.<sup>103</sup>

In consequence of a destructive flood in New South Wales, *Australia*, on the Hawkesbury River, which rose 8 feet higher than on any previous occasion, several lives were lost and £36,000 worth of property was destroyed. The flood commenced in the last week of February, and its greatest height was reached on 22 March 1806. This reduced the colony to a state of famine. Wheat rose to 70s. or 80s. a bushel. A 2 pound loaf of bread rose to 4s. 6d. or 5s. Vegetables were not procurable at any price.<sup>103</sup>

In March 1806, there was a major flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*.

Many individuals lost everything they possessed, and several perished in the deluge. At the time many people had the false notion of security and confidence that there never would be another heavy flood in the main river. The first hint of what was to come appeared on Thursday, March 20<sup>th</sup> when the river rose several feet above the high water mark and the color of the water became discolored. But during the course of the night the rise abated, and by the next morning apprehension had totally subsided. The incessant rains on Friday night gave the inhabitants new fears. By daylight on Saturday morning a scene of horror presented itself in every quarter. Many farms were then underwater; the rain continued without interruption, and a rapid rise of the river became very observable. Mr. Thompson, the Chief Constable, with his boat saved the lives of a hundred people, whom he took from the roofs of houses, and rafts of straw floating on the deluge. Mr. Thomas Biggers, often at the risk of his own life, saved upwards of 150 men, women, and children; and others who possessed boats, particularly the District Constables, were very active in rescue operations.<sup>110</sup>

During the course of this dreadful day upwards of 200 wheat stacks were swept into the stream, and carried down the river with incredible velocity: livestock of all descriptions were seen floating about and on the tops of stacks, but could not be saved for want of boats, those of Messrs. Thompson, Biggers, and others being constantly employed taking the settlers families from the roofs and ridges of the houses, where many had for hours clung despairing of assistance, and expecting to be shortly washed into the watery waste. Towards Richmond Hill it seemed to abate on Saturday evening; down the River it still rose. Not a house, except at the Green Hills, could be seen, the roofs of one or two of the highest on the opposite side of the water being then only visible. Muskets were discharged by the settlers from the trees and roofs all day, and the great number had been taken up, and left in safety on the higher ground; but many were devoted to undergo a night of horror the most inexpressible: in the evening the dismal cries from distant



quarters, the report of fire-arms dangerously charged in order to increase the noise of explosion; the howling of dogs that had by swimming got into trees, all concurred to shock the feelings of the few that were out of reach, but were sorrowful spectators of the calamity they could not relieve.<sup>110</sup>

On Sunday morning the rigor of the weather abated, and in the course of the day the rains stopped. Nearly 300 persons, saved from the deluge by the humane perseverance and incredible exertions of their rescuers, were released from a state of actual famine by a supply sent from the Green Hills.<sup>110</sup>

Five persons are at present known to have lost their lives. Mr. Chalker along with four others attempted to flee the rising waters in a boat. But the boat overturned. Chalker with a young boy clinging to his neck tried to swim almost a mile to the shoreline. But he didn't make it and all five drowned. Among those that escapee was William Leeson, a settler who with his mother, wife and two children, and three men, was carried from his farm upon a barley mow. They were driven by the impetuous current nearly seven miles; and were taken off in the dark by Richard Wallis, with the greatest difficulty.<sup>110</sup>

The number of livestock loss was serious and considerable. Many of wheat and barley that floated off were forced by the current into the ocean; upward of sixty were seen by one observer to clear Cumberland Reach, and twenty were seen by two lime burners in a very short space of time drifting towards Pittwater: upon some were many pigs, dogs, and prodigious quantities of poultry, a great many of which took flight and got to land as they occasionally approached the banks.<sup>110</sup>

On 6 June 1806 in *England*, there was a hailstorm in Worcestershire and Herefordshire.<sup>93</sup>

On 7 July 1806 in *England*, there was a hailstorm in Rutlandshire.<sup>93</sup>

On 22 July 1806 in *England*, there was a hailstorm in Suffolk.<sup>93</sup>

On 24 July 1806 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>

On 24 July 1806, a tremendous storm visited the metropolis [London, *England*]. The clouds appeared to be nearly as low as the housetops. The darkness was extraordinary. The rain came down in torrents. The lightning did much damage.<sup>128</sup>

On 9 and 21 August 1806 in Dublin, *Ireland*, there were great hail showers.<sup>93</sup>

In August 1806, there was a major flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 47 feet (14.33 meters) above the water mark at Windsor.<sup>99, 109</sup>

The maximum temperature during the summer in Arles, *France* was 99.5° F (37.5° C) on 20 August.<sup>62</sup>

On 23 August 1806, a hurricane struck offshore the eastern coast of the *United States* causing 42 deaths.<sup>141</sup>

On 29 August 1806 in *England*, there was a hailstorm in Somersetshire.<sup>93</sup>

In 1806, *the Bahamas* were afflicted in a manner never known before by the oldest inhabitants; first by a great drought, and afterwards by four dreadful gales of wind [hurricanes]. At Eleuthera, on 30 August 1806, a gale began about eight in the evening, and lasted till daylight the next morning; it entirely destroyed everything, which the inhabitants had in their fields. September 13<sup>th</sup>, a more dreadful gale



threw down the houses, tore up trees by the roots, leaving almost everything in a state of destruction. On the 27<sup>th</sup> of September and on the 5<sup>th</sup> of October there were two more gales.<sup>146</sup>

Long rains in 1806 ruled in Languedoc and Provence, *France*. In Viviers this year produced an annual rainfall of 48.8 inches (1,240 millimeters) compared to the average 35.8 inches (910 millimeters). There were one hundred and eighteen rainy days instead of the nominal ninety-eight. At Joyeuse, there were one hundred and seventeen rainy days instead of the typical ninety-seven. Provence had repeated showers, which made it permanently damp.<sup>79</sup>

On 9 September 1806, reports were received of a tremendous hurricane that struck *Dominica*. Many persons died.<sup>128</sup>

On 9 September 1806, a hurricane struck Dominica in the *Lesser Antilles*. [Various accounts list 457, >300 and 131 fatalities.]<sup>141</sup>

On 9 September 1806, a hurricane struck Dominica in the *Lesser Antilles*. The following is from the *Dominica Journal* entry dated 20 September 1806:<sup>146</sup>

— "We again resume our journal, after an interruption occasioned by the confusion and loss sustained in the office during the late hurricane, one of the greatest calamities this colony has sustained within the memory of its oldest inhabitants. To give a detail of all the particulars of that unfortunate event would be a task impossible to fulfil with accuracy, until things commence to be a little more settled, and that a regular communication with the country should be opened, the roads being entirely destroyed. We shall therefore confine ourselves chiefly to the giving a general idea of the whole, as far as the intelligence received from the different parts of the colony may enable us.

— "On Tuesday the 9<sup>th</sup> instant, about seven o'clock in the evening, the sky became totally overcast, and tremendous flashes of lightning, accompanied by heavy puffs of wind, presaged to the more experienced part of the inhabitants an approaching storm; but few expected it would have been so fatal in its consequences. The wind continued increasing until ten o'clock, when it began to be accompanied by a most dreadful fall of rain, the effect of which, accompanied by a pitch-like darkness, each moment illuminated by a sheet of livid fire, and the roaring of the wind, which every instant became louder, was awful enough to impress a dread upon the heart of the most intrepid. Soon after, to complete our misfortune, the river Roseau, increased by the heavy rains, overflowed its banks, inundated the town in every direction, and then the destruction became general. Every house which obstructed its passage was thrown down, or carried away by the stream; and a great proportion of their unfortunate inhabitants perished. About ten o'clock every vessel in the harbour was driven from its moorings, except a small Swedish schooner, which was cast ashore under the fort a little after midnight; and those who were driven out generally met with the same fate, amounting, in the whole, to sixteen sail, of different descriptions.

— "No pen can paint the horrors of that dreadful night; the tremendous noise occasioned by the wind and rain, the roaring of the waters, together with the shock of an earthquake, which was sensibly felt about midnight — the shrieks of the poor sufferers crying out for assistance — the terror of those who in their houses heard them, and dared not open a door or window to give succour, and who expected momentarily to share the same fate, formed a scene which can hardly be conceived, and still more difficult to be described. Fortunately for the inhabitants of the town, and, indeed, for the whole colony, the force of the wind and rain abated about three o'clock in the morning, and near the same time the water began to fall. If it had continued another hour, there is not a doubt but the town would have been entirely destroyed.

— "The spectacle which presented itself, on the return of daylight, was horrid beyond every power of description. Heaps of mud and sand, (in some places five or six feet deep,) through all parts of the town — the form of a street hardly to be discerned — two large streams, or rather torrents, running through the midst of the town — ruins of houses blown down, and others brought down by the flood, obstructing every passage — the carcasses of several of the unfortunate victims of this event drawn out from the ruins, and lying in the streets — while numbers, almost distracted, were searching for some near relation or friend, who had perished in the storm — the lamentations of those who had lost some of their nearest and dearest connections, joined to the despair of those who had lost their little all, formed altogether a scene fit to draw tears from the eyes of the most unfeeling.

— "From the most authentic accounts which have been gathered during the confusion occasioned by this fatal occurrence, there has been ascertained to have perished in the town of Roseau and its vicinity, eight white persons of

different sexes and ages, fifty-seven free persons of colour, and sixty-six slaves, forming a total of 131, besides numbers of others yet missing, and several wounded.

— "On Morne Bruce, where that part of the garrison stationed at Roseau is quartered, the whole of the barracks were blown down, excepting one; three men and one woman killed, and one man wounded.

— "The planters have equally suffered with the inhabitants of the town. Every plantation on the windward coast of the island, from the river Tabarie to Morne Paix Bouche, are almost entirely destroyed; only three mills standing in the whole extent, and these considerably damaged. No other building left on either sugar or coffee estate, and the numerous inhabitants of that quarter have only for shelter four houses situated at some distance from the sea, to which most of the white inhabitants have retired. On the different estates on that coast, as far as accounts have reached town, there have perished about thirty Negroes, and upwards of 180 dangerously wounded. Round the coast from the river Tabarie, by way of La Soye, the estate which bears the name of that river, is perhaps the only one that has not received any considerable damage in this general disaster.

— "All the plantations to leeward of the island have experienced the effects of the hurricane. Every house, from the river Mahaur down to Prince Rupert's, either laid flat, or greatly damaged — the town of Portsmouth entirely destroyed — the greatest part of the barracks on Morne Cabrit carried away; and, in general, the whole island offers a scene of devastation and ruin."

On 20 September 1806, a hurricane struck Dominica in the *Lesser Antilles* causing more than 165 deaths.<sup>141</sup> [I suspect this is the hurricane of 9 September that appeared in the journal entry dated 20 September.]

On 24 September 1806, there was a heavy hailstorm that did much damage to crops at the Hawkesbury River, in New South Wales, *Australia*.<sup>103</sup>

On 29 September 1806, a hurricane struck offshore in Virginia in the *United States*. The schooner *Charming Mary* was found partially submerged.<sup>141</sup>

In 1806 during the period between 6 May and 8 August, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at T'ai. Then during the period between 14 August and 11 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou and Ningpo; Hupeh (now Hubei province) in central *China* at Chung-hsiang; and Szechwan (now Sichuan province) in southwest *China* at Kung.<sup>153</sup>

*Also refer to the section 1802 A.D. – 1807 A.D. for information on the famine in India during that timeframe.*

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**Winter of 1806 / 1807 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1806 occurred on 16 November. Snowed all day; snow 8 or 9 inches deep; quite wintry weather.<sup>116</sup>

On 26 December 1806, one of the highest tides ever remembered happened. Boats rowed in Palace Yard in London, *England*.<sup>128</sup> [The Old Palace Yard is immediately to the west of the Houses of Parliament (the Palace of Westminster) in Westminster, London.]

In the *United States*, 7 February 1807 was known for many years as Cold Friday by reason of the low temperatures in the Middle States reached during that day.<sup>123</sup>

In the *United States* a massive late-season snowstorm traveled from the Tennessee Valley to southeastern Pennsylvania on March 30-April 1, 1807. The depth of the heavy wet snow in Pennsylvania was 36 inches (91 centimeters) at Huntingdon; 36-42 inches (91-107 centimeters) in the Nittany Valley; and 54 inches (137 centimeters) in Montrose. In Bradford County, Pennsylvania near the New York border "snow fell continuously three days and was between four and five feet (1.2-1.5 meters) deep".<sup>27</sup>

In the winter of 1806-07 in Bradford County, Pennsylvania in the *United States*, there was a very heavy March snowfall. Beginning on the 31 March 1807, it snowed continuously two days and the snow was between 4 and 5 feet [1.2 – 1.5 m] in depth. In April, following the rapid thaw of this snow, one of the most notable floods of the Susquehanna River took place.<sup>178</sup>

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**1807 A.D.** In Dublin, *Ireland*, there were great floods in the neighborhood.<sup>47, 92</sup>

A great flood struck New England in the *United States* during the beginning of February 1807. The freshet was caused by heavy rains, which melted the snow and swelled the rivers until they overflowed, carrying away bridges and mills, entering warehouses and stores and doing great damage. The floods carried away several bridges east of Portsmouth, New Hampshire. It also took out a bridge over the Little River in Haverhill, Massachusetts. The principal bridge at Lawrence [connecting Andover and Methuen] was destroyed. Other bridges further up the Merrimack River were destroyed. The Watertown Bridge and the Milford Bridge were carried away. At Pawtucket, Rhode Island, the bridge was destroyed along with a cotton factory and four or five other buildings. In Connecticut, the stone bridge over Swallow-Tail Brook at East Chelsea was destroyed. The Shetucket River rose from 18 to 20 feet [5.5-6.1 meters]. At Norwich, Connecticut, the Lord and Lathrop bridges were swept away. The Lovett, Geometry and Quarter bridges were damaged. Water rose in houses compelling the inhabitants to climb out of their windows and be evacuated by boats.<sup>199</sup>

In France there was a flood. On 3 March 1807, the Seine River in Paris, *France*, at the bridge “Pont de la Tournelle” reached a height of 6.7 meters (22 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

On 2 May 1807 in *England*, there was a great hailstorm in Suffolk, also in Cumberland, Lancashire, and Leicestershire.<sup>93</sup>

On 10 May 1807 in *England*, there was a hailstorm in Staffordshire.<sup>93</sup>

On 26 May 1807 in Brunswick, *England*, a district of nearly 30 English miles was laid waste by a hailstorm. The stones were about the size of an ordinary fowl's egg.<sup>93</sup>

The summer of 1807 was remarkable for its troublesome heat, thunderstorms, hail and a major drought that extended over *Europe*. The high temperatures observed during the summer were:<sup>62</sup>

Naples, <i>Italy</i>	(104.0° F, 40.0° C) in August
Nîmes, <i>France</i>	( 99.5° F, 37.5° C) on 18 July
Frankfurt, <i>Germany</i>	( 97.2° F, 36.2° C) in July
Strasbourg, <i>France</i>	( 96.4° F, 35.8° C) on 13 July
Avignon, <i>France</i>	( 96.3° F, 35.7° C) on 30 July
Maastricht, <i>the Netherlands</i>	( 95.5° F, 35.3° C) on 31 July
Karlsruhe, <i>Germany</i>	( 95.0° F, 35.0° C) on 13 July
Moens, <i>France</i>	( 95.0° F, 35.0° C) on 31 July
Paris, <i>France</i>	( 92.5° F, 33.6° C) on 11 July
London, <i>England</i>	( 84.9° F, 29.4° C) on 22 July

In London, *England*, the driest years in the 23-year period [1797-1819] occurred in 1807 with 18.01 inches of rainfall.<sup>175</sup>

In *France*, lightning caused many fires and there were severe hailstorms. In *Italy*, a long heat wave was truly remarkable. For three continuous weeks in Naples, *Italy*, the temperature was over 89.6° F (32° C). During this time, frequent apoplexy and sudden deaths were observed. Throughout the north, the heat and drought was very great. In Berlin, *Germany*, the mean temperature for August rose to 73.9° F

(23.3° C). In Stuttgart, *Germany* a tremendous heat prevailed on 31 July, and many people complained of severe headaches. In *Sweden*, the summer was long. In St. Petersburg, *Russia* there were three weeks of stable temperatures at 73.4° to 77° F (23° to 25° C).<sup>62</sup>

In Burgundy, *France*, the grape harvest began on 24 September. The weather had been warm with rain showers. The weather alternated with frequent rain and high heat. The yield [of wine] was plentiful and the quality good. The corn crop in *France* did quite well.<sup>62</sup>

The rainfall of 1807 in *France* dropped below the typical annual rainfall by 7.4 inches (189 millimeters) in Marseille; 11.7 inches (297 millimeters) in Montpellier; 3.2 inches (81 millimeters) in Joyeuse; and 2.1 inches (54 millimeters) in Viviers. The number of rainy days decreased by 27 in Montpellier, by 16 in Joyeuse, by 26 in Viviers.<sup>79</sup>

On 17 October 1807, a hurricane struck the *Spanish Main*. [In the days of the Spanish New World Empire, the mainland of the American continent enclosing the Caribbean Sea and the Gulf of Mexico was referred to as the Spanish Main.] From the ship *Firefly*, "all except the Surg. & 3 men (lost when vessel) foundered in a hurricane off the Spanish Main."<sup>141</sup>

On 10 November 1807, Honiton Bridge [Devon, *England*] carried away by a flood.<sup>128</sup>

In 1807, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 9 March and 7 April, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin and Shantung (now Shandong province) on the east coast of *China* at Huang.

— During the period between 8 May and 5 June, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Yüeh-ch'ing.

— During the period between 6 June and 4 July, a drought engulfed Hupeh (now Hubei province) in central *China* at Ch'ung-yang and Shih-shou.

— During the period between 4 August and 1 September, a drought engulfed Chekiang province at Hsüan-p'ing.

— During the period 2-30 September, a drought engulfed Hopei (now Hebei province) in northern *China* at Luan.

*Also refer to the section 1802 A.D. – 1807 A.D. for information on the famine in India during that timeframe.*

**Winter of 1807 / 1808 A.D.** On 20 November 1807, a fiddler near Alston Moor in Cumbria in northwestern *England* returning home in a snowstorm took shelter in a hovel, which was soon overwhelmed with snow. Some shepherds heard him next day playing on his fiddle, and relieved him from his perilous situation.<sup>128</sup>

On 2 February 1808, the breakwater at Cherbourg [in northwestern *France*] injured by a storm.<sup>128</sup>

On 16 February 1808, a snowstorm halted travelling in the north [of *England*].<sup>128</sup>

**1808 A.D.** In *England*, there were floods in various parts.<sup>41, 43, 47, 56</sup>

On 25 June 1808, there was a violent hurricane, attended by an earthquake at Montaldo in northwestern *Italy*.<sup>128</sup>

On 13 July 1808 in *England*, there was a hailstorm in Somersetshire, and in Gloucestershire.<sup>93</sup>

In July 1808, the temperature [in London, *England*] rose to 93.5° F (34.2° C).<sup>128</sup>

On 15 July 1808, there was a thunderstorm in Somersetshire, *England*, when the hailstones measured from six to seven inches.<sup>128</sup>

On 15 July 1808 in *England*, there was a hailstorm in Oxfordshire, and in Somersetshire. Hailstones measured 6 or 7 inches in circumference.<sup>93</sup>

In Somersetshire, *England* on the 15<sup>th</sup> of July, there was a great thunderstorm, accompanied by hailstones, measured 6 and 7 inches in circumference.<sup>41, 43, 56, 57</sup>

On 16 July 1808 in *England*, there was a great hailstorm in Gloucestershire and Somersetshire.<sup>93</sup>

On 16 August 1808 in southwestern *England*, there was a great hailstorm at Bristol. This destructive hail shower consisted of masses of ice, many of them from 3 to 9 inches in circumference. The tempest arose in the southwest, and passed away in the northwest. The destruction of glass was enormous, as also of trees.<sup>93</sup>

The vineyards of Tokaj in northeastern *Hungary* were destroyed by a hailstorm.<sup>41</sup>

On 30 August 1808, the greater part of the vineyards of Tokay, in *Hungary* was destroyed by a storm. The hailstones were the size of walnuts; seven men and a boy lost their lives, and great number of cattle perished.<sup>128</sup>

The summer of 1808 was again remarkable for the drought and the great heat in *Russia, Belgium, France* and *Italy*. The high temperatures of the summer were:<sup>62</sup>

Avignon, <i>France</i>	( 98.6° F, 37.0° C) on 16 July
Maastricht, <i>the Netherlands</i>	( 98.1° F, 36.7° C) on 14 July
Moens, <i>France</i>	( 97.3° F, 36.3° C) on 15 July
Paris, <i>France</i>	( 97.2° F, 36.2° C) on 15 July
Dijon, <i>France</i>	( 96.1° F, 35.6° C) in July
London, <i>England</i>	( 91.9° F, 33.3° C) on 13 July

In *Russia*, the heat began in June and at St. Petersburg the first days of July were very intense. Also in *Denmark*, the temperature was significantly elevated. In *England*, the heat was so overwhelming that many post horses collapsed on the roads. In mid-May individuals in the south of *France* began to complain about the exceptional drought and heat, calling them the dog days [of summer]. The summer was also warm and dry; but on the other hand, autumn was rainy. In *France*, there were numerous thunderstorms and many fires caused by the lightning. Several vineyards in Burgundy, *France* were devastated by hailstorms. In Burgundy, the grape harvest only began on 28 September. The wine was quite abundant, but only of mediocre quality. Fruits were in abundance, but there was a lack of vegetables. The grain harvest in *France* was rather abundant. In *Russia* and *Italy*, very good yields were produced.<sup>62</sup>

In 1808 during the period between 5 February and 6 May, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Yüeh-ch'ing. During the period between 5 February and 8 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Huang-an.<sup>153</sup>

In 1808, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 27 March and 25 April, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin and Hopei (now Hebei province) in northern *China* at Wang-tu, Ting and Pao-ting.

— During the period between 25 May and 23 June, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hsin-têng and Ch'ing-yüan.

— During the period between 22 August and 19 September, floods struck Chekiang province at Ch'ing-yüan.

— During the period between 12 October and 17 November, floods struck Hopei province at Nan-kung and Kiangsi (now Jiangxi province) in southern *China* at I-ch'un and Kiukiang.

**Winter of 1808 / 1809 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1808 occurred on 15 November. Snowed steadily all day.<sup>116</sup>

On 18 December 1808, a sheep, one year old, buried in the snow [in *Great Britain*] since the 19<sup>th</sup> of November was found alive.<sup>128</sup>

On 9 December 1808, great damage done to the adjoining warehouses and cellars by the overflowing of the River Thames in *England*.<sup>128</sup>

During the Finnish War [between Sweden and the Russian Empire], two Russian armies crossed the frozen *Baltic Sea* through the Gulf of Bothnia and invaded *Sweden*. One army of 17,000 crossed the frozen sea traveling from Turku, *Finland* to the Åland Islands. A vanguard of these troops then crossed over the ice and reached the Swedish shore within 70 km from Stockholm on 19 March 1809. Another army of 5,000 troops crossed the frozen *Baltic Sea* from Vaasa, *Finland* reaching Umeå, *Sweden* on March 24.<sup>36</sup>

The *Baltic Sea* froze.<sup>37</sup>

During the winter of 1808-09, the *Baltic Sea* was completely covered with ice.<sup>68</sup>

The winter of 1808-09 was mild in *Southern Europe*; but in *the North*, the cold was very severe. In Paris, *France*, the Seine River froze twice. The first time was from 20 to 29 December 1808 and the second time from 19 to 20 January 1809. The lowest temperatures observed during the winter were:

Paris, <i>France</i>	( 10.0° F, -12.2° C) on 21 December 1808
<i>Ibid.</i>	( 14.7° F, -9.6° C) on 18 January 1809
Maastricht, <i>the Netherlands</i>	( 13.1° F, -10.5° C) on 22 December 1808
<i>Ibid.</i>	( 5.5° F, -14.7° C) on 17 January 1809
Moens, <i>France</i>	( 12.9° F, -10.6° C) on 19 December 1808
<i>Ibid.</i>	( 11.7° F, -11.3° C) on 17 and 19 January 1809

In Moscow, *Russia*, the mercury froze several times in the thermometer towards the end of March and great quantities of snow fell.<sup>62</sup> [The mercury in mercury thermometers solidifies (freezes) at -37.89 °F (-38.83 °C).]

### 1809 A.D. – 1811 A.D. Australia. Drought

There was a drought in New South Wales, *Australia*. Crops were destroyed. There was a serious water shortage. The drought was said to be the worst since the drought of 1789-1791.<sup>101</sup>

In January 1809 in New South Wales, *Australia*, there was a drought. In April there was a long period of dry weather.<sup>103</sup>

On 11 February 1810 in New South Wales, *Australia*, town gangs cleaned out [water] tanks.<sup>103</sup>



In 2 March 1811 in New South Wales, *Australia*, the drought destroyed the maize crop; [water] tanks empty; water sold for 6d. per full pail.<sup>103</sup>

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**1809 A.D.** On 28 March 1809 in *England*, there was a hailstorm in Sussex.<sup>93</sup>

In April 1809, there was a major flood when the Derwent River overflowed its banks in Tasmania, *Australia*.<sup>99</sup>

In May 1809, there was a major flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 48 feet (14.64 meters) above the water mark at Windsor.<sup>99, 109</sup>

On 18 May 1809 in *England*, there was a great hailstorm in Essex and Middlesex.<sup>93</sup>

In Burgundy, *France*, the summer of 1809 was very unfavorable for the [grape] vines. The grape harvest only began on 16 October. The yield of wine was very small and of poor quality. In southern *France* the summer was cold, rainy and produced many thunderstorms. At the beginning of October in many places the grain was cut. The hay was spoiled. The fruit did not ripen and as a result produced rotted grapes. In Paris, *France* the highest temperature was only 88.2° F (31.2° C) which occurred on 17 August. The average temperature during the summer was 62.4° F (16.9° C). The grain harvest was insufficient in *France*.<sup>62</sup>

In 1809 in Tasmania, *Australia*, the Derwent River overflowed its banks.<sup>101</sup>

In August 1809, there was a major flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 47.5 feet (14.49 meters) above the water mark at Windsor.<sup>99, 109</sup>

In 1809 in *Australia*, the Hawkesbury River flooded.<sup>101</sup>

In August 1809, a hurricane struck near Tortola, Montserrat in the *Leeward Islands* causing 62 deaths.<sup>141</sup>

On 3 August 1809, a hurricane struck off the coast of *Puerto Rico*. The 18-gun ship *H.M.S. Lark* foundered and all her crew, except one man, perished.<sup>141</sup>

On 6 August 1809, lightning struck Swinton, three miles [5 kilometers] from Manchester, *England*. “The lightning produced remarkable mechanical effects on part of a house belonging to Mr. Childwick. At two o’clock in the afternoon, after repeated discharges of distant lightning, which seemed to be approaching, a frightful explosion took place. It was immediately followed by torrents of rain. For some minutes a sulphurous vapour surrounded the home. The outside wall of the small building, cellar, and cistern was torn up by its foundation and lifted up bodily; the explosion carried it vertically without overturning it, to a short distance from the place which it had occupied. One of its ends had been moved nine feet [2.7 meters], the other four [1.2 meters]. The wall thus lifted and carried was composed of 7,000 bricks, and, without counting the mortar, would weigh about twenty-six tons.”<sup>271</sup>

On 17-19 August 1809, a hurricane struck *Puerto Rico* and there was a great death toll.<sup>141</sup>

On 27 August 1809, a hurricane struck the central *Atlantic Ocean*. The cutter *Express*, together with several other ships of the fleet was believed to have foundered during the storm and several people on the wrecks were seen to go down.<sup>141</sup>

In 1809 during the period between 14 May and 12 June, floods struck Hopei (now Hebei province) in northern *China* at Wang-tu and Hupeh (now Hubei province) in central *China* at Fang. During the same time period, a drought engulfed Hopei province at Hsing-t'ai and Hupeh province at Ying-shan. During the period between 13 July and 10 August, floods struck Hopei province at Nan-kung.<sup>153</sup>

*Also refer to the section 1809 A.D. – 1811 A.D. for information on the drought in Australia during that timeframe.*

**Winter of 1809 / 1810 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1809 occurred on 24 November. A severe snowstorm lasted all day. November 25, snow nearly a foot deep; people move in sleighs.<sup>116</sup>

A dramatic cold spell struck New England in the *United States* on 19 January 1810. The winter had been warm and little snow had fallen. A strong gale struck and at Salem, Massachusetts, temperatures dropped from 45° F to -5° F [from +7° C to -21° C]. At Amherst, New Hampshire, the temperature reached -14° F [-26° C]. The temperature drop was so extreme that many people froze to death while traveling along the highways. The winds were exceptionally strong and destroyed houses, barns and a vast number of timber trees. This day became known as “Cold Friday”.<sup>199</sup>

The Loire, the Saône rivers in *France*, and the Maas (Meuse) River were frozen.

During a part of January 1810, the cold was so intense at Moscow, *Russia* that the mercury froze. [The mercury in mercury thermometers solidifies (freezes) at -37.89 °F (-38.83 °C).]<sup>1</sup>

The winter of 1809-10 was very cold all over *Europe*, even in the south. Ice formed on the Seine River. For several days individuals went across the ice over the Saône River. The Maas (Meuse) River was frozen beginning in the last days of December through the greater part of January. The coldest temperatures observed during the winter were:

Lyon, <i>France</i>	( 5.0° F, -15.0° C) in January
Moens, <i>France</i>	( 5.0° F, -15.0° C) on 21 February
Maastricht, <i>the Netherlands</i>	( 5.5° F, -14.7° C) on 16 January
Brussels, <i>Belgium</i>	( 5.5° F, -14.7° C) on 3 and 7 January
Paris, <i>France</i>	( 9.9° F, -12.3° C) on 31 January
Avignon, <i>France</i>	(15.1° F, -9.4° C) on 22 February

Lake Geneva at Geneva, *Switzerland* was frozen until 22 February. The Loire River froze at Nantes, *France*. The Danube, the Inn, the Isar, the Roth, the Vils and the Ilz rivers (up to a considerable distance from Passau, *Germany*) were frozen. In St. Petersburg, *Russia*, the cold was very severe. The Dvina (Daugava) River was completely frozen beginning in November 1809 and the port of Archangel (Arkhangelsk) was blocked by ice.<sup>62</sup>

On 19 January 1810, intense cold swept through the *United States*. The weather became simultaneously cold from North Carolina to the extreme West, and through all the middle, northern and eastern States and continued cold until March.<sup>1</sup>

During the winter of 1809-10 in Bradford County, Pennsylvania in the *United States*, temperatures dropped to -20° F [-29° C] on January 19<sup>th</sup>.<sup>178</sup>

**1810 A.D.** Towards the end of January 1810, a dreadful gale of wind from the southeast struck Ochotsk in Siberia, *Russia*. This gale lasted two days; waters of Ochotsk rose 12 feet, flowed over the tops of the houses, and a transport was driven into the middle of town.<sup>43</sup> [Ochotsk is a seaport at the mouth of the Okhota River on the Sea of Okhotsk in eastern *Russia*]

The four famines of 1810, 1811, 1846, and 1849 in *China* are said to have taken a toll of not less than 45,000,000 lives.<sup>84</sup>

In Lincolnshire, *England*, an inundation broke down the seabanks.<sup>47</sup>

From the 6<sup>th</sup> to the 8<sup>th</sup> of March in 1810, there was a violent tempest at Cadiz, *Spain*, which caused great destruction among the shipping.<sup>43</sup>

On 6 March 1810, a storm at Cadiz, *Spain* destroyed thirty-six ships.<sup>128</sup>

In 1810 in the northwest provinces of *India*, there was a famine. Between 2% and 8% of the population died. In one central district alone, 90,000 people died of famine.<sup>91</sup>

In 1810, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

On 20 June 1810, it was reported that a forest in *India*, 23 miles broad and 65 miles long, was set fire and burned for five weeks; 50 villages destroyed. [The same incident was reported in December 1812.]<sup>128</sup>

On 1 July 1810, there was a violent storm in London, *England*. The effects of which were felt in most parts of *England*.<sup>43</sup>

On 15 July 1810 in *England*, there was a great hailstorm in Berkshire and Middlesex.<sup>93</sup>

On 4 August 1810 in *England*, there was a hailstorm in Cumberland.<sup>93</sup>

On 14 August 1810 in London, *England*, there was a great hailstorm and much damage in the northwest districts.<sup>93</sup>

On 14 & 15 August 1810, the thunder and lightning [in *England*] of these two days did immense damage. Many persons were killed.<sup>128</sup>

On 15 August 1810 in *England*, there was a hailstorm at Windsor. There was great destruction by unusually large hailstones.<sup>93</sup>

On 15 August 1810, a hurricane struck *Jamaica*. Some lives were lost at sea.<sup>141</sup>

On 28 August 1810, it was reported that there was a great hurricane at *Barbados*.<sup>128</sup>

On September 7 1810, a very destructive hurricane struck South Carolina and Georgia in the *United States* and many lives were lost.<sup>1</sup>

On 3 November 1810, it was reported that at Boston [in Lincolnshire on the east coast of *England*], the tide rose some feet above its usual level and continued so nearly an hour. It overflowed its banks and did great damage. Numerous sheep perished.<sup>128</sup>

In November 1810, an exceptional flood occurred in Pittsburg, Pennsylvania in the *United States*. This flood was referred to as the "Pumpkin Flood".<sup>124</sup>

On 10 November 1810, there was an inundation at Boston [*England*], caused by the tide breaking down the sea banks.<sup>43</sup>

In 1810 during the period between 5 February and 8 August, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at An-ch'iu.<sup>153</sup>

In 1810, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 3 May and 1 June, floods struck Hsin-lin [uncertain name and province] and Hupeh (now Hubei province) in central *China* at I-ch'êng.

— During the period 2-30 July, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan.

— During the period between 31 July and 29 August, floods struck Shantung province at P'ing-tu; Hopei (now Hebei province) in northern *China* at Nan-kung; and Szechwan (now Sichuan province) in southwest *China* at Kuang-yüan and Yen-yüan.

— During the period between 28 October and 26 November, floods struck Hupeh province at I-ch'êng.

*Also refer to the section 1809 A.D. – 1811 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1810 / 1811 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1810 occurred on 2 November. Had a severe snowstorm; great quantities of corn, apples, etc., were still outdoors; severe winter weather.<sup>116</sup>

The Meuse River froze. For several days, individuals crossed the ice on foot on the Saône River at Lyon, *France*.<sup>62</sup>

The winter of 1811 maltreated many olive trees. The cold rigor also slew the orange gardens of Hyères in *France*. The cold weather occurred mainly during the month of January. On the 1<sup>st</sup> of December the thermometer at Avignon sank to 23° F (-5° C). On the 3<sup>rd</sup> at sunrise the temperature read 16.3° F (-8.7° C) and at six o'clock in the evening 15.3° F (-9.3° C). The thaw came the next day by a very light southwest wind. The cold returned on the 27<sup>th</sup> with a reading of 18.5° F (-7.5° C). At Montpellier, the temperature dropped to 18.5° F (-7.5° C) on January 6<sup>th</sup> and at Marseille it dropped down to 25.3° F (-3.7° C). The northern regions of *France* suffered less than the southern regions. In Paris, for example, the thermometer did not exceed 13.5° F (-10.3° C) on January 2<sup>nd</sup>.<sup>79</sup>

The winter of 1810-11 was pretty harsh. In the *Baltic Sea*, the shipping was interrupted by the ice. The *Sound* was almost frozen over. The Meuse River was covered with ice from the middle of December to the middle of January. The Waal and Leck rivers froze. Ice flows formed on the Seine and Loire rivers. But the cold weather in *Provence* was moderate. The lowest temperatures observed during the winter were:<sup>62</sup>

Maastricht, <i>the Netherlands</i>	( 5.5° F, -14.7° C) on 7 January
Brussels, <i>Belgium</i>	( 5.5° F, -14.7° C) on 3 and 7 January
Moens, <i>France</i>	( 10.6° F, -11.9° C) on 3 January
Avignon, <i>France</i>	( 12.4° F, -10.9° C) on 3 January
Paris, <i>France</i>	( 13.5° F, -10.3° C) on 7 January
Hyères, <i>France</i>	( 24.1° F, -4.4° C) on 1 January

On 8 January 1811, the River Thames in *England* froze over.<sup>128</sup>

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**1811 A.D.** In Pesth (Budapest, *Hungary*) in April, there was an overflow of the Danube River, by which twenty-four villages and their inhabitants were swept away.<sup>43, 47, 92</sup> [Pesth is the eastern, mostly flat part of Budapest, *Hungary*, comprising about two thirds of the city's territory. It is divided from Buda, the other part of Budapest, by the Danube River.]

In April 1811, at Pesth [Budapest], near Presburg, in *Hungary*, the overflow of the Danube River caused

24 villages and their inhabitants to be swept away.<sup>90</sup>

In 1811, ninety-four communities in northern *France* were ravaged by storms in April, May and June.<sup>79</sup>

In Shropshire, *England* in May, there was a cloudburst near Salop; many persons and cattle drowned.<sup>47, 92</sup>

On 4 May 1811, a monsoon at Madras [now Chennai, *India*] caused all the ships in the road to either be driven on shore or foundered at anchor.<sup>128</sup>

There was an inundation on 27 May 1811, in the vicinity of Salop [Shropshire, *England*] by the bursting of a cloud, during a storm, by which many persons and much stock perished.<sup>43, 90</sup>

On 28 May 1811 at Worcester, *England* was struck by a storm, which raised the River Severn 20 feet in 24 hours.<sup>43</sup>

On 28 May 1811 in *England*, there was a hailstorm in the neighborhood of Worcester. The storm began in the afternoon, lasting about half an hour. Hailstones of enormous bulk fell. These destroyed vegetation, and perforating the windows like bullets. The storm passed westward with equal fury. A great flood followed.<sup>93</sup>

On 4 June 1811 at Plymouth, *England*, the tide suddenly fell, leaving the ships in the port dry, and in about half an hour returned with great violence, set the ships afloat and rushed out again in a different location.<sup>128</sup> [Plymouth is in Devon on the south coast *England*.]

On 5 June 1811 in *England*, there was a hailstorm in Yorkshire and in Suffolk.<sup>93</sup>

On 8 June 1811 in *England*, there was a hailstorm in Worcestershire.<sup>93</sup>

On 3 August 1811 in Leitrim, *Ireland*, there was a great storm of rain and hail, which destroyed the crops.<sup>93</sup>

The summer of 1811 [in *Europe*] was, for various reasons, one of the strangest that have ever occurred. Here is a table of the highest temperatures:<sup>62</sup>

Augsburg, <i>Germany</i>	( 99.5° F, 37.5° C) on 30 July
Vienna, <i>Austria</i>	( 96.3° F, 35.7° C) on 6 July
Milan, <i>Italy</i>	( 95.0° F, 35.0° C) on 27 July
Avignon, <i>France</i>	( 95.0° F, 35.0° C) on 27 July
Riga, <i>Latvia</i>	( 95.0° F, 35.0° C) on 27 June
Altona, <i>Germany</i>	( 95.0° F, 35.0° C) on 20 July
Hamburg, <i>Germany</i>	( 94.6° F, 34.8° C) on 19 July
Naples, <i>Italy</i>	( 94.3° F, 34.6° C) on 20 July
Copenhagen, <i>Sweden</i>	( 92.8° F, 33.8° C) in July
Liège, <i>Belgium</i>	( 92.7° F, 33.7° C)
Maastricht, <i>the Netherlands</i>	( 92.1° F, 33.4° C) on 19 July
Strasbourg, <i>France</i>	( 91.4° F, 33.0° C)
St. Petersburg, <i>Russia</i>	( 88.0° F, 31.1° C) on 27 June
Paris, <i>France</i>	( 87.8° F, 31.0° C) on 19 July
Moens, <i>France</i>	( 86.0° F, 30.0° C) on 19 and 29 July
London, <i>England</i>	( 72.9° F, 22.7° C) on 28 & 29 July

In *Hungary*, the spring was already very hot; something that normally occurs during the dog days of summer. In *Russia*, on the *Danish islands* and in *Jutland* the heat was very strong since June, and by late

June the heat was excessive. In Berlin, *Germany*, the heat in the middle of May was some of the highest in the century. Nature languished due to the heat and the drought. During the solstice rain swept in and freshen the air, and repaid the earth with a little moisture. Devastating storms swept over *Germany*. In *Austria*, the harvest was over by the 6<sup>th</sup> of July. The grain was rich and quite excellent. In *Poland*, the harvest was a month earlier than usual. In *Denmark*, the rye harvest took place on 27 July. This is very early for the region. In Elberfeld, *Germany* on the Feast of St. John's [25 July], people enjoyed a lunch of bread and wine from the harvest of that year. In certain districts, the rye was harvested before the hay.<sup>62</sup> [Elberfeld is now in Wuppertal in west-central *Germany*.]

In *Italy* and throughout the *East*, the summer was early and warm. The harvest was already over by 20 June. In *Languedoc*, the spring in April and May was warm and dry, although there were some abundant rains. The summer produced strong atmospheric alternations. The grain crops in the south were very mediocre. The agricultural food that was harvested reached very high prices and the food was scarce. The grain harvest in *France* was rather low. In Burgundy, the grape harvest began on 14 September. On 11 April, a frost suddenly occurred which compromised two thirds of the harvest. The grapes produced very little but the wine earned very excellent ratings, which later became known under the name - comet wine.<sup>62</sup>

The summer of 1811 in *France* produced heat that was everywhere early, intense and prolonged. This excess heat burst suddenly from the month of February. The heat was maintained almost without interruption, or rather increasing month-by-month during the months of March, April and May. But the heat declined during the three summer months. The heat returned during the next four months, especially during the month October, when the temperatures were 2° to 5° F (1° to 3° C) above normal.<sup>79</sup>

In Nancy, *France* the heat began 15 March 1811, and persisted obstinately until August 6. On that day and two days following heavy rains momentarily cooled the earth. But right after the heat rose anew and continued to the end of October. During the months of May, June and July, the thermometer usually reached in the countryside 77° to 86° F (25° to 30° C). The temperature even on three occasions reached 91.4° and 93.2° F (33° and 34° C). October 18, the temperatures each day were at 68° F (20° C). This was the same temperature observed during the last half of August. The sky remained almost constantly serene. The atmosphere was very dry. The prevailing winds were southwesterly or northwesterly winds. The barometer was several millimeters above the norm. This dry heat was responsible for drying up a large number of streams early in the year that nobody had ever seen dry up before. It compromised meadows and spring seeding, but advanced all the crops and produced very abundant grain and grapes harvest. The grapevine bloomed on May 24, instead of the normal June 24. The grain harvest took place from July 10<sup>th</sup> to 20<sup>th</sup>, and the grape harvest began on September 8<sup>th</sup>. In the South, there were warm southerly winds that produced humid and stuffy weather. Special summer days in Provence lasted until the end of this year. In both southern and northern *France*, heat and drought exhausted most sources, parched streams and rivers, precipitated the mature fruit, consumed the plant foragers, and favored, in general the harvests of wine.<sup>79</sup>

In 1811, the hot temperatures generally occurred with the extraordinary rainfall. For example compare the rainfall in Paris, Viviers, Joyeuse and Montpellier, *France*. Paris had 23.5 inches (597 millimeters) of rainfall compared to the average annual rainfall of 19 inches (482 millimeters). Viviers had 40 inches (1,015 millimeters) rainfall compared to the nominal 35.8 inches (910 millimeters). Montpellier had 44.8 inches (1,139 millimeters) of rainfall instead of typical 30.1 inches (764 millimeters). Joyeuse had 68 inches (1,728 millimeters) of rainfall instead of the typical 50.4 inches (1,281 millimeters). The rainfall in Paris was proportionally less than in the provinces. The largest amount in relation to the average occurred in Montpellier and Joyeuse. At precisely the same time that the rain ravaged the Languedoc and Vivarais, the regions of Roussillon and Lorraine complained of unusual droughts lasting several months.<sup>79</sup>



On September 8, a terrible tornado struck Charleston, South Carolina in the *United States*. Many lives were lost and there was great destruction.<sup>1</sup>

On 10 September 1811, a hurricane struck South Carolina in the *United States*. Many were killed.<sup>141</sup>

In Lüneburg, *Germany* in October, the village of Wurgen was swept away by overflowing of the River Elbe.<sup>43, 47</sup> [Lüneburg is near Hamburg in northern *Germany*.]

On 1 November 1811, the greatest quantity of rain fell this night in *Scotland* than was ever known, and an immense quantity of land was overflowed.<sup>128</sup>

There was an inundation on 29 November 1811 caused by the bursting of the Driggle reservoir, nine miles west of Huddersfield in west Yorkshire in northern *England*, by which a cottage was swept away, and four children with their father and mother perished in the flood.<sup>43</sup>

In 1811, there was a famine in Marwar and Guzerat [now Gujarat], *India* caused by locusts.<sup>179</sup>

The four famines of 1810, 1811, 1846, and 1849 in *China* are said to have taken a toll of not less than 45,000,000 lives.<sup>84</sup>

In 1811, a drought engulfed several regions of *China* including:<sup>153</sup>

- During the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Huang.
- During the period between 22 May and 20 June, a drought engulfed Hopei (now Hebei province) in northern *China* at Peiping, Lin-yü and Fu-ning [possible misprint, “Fu-hsüan”].
- During the period between 21 June and 19 July, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou, Li-shui, Chin-yün and Ch’êng; Hupeh (now Hubei province) in central *China* at Chung-hsiang, Fang, Chiang-ling and I-tu; and Hopei province at Ching.
- During the period between 20 July and 18 August, a drought engulfed Hopei province at Ch’ü-yang and Shantung province at P’êng-lai, Chao-yüan, Mou-p’ing, Wên-têng and Chi-mo.
- During the period between 8 August and 8 November, a drought engulfed Shantung province at Lin-ch’ü and Kuan-ch’êng.

In 1811, several regions of *China* experienced flooding including:<sup>153</sup>

- During the period between 22 May and 20 June, floods struck Honan (now Henan province) in central *China* at Hsin-an [uncertain name]; and Hopei (now Hebei province) in northern *China* at Ta-ch’êng, Pao-ting, Wên-an, Yung-ch’ing, An-tz’ü, Wan-p’ing, Liang-hsiang, Hsiung, An-hsin, Jên-ch’iu, Ku-an and Cho.
- During the period between 8 August and 8 November, floods struck Shantung (now Shandong province) on the east coast of *China* at Fei-ch’êng, Chi-mo, P’ing-tu and Mou-p’ing.

*Also refer to the section 1809 A.D. – 1811 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1811 / 1812 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1811 occurred on 20 November. Snowed most of the day; storm very tedious.<sup>116</sup>

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**1812 A.D. – 1814 A.D. India and Pakistan. Famine**

In *India* during 1812-13, there was a famine in parts of Sind [Sindh province, now *Pakistan*] and other neighboring districts, attributed to failure of rains. “In Kach and Pahlunpore [Palanpur] the loss was aggravated by locusts; and in Kattywar it was followed by a plague of rats. Guzerat [Gujarat] suffered most from scarcity caused by the export of grain to the famine districts; and Ahmerdabad [Ahmedabad]

was overrun by starving immigrants. In Mahee Kanta the distress was caused by internal disturbances; whilst in Broach [Bharuch] there was no failure of rain, but the crops, before they were reaped, were entirely devoured by locusts, which came in very large numbers and spread all over the country.”<sup>57</sup> [Palanpur and Ahmedabad are in the state of Gujarat in western *India*. Mahee Kanta is in the Gujarat Division of the then Bombay Presidency. Bharuch is located in west-central *India*.]

In 1812, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

In *India* during 1812-14, there was a scarcity in Madras Presidency, following unfavorable season of 1811; “but no serious distress appears to have been generally experienced throughout the presidency on this occasion, although the district of Madras [Chennai] suffered considerably.”<sup>57</sup>

In 1812, there was a famine in Cutch [Kutch district in western *India*] caused by locusts. There was also a minor famine in southern India.<sup>179</sup>

In 1812, a plague of rats visited Kathiawar [a peninsula in western *India*] and caused considerable damage to all vegetation and even scarcity to some extent.<sup>179</sup>

In 1812-13, there was a famine in Guzerat [now Gujarat], a region of northwestern Bombay state [now Mumbai, *India*]. Locusts first appeared from the eastward in the Bengal provinces [today this is *Bangladesh* and the state of West Bengal in *India*] about the beginning of the year 1810. From there they took a northerly direction passing through Hindoostan [Hindustan, the Gangetic Plain of North India, between the mountains of the Himalayas and the Vindhya]. Fifteen months later, they arrived at Marwar skirting the large western deserts of *India*. In 1811, the annual rainfall failed in Marwar, and when all vegetation was destroyed, the locusts made their way into the northwest district of Guzerat called Puttur and from there scoured Kattiwar [now Kathiawar] and appearing as far south as the city of Baroach [now Bharuch] on the Nurbadda River. Because of the agricultural destruction by the locusts and the drought, the inhabitants of Marwar fled to Guzerat [now Gujarat]. But in 1812, Guzerat experienced a failure of rain. The immigrants suffered the most during the famine. Captain James Rivett Carnac, relates what he witnessed: “I have seen a few Marwarees sitting in a cluster, denying a little water to sustain her drooping spirits to a woman stretched beside them with a dead infant reposing on her breast. In a few hours this woman had also expired.” “I have seen a child, not quite dead, torn away by a pack of dogs from its mother, who was unable to speak or move.” “Bramin [Brahmin - a term for a scholar class in the traditional Hindu societies of India and Nepal] sold his wife, his child, sister and connexions [family connections], for a trifle of two or three rupees.” “The number of Marwarees who died in a single day at Baroda [now Vadodara] could scarcely be counted, and the return of burials in twenty-four hours often exceeded five hundred bodies.” When relief aid was given, “children were often crushed to death, when attending for their pittance of food, under the feet of their own parents.” The starvation was compounded with an epidemic of small pox. The mortality at Ahmedabad was computed at a hundred thousand souls, about ½ of its population. The demand for wood to cremate the Hindu required the destruction of the houses. Of the Marwar refugees, “I would be inclined to estimate, that not more than one in a hundred of these poor creatures ever returned to their native country.”<sup>189</sup>

During 1812-1814, Madura [now Madurai district of *India*] suffered considerably from scarcity. The distress extended into the Canara [now Kanara or Coastal Karnataka] district in 1812.<sup>188</sup>

In 1813, there was a minor famine in Guzerat [now Gujarat], Cutch [Kutch district in western *India*], Rajpootana [Rājputāna now the state of Rājasthān in central *India*] and part of the North-Western Provinces of *India*.<sup>179</sup>

In 1813, there was a famine in the Northwest Provinces and Rajputana [now Rajasthan state] in *India*.<sup>156</sup>

— The famine prevailed in and around Agra, and apparently the western states of Rajputana were affected. Bundelcund, to the south, was also in strained circumstances. The late rains of 1813 were the immediate cause of this scarcity.

In northern *India* during 1813-14, there was a partial famine in many parts of the Agra district. This is because the autumn crop of 1812 failed, and the harvest of the following spring was indifferent. In 1813 the rains set in late, and were then only partial.<sup>57</sup>

In Goojerat, Hindostan [now Gujarat in western *India*] in 1813-14, the province suffered from severe famine.<sup>91</sup>

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**1812 A.D.** On 10 January 1812, the fog was so dense in London, *England* that every house was lighted with candles or lamps; and it was so dark in the streets at mid-day, that a person could scarcely be discerned at a distance of eight or ten feet (2.4-3.0 meters).<sup>1</sup>

Another dense fog occurred in London, *England* on 10 January 1812 similar to the one of 1 January 1729.<sup>2</sup>

On 10 January 1812, there was a remarkable fog in London, *England*.<sup>128</sup>

On 18 January 1812 there was a severe hailstorm 10 miles from Sydney, *Australia*. Some of the hailstones, literally flakes of ice, were 8 inches in circumference.<sup>103</sup>

The summer of 1812 in the north of *France* and *Burgundy* was cold and rainy. The grape harvest began on 8 October. The yield was abundant, but the wine was of a very mediocre quality. During the summer in Languedoc and Provence, there was a great drought. Autumn was cold and rainy. The maximum temperature in Paris was 91.0° F (32.8° C) on 14 June. The harvest of cereals was very inadequate.<sup>62</sup>

The drought of 1812 struck Languedoc and Provence, *France*. Annual rainfall totals dropped below the average by 8.3 inches (211 millimeters) at Toulouse, and 13.4 inches (340 millimeters) at Marseille. Some northern countries, particularly in Paris, experienced this drought but to a lesser degree. The drought in southern *France* lasted two years.<sup>79</sup>

In 1812 in the *United Kingdom*, there was great scarcity in *England* and *Ireland*.<sup>57, 91</sup>

On 19 August 1812, a hurricane struck Louisiana in the *United States* causing 45 deaths.<sup>141</sup>

In 1812, a hurricane struck the Cayman Islands in the *Caribbean Sea*. The women of the east end were left widowed, when their husbands were lost at sea.<sup>141</sup>

On 12 October 1812, a hurricane struck *Jamaica*.<sup>124</sup>

On 14 October 1812, a hurricane struck *Cuba*. In Trinidad, *Cuba*, 500 houses were almost destroyed by the hurricane. Many vessels, which were at anchor in the harbor of Casilda, were driven on shore and others sank. The convent of the Pope, and the hospitals Francisco de Paula and Santa Anna were damaged.<sup>146</sup>

On 21 October 1812, there was a flood caused by the rising of the water in the River Thames, which overflowed the houses in Palace-yard, and filled Westminster Hall in London, *England*.<sup>43</sup>

On 21 October 1812, the River Thames rose so high in London, *England*, as to overflow Palace Yard and many of the low streets in or near the river.<sup>128</sup>

In 1812 during the period between 5 February and 6 May, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang and Ch'ing-chiang. During the same time, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tung-a, T'êng and Kao-t'ang. Then during the period between 9 June and 8 July, floods struck Hupeh (now Hubei province) in central *China* at Chu-ch'i. During the period between 9 July and 6 August, floods struck Hupeh province at Fang and Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui.<sup>153</sup>

*Also refer to the section 1812 A.D. – 1814 A.D. for information on the famine in India and Pakistan during that timeframe.*

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**Winter of 1812 / 1813 A.D.** In 1812, the frost in *Russia* was very severe.<sup>47, 90, 93</sup>

The Meuse River was frozen from 13 December 1812 until 6 January 1813. The Seine River in *France* was ice bound on 14 December and frozen over on the 17<sup>th</sup> and 18<sup>th</sup>.<sup>62</sup>

On 20- 27 December 1812, there were remarkable thick fogs in London, *England*.<sup>128</sup>

When the cold is intense, individuals exposed can experience lethargic sleep which can lead to death. (*Hypothermia*) This happened to many of the French and Italian soldiers in the fatal expedition to Moscow, *Russia* in 1812.<sup>58, 80</sup>

The winter of 1812-13 was one of the hardest ever known in *Europe*. The River Thames in *England* froze from the source to the sea; the Seine River in *France*, the Rhine River in *Germany*, the Danube River, the Po River in *Italy* and the Gaudalquiver River in southern *Spain* were all covered with ice. The *Baltic Sea* froze for many miles from land, and the Ikagerack and the Cattegat were both frozen over. The *Adriatic Sea* at Venice, *Italy* was frozen, so was the Sea of Marmora, while the Hellespont and Dardanelles were blocked with ice and the archipelago was impassable. The Tiber River in *Italy* was lightly coated, and the Straits of Massina at the eastern tip of Sicily were covered with ice. Snow fell all over *North Africa* and drift ice appeared in the Nile, in *Egypt*. This was the winter Napoleon's retreat from Moscow, *Russia*, when 400,000 men perished, mostly of cold and hunger. The men froze to death in battalions, and no horses were left either for the artillery or cavalry. Quicksilver [Mercury] froze that winter.<sup>63</sup> [The mercury in mercury thermometers solidifies (freezes) at -37.89 °F (-38.83 °C).] [Ikagerack or the Skagerrak Sea is a strait running between *Norway* and the southwest coast of *Sweden* and the Jutland peninsula of *Denmark*. Cattega or the Kattegat Sea is a strait between north *Denmark* and *Sweden*.]

This winter of 1812-13 will be forever memorable by the terrible disaster, which suffered after the French army captured Moscow, after the city was burned, and the running French retreats during one of Russia's harshest winters. Winter took its grip over all of *Europe* at an early stage with severe cold. The first snow fell on Moscow, *Russia*, on 13 October. The French army began to retreat on 18 October and completely evacuated the city by 23 October. Under continuous snowfall the French army retreated to Smolensk, *Russia*. From 7 November onwards, extreme severe cold gripped the area. On 9 November, the thermometer dropped to -12° R. (5° F, -15° C). Larrey [Dominique Jean Larrey, a French surgeon in Napoleon's army] carried a [Reaumur] thermometer [which used diluted alcohol] in the buttonhole of his tunic. [He kept a temperature record during the French retreat.] The French army stayed at Smolensk from 14 to 17 November. As they left Smolensk, Larrey observed the temperature had dropped to -21° R. (-15.3° F, -26.3° C). The brave French Corps of Marshal Ney [that held the rear guard during the retreat] escaped [after being cut off by the Russian army] because on the night of 18/19 November, they crossed the frozen Dnieper River. The night before a Russian army corps went with his artillery on the ice of the

Dvina (Daugava) River. On 24 November as Napoleon's troops approached the Berezina (Beresina) River the weather had turned warmer; the river began to thaw, and was impassable because of numerous ice floes [and bridges destroyed during the conflict]. This left the French army without a way to retreat, just as the Russian army was closing in. On 26-29 November, the French hastily constructed temporary bridges and moved their troops across to the other side of the Berezina River. Immediately after, the cold began again with renewed intensity, the thermometer fell to  $-20^{\circ}$  R. ( $-13^{\circ}$  F,  $-25^{\circ}$  C). On 30 November it continued to decline to  $-24^{\circ}$  R. ( $-22^{\circ}$  F,  $-30^{\circ}$  C). On 3 and 6 December at Molodechno (now Maladzyechna, *Belarus*) the temperature read  $-30^{\circ}$  R. ( $-35.5^{\circ}$  F,  $-37.5^{\circ}$  C). As this intense cold continued, the army continued its withdrawal to Vilna (now Vilnius, *Lithuania*). On 11 and 12 December the French army crossed the ice of the Niemen River at Kovno (now Kaunas, *Lithuania*), and brought the few remnants across the Vistula River and the Oder River to safety. Toward the end of December, the weather became milder, and the remaining portion of this winter showed no further unusual meteorological phenomena.<sup>62, 70</sup>

The severe frost was very destructive to the French army in its retreat from Moscow, *Russia*. Napoleon commence his retreat on the 9<sup>th</sup> of November 1812. The men perished in battalions, and the horses fell by hundreds on the roads. France lost the campaign of this year more than 400,000 men.<sup>90</sup>

In the rest of *Europe* during December 1812, the weather was extremely severe. In Paris, *France*, the lowest observed temperatures fell to  $12.9^{\circ}$  F ( $-10.6^{\circ}$  C) on 9 December 1812, and  $19.4^{\circ}$  F ( $-7^{\circ}$  C) on 21 January 1813. The lowest temperatures observed at different locations were as follows:<sup>62</sup>

Liège, <i>Belgium</i>	( $0.5^{\circ}$ F, $-17.5^{\circ}$ C)
Maastricht, <i>the Netherlands</i>	( $2.1^{\circ}$ F, $-16.6^{\circ}$ C) on 14 December 1812
<i>Ibid.</i>	( $16.0^{\circ}$ F, $-8.9^{\circ}$ C) on 25 January 1813
Strasbourg, <i>France</i>	( $3.9^{\circ}$ F, $-15.6^{\circ}$ C)
Moens, <i>France</i>	( $5.0^{\circ}$ F, $-15.0^{\circ}$ C) on 14 December 1812
Poitiers, <i>France</i>	( $9.7^{\circ}$ F, $-12.4^{\circ}$ C) on 26 January 1813
Paris, <i>France</i>	( $12.9^{\circ}$ F, $-10.6^{\circ}$ C) on 9 December 1812
Avignon, <i>France</i>	( $23.0^{\circ}$ F, $-5.0^{\circ}$ C) on 25 January 1813
London, <i>England</i>	( $25.0^{\circ}$ F, $-3.9^{\circ}$ C) on 9 December 1812 and 29 January 1813
Hyères, <i>France</i>	( $32.0^{\circ}$ F, $0.0^{\circ}$ C) on 15 January 1813

In the region of Toulouse, *France*, this winter was cold and fairly dry. In the last third of January and the first third of February there were strong frosts. The weather of the year was irregular with regard to the seasons, and unfavorable for the crop.<sup>62</sup>

During the winter of 1812-13, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 83 days.<sup>202</sup>

On 14 March 1813, hailstones fell at Caitro in Calabria, *Italy* during a storm of red snow. The same occurred in Tuscany and near Bologna, accompanied by a hail of red color.<sup>128</sup>

On 14 March 1813, red dust and red snow fell in Calabria, Tuscany and Friuli, *Italy*. At the same time, there was a great noise and a falling of stones at Cutro. Several specimens of the dust were collected and analyzed and found to be of the same composition as that of aerolites [meteorites].<sup>205</sup>

### 1813 A.D. – 1815 A.D. Australia. Drought

There was a severe drought in *Australia*. The wheat yield dropped by two-thirds. A bushel of wheat cost £2. The loss of livestock was extensive. The drought was so severe that settlers sought new pastures on the other side of the Blue Mountain Range after early explorers Gregory Blaxland, William Lawson and William Wentworth found a way across the mountain range.<sup>101</sup>

In New South Wales, *Australia*, the drought was prevalent in 1812 and 1813; so severe that Wentworth and party were led to cross the Dividing Range.<sup>103</sup>

In 1814 in New South Wales, *Australia*, there was a drought.<sup>103</sup>

On 18 December 1813, the thermometer stood at 90° F (32.2° C) in the shade and 146° F (63.3° C) in the sun at Parramatta in New South Wales, *Australia*.<sup>103</sup>

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**1813 A.D.** In *Austria, Hungary, and Poland*, there were great floods from rain during the summer. The floods produced a famine in Poland; and caused the loss of 4,000 lives.<sup>47, 92</sup>

In 1813, there was a dreadful inundation in *Hungary, Austria, Silesia, and Poland* in the summer.<sup>43, 90</sup>

Major storms reigned in *France* in 1813.<sup>79</sup>

On 17 May 1813 in *England*, there was a great hailstorm in Cheshire.<sup>93</sup>

On 9 June 1813 in *Wales*, there was a great hailstorm in Glamorganshire.<sup>93</sup>

In *Silesia, Prussia (now Poland)*, the floods caused the death of about 6,000 inhabitants; and the ruin of the French army under Macdonald was accelerated by the same cause.<sup>47, 92</sup> These floods occurred in June and July.<sup>43</sup>

The rivers in *Silesia* swelled by the heavy rains during three days and nights became torrents. They swept away houses, cattle, and the standing crops. Nothing escaped. Of the inhabitants, over 6,000 perished. “Even the operations of the contending armies were impeded; but it will be some consolation to every patriotic German to learn, that the ruin of the French under Macdonald was accelerated by these floods: that they at once arrested his progress, and cut off his retreat; and that by presenting the alternative of death or imprisonment to his best troops, they paved the way to the entire liberation of Prussian *Silesia* from the cruelties and exactions of the enemy.”<sup>74</sup>

In 1813 in *Silesia*, floods caused 6,000 inhabitants to perish. The floods also accelerated the ruin of the French army under Macdonald. In *Poland*, 4,000 lives were lost due to floods.<sup>90</sup>

During June/July 1813, the Mississippi River in the *United States* overflowed its banks and flooded the country on the west side inundating it to the distance of 65 miles, by which 22,000 head of cattle were destroyed.<sup>43</sup>

[In *France*] the summer of 1813 was disastrous for many crops; the exception being the cereal crops. In Burgundy, the year was rainy. The grape harvest produced only a mediocre crop of poor quality wine. In the south, the products of the soil were very mediocre. In Paris, *France*, the peak temperature only reached 85.5° F (29.7° C).<sup>62</sup>

*Poland* in 1813 suffered from a famine caused by an inundation.<sup>57, 91</sup> Drontheim, *Norway* suffered from a famine as a result of the interception of supplies by the Sweden.<sup>57, 90</sup> This caused 5,000 to perish.<sup>57</sup> [Drontheim or Trondheim is a port in central *Norway*, on Trondheim Fjord.]

“The travelers who have arrived from *Poland*, declare that the hopes of the husbandmen [farmers] have, in particular districts, been blasted [damaged], by the Vistula River rising ten feet. Houses and cattle have likewise been destroyed; and 4,000 lives lost.” Up until the flood, the harvest in *Poland* had promised to be very abundant and of good quality.<sup>74</sup>



On 20 July 1813, it was reported that a hurricane at *Bermuda* destroyed one third of the houses.<sup>128</sup>

On 22-23 July 1813, a hurricane struck Barbados in the *Lesser Antilles*. There were at least 18 dead and 8 missing.<sup>141</sup>

On 26 July 1813 in *England*, there was a storm that struck Bielby, Yorkshire near Pocklington. Several persons making hay were knocked down, and a young woman killed.<sup>43</sup>

On 31 July - 1 August 1813, a hurricane struck *Jamaica* and many lives were lost.<sup>141</sup>

In 1813, on the island of Dominica in the *Lesser Antilles*, two hurricanes, which succeeded each other within a short time, caused considerable destruction. Several houses were blown down.<sup>146</sup>

On 19 August 1813, a very destructive hurricane struck the Gulf coast in the *United States*.<sup>117</sup>

On 27 August 1813, Charleston, South Carolina in the *United States* was struck by a fearful hurricane, doing great damage; the water rose 18 inches higher than in the corresponding gale of 1804.<sup>124</sup>

In August 1813, a hurricane struck the *Caribbean* island of Martinique causing more than 3,000 deaths.<sup>107, 141</sup>

On 28 August 1813, a hurricane struck *Jamaica*.<sup>124</sup>

In August 1813, there was an inundation by the overflowing of the Drave [Drava] River, near Orsatch, six villages and the suburbs of a town were swept away, and a congregation of 240 persons were buried beneath the ruins of a church.<sup>43</sup>

“In the middle of August, the Drave [Drava] River [located in *southcentral Europe*] flooded the country in the neighbourhood of Orsatch. By the conjoint influence of the rains and high winds, the waters of the river were raised to a tremendous height. They swept away six villages and the suburbs of a town. In the latter, a minister of the church, while intent upon celebrating divine service, was, with his congregation of about 240 persons, buried beneath the ruins of the building.”<sup>74</sup> [Orsatch is possibly Osijek, *Croatia*, located on the right bank of the river Drava, 25 kilometers (16 miles) upstream of its confluence with the Danube River.]

A division of British Infantry were, in August 1813, while descending the *Pyrenees Mountains*, overtaken by a hailstorm. The hailstones varied in size from a bean to an egg.<sup>43</sup>

In August 1813, it was reported that a caravan of 2,000 persons from Maschah to Aleppo, *Syria* in crossing the desert were overwhelmed by sand, and not more than twenty escaped.<sup>128</sup>

The River Waag [now the River Váh], which runs through *Slovakia*, was in the beginning of September raised six feet above its usual height by the great rains, which had fallen over several days. The banks of the river suddenly gave way and the lands around Trentschin [Trenčín] were inundated. A high mountain, which was undermined by the flood, suddenly fell into the channel of the river, and gave it an impetus, which nothing could resist. From Zailina [Žilina] to Szered [Sereď], upwards of sixty villages, with all their houses, flocks, and standing crops, were washed away. The calamity having occurred during the day, many of the inhabitants had time to save themselves; but, nevertheless, more than twelve hundred persons perished, besides many thousand cattle, sheep and horses. All the bridges upon the Waag were destroyed; so that in particular situations, five days elapsed before assistance could be given to the

survivors of this dreadful calamity. All the towns in the neighborhood of the Waag have been damaged. At Neustadt [now Nové Mesto nad Váhom], *Slovakia* about thirty houses were overturned. One half of the extensive district of Trentschin was laid waste.<sup>74</sup>

In Widdin, *Bulgaria* there was a flood on the Danube River on September 14. An island near, on which were 2,000 Turkish troops, suddenly flooded; all drowned.<sup>47, 92</sup> [Widdin or Vidin is a port town on the southern bank of the Danube River in northwestern Bulgaria.]

On 14 September 1813, there was an overflow of the Danube River, where a Turkish corp. of 2,000 men on a small island, near Widden, *Bulgaria* were surprised and met with instant death, and the island itself sunk and disappeared.<sup>43, 90</sup>

“Letters from Belgrade mention that there had been an inundation of the Danube in the neighbourhood of Widden, during the night of the 14<sup>th</sup> of September. A small Turkish corps of 2,000 men had occupied one of the islands, and thrown up fortifications thereon. They formed part of the force, which was blockading the Serviau fortress. In the middle of the night, while buried in a profound sleep, they were surprised by the waters, and met with instant death. Not one person escaped. Even the island itself sunk and disappeared.”<sup>74</sup>

On 28 September 1813, accounts were received of dreadful inundations in *Hungary, Austria, Silesia* and *Poland*.<sup>128</sup>

On 28 September 1813, two thousand Turks encamped on a small island near Viddin [Vidin, *Bulgaria*] drowned by the overflowing of the Danube River.<sup>128</sup>

On 28 September 1813, six villages destroyed by the overflowing of the Drava River in south central *Europe*.<sup>128</sup>

In October in *England*, there was a great storm of hail in Bedfordshire.<sup>93</sup>

On 28 October 1813, reports were received that the Mississippi River in the *United States* overflowed its banks, and did incredible damage by the destruction of cattle and livestock.<sup>128</sup>

In the *United States*, there was a great overflow of the Mississippi River; immense damage.<sup>47</sup>

In Bedfordshire, *England* in October, there was a great storm of thunder, lightning and hail, with fireball [lightning strikes], which set fire to buildings.<sup>57</sup>

In 1813, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tung-p’ing, Tung-a, Ts’ao and Chi-ning.

— During the period between 6 May and 8 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Pao-k’ang.

— During the period between 26 August and 23 September, a drought engulfed Hupeh province at Yün, Ma-ch’êng, Chung-hsiang, Hsiang-yang and Tsao-yang.

— During the period between 24 September and 23 October, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Yüeh-ch’ing and Hopei (now Hebei province) in northern *China* at Ning-ching, Nan-yüeh, Pao-ting, Hsing-t’ai, Kuang-tsung, Ching-ching, Ch’ing-fêng, Wu-i, T’ang-shan, Wang-tu and Nan-kung.

Also refer to the section **1812 A.D. – 1814 A.D.** for information on the famine in India and Pakistan during that timeframe.

Also refer to the section **1813 A.D. – 1815 A.D.** for information on the drought in Australia during that timeframe.

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**Winter of 1813 / 1814 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1813 occurred on 15 November. Snowed steadily all day; snow more than a foot deep; sleighs move considerably.<sup>116</sup>

On 27 December 1813, a fog similar to the one of 19 January 1812 occurred in *England*, which continued for four days, and several persons missed their way and fell into canals and rivers.<sup>1</sup>

Another dense fog occurred in London, *England* from December 20-27, 1813 similar to the fog of 1 January 1729.<sup>2</sup>

On 27 December 1813, there was a remarkable fog, which extended fifty miles round London, *England* and continued eight days; accompanied by a severe frost, which lasted six weeks.<sup>128</sup>

On 10 January 1814, seven boys drowned in the River Trent in *England* by the breaking of the ice.<sup>128</sup>

On 10 January 1814, in a sudden storm and swell near Belfast, *Ireland*, many fishing boats lost and above one hundred people perished.<sup>128</sup>

On 14 January 1814, the snow fell so deep in the West so as to impede travelling, and the severity of the frost was noticed in every part of *England*. The thermometer exposed to a northeastern aspect stood 19 degrees below the freezing point [13° F, -10.6° C]. In Ireland, the winter was nearly as severe.<sup>128</sup>

“The severest and most remarkable frost in *England* of late years, commenced in December 1813, and generally called "the Great Frost in 1814", was preceded by a great fog, which came on with the evening of the 27th of December, 1813. It is described as a darkness that might be felt. After the fogs, there were heavier falls of snow than had been within the memory of man. With only short intervals, it snowed incessantly for forty-eight hours, and this after the ground was covered with ice, the result of nearly four weeks continued frost. During this long period, the wind blew almost continually from the north and north-east, and the cold was intense.”<sup>29</sup>

“In London, *England* on 2 February after over a month of large snow accumulations and frost, the River Thames again became the site of a frost fair. The Thames this day presented a complete frost fair. The grand mall or walk extended from Blackfriars to London Bridge. This was named the city road, and was lined on each side by persons of all descriptions. Eight or ten printing presses were erected, and numerous pieces commemorative of the 'great frost' were printed on the ice. By 3 February, the number of adventurers increased. Swings, book-stalls, dancing in a barge, suttlings-booths, playing at skittles, and almost every appendage of a fair on land appeared on the Thames. Thousands flocked to the spectacle. The ice presented a most picturesque appearance. The view of St. Paul's and of the city, with the white foreground, had a very singular effect; in many parts mountains of ice upheaved, resembled the rude interior of a stone quarry.”<sup>29</sup>

The winter in *England* was very severe in January 1814, when booths were erected on the various parts of the River Thames, and the antiquarian society of Newcastle recorded, that the rapid river Tyne was frozen to the depth of 20 inches (51 centimeters).<sup>2, 42, 43</sup>

“When [exiled King of France] Louis XVIII was King, at Hartwell, his bill for coals on one Sunday when the Thames was frozen over in 1814 was 94l. 18s. 6d. at 5s. per cwt.” There was also “a power of beer

and spirits” for the coalheavers.<sup>47,93</sup> [Hartwell is Hatwell House in Buckinghamshire where the king stayed in exile.]

In January 1814, there was a great fall of snow in every part of *England*.<sup>43</sup>

In *England*, there were fairs on the frozen River Thames during the winter of 1813-14.<sup>90</sup>

During the winter of 1813-14, booths were erected on the ice on the River Thames in London, *England*. The winter was very severe in *Ireland*.<sup>90</sup>

In 1814 in *Ireland*, the winter was very severe.<sup>47,93</sup>

On 27 January 1814, a thaw commenced [in *England*]. On 22 February, because of the recent thaw, there were great inundations occasioned on the low land in most places.<sup>128</sup>

On 18 August 1814, it was reported that the season broke so late that the River Dwina [Dvina] in *Russia*, was not open on the 24<sup>th</sup> of May.<sup>128</sup>

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**1814 A.D.** In *Ireland*, the River Shannon overflowed and did great damage.<sup>47,92</sup>

Scarcity of food severely felt by the *Irish* poor in 1814, 1816, 1822, 1831 and 1846 in consequence of the failure of the potato crop. Grants by parliament to relieve the suffering of the people, were made in the sessions of 1847. The whole amounting to ten million sterling.<sup>90</sup>

In Bengal [Bengal today is West Bengal in *India* and East Bengal in *Bangladesh*], there was a great overflow of the Narbudda River [Narmada River in central *India*], sweeping away villages, inhabitants, and cattle.<sup>47</sup>

On 12 February 1814, there was an flood caused by the overflowing of the Narbudda River, in the provinces of Bengal [*India* and *Bangladesh*], which swept away 15 villages, with the houses, inhabitants, and cattle.<sup>43</sup>

In May 1814, a flood struck Maine in the *United States*. Beginning on the night of 13 May, it rained in torrents for 4 days and nights. The Mousam River swept away the bridge in Kennebunk and damaged the dam and mills. The Saco River became a roaring flood of water. At Conway, New Hampshire, the dam for the iron works was carried off. At Fryeburg, Maine, a bridge was destroyed. The freshet took out all the bridges in Brownfield. At Hiram, the flood took out the bridge over the Saco River. The part of the bridge across the Great Ossipee River was lifted and set adrift. The mill, several dwelling houses, an immense number of logs and all the bridges between Buxton and the mouth of the Saco River, including two bridges in Saco were carried away into the ocean. The damage on the Androscoggin River was equal to that on the Saco River. Eight sawmills, an aqueduct, and part of the bridge between Topsham and Brunswick were carried off. A hundred thousand dollars of logs and other valuable property floated out to the sea. [In present currency, that would be equivalent to \$1.1 million in losses based on the Consumer Price Index (CPI) inflation rates.] The dam and five gristmills and sawmills were carried away in Waterford. The bridge between Long pond and Brandy pond floated upstream and the next day the current changed direction and the bridge floated back to near its original position and was salvaged.<sup>199</sup>

On 21 May 1814, a tornado struck New Hampshire in the *United States*. It passed over Litchfield, Merrimac, Londonderry, North Chester, and Chester. It traveled a distance of 17 miles [27 kilometers] and was from fifty to a hundred rods wide [825-1650 feet, 252-503 meters]. A considerable number of houses, barns and other buildings, trees of all kinds, and fences were destroyed. The area was also struck

by a hailstorm. The hailstones were extremely large. Some weighed more than a half a pound [0.23 kilograms] and measured 11 inches [28 centimeters] in circumference.<sup>199</sup>

On 28 July 1814 in *England*, there was a violent hailstorm at Stamford and parts of Leicestershire. The hailstones were as big as hens' eggs. Windows and window frames were beaten in and grain and fruit crops destroyed.<sup>93</sup>

On 24 August 1814, the British invaded the *United States*, attacked the Capital in Washington D.C. and towards the evening set it aflame. The public buildings were all burned including [the White House], the U.S. Capital, the Library of Congress, [and the U.S. Treasury]. The next day, a tornado struck the city causing so much havoc that the invaders were driven off.<sup>147, 148</sup>

— On Tuesday, 23 August 1814, Washington D.C. was in chaos. The British were coming. The enemy was in a full march towards the city. The original Declaration of Independence, the Articles of the Confederation, the Federal Constitution, many treaties and laws as enrolled, along with George Washington's Commission as Commander-in-Chief of the Army of the Revolution were placed in coarse linen bags and spirited away first to a mill over the Potomac River, about 3 miles from Georgetown and then to Leesburg, a small town in Virginia about 35 miles from Washington D.C.

— The loss of these documents to the British would have deeply blackened our disgrace. If they had been captured and deposited in the Tower of London, it would illustrate the British triumph.

— On the 24<sup>th</sup>, Dolley Madison was in the White House, which was almost deserted. She was trying to save what could be saved. The enemy was closing in. Two messengers covered in dust came to bid her fly. She wouldn't leave until a large portrait of George Washington was secured. This was not going to be a trophy for the captors. Mrs. Madison, with a carving knife in her hand, stood by while French John and others strove to detach the picture uninjured from its heavy external gilt frame and preserve it whole on the inner wooden work, by which it was kept distended and screwed to the wall. When it was safe, she fled. She spent the night 2½ miles from Georgetown on the Virginia side of the Potomac River.

— During the evening Mrs. Madison sitting at an open window gazing on the lurid flames and listening to the hoarse murmurs of the smoldering city, while several hundred disorderly militia around the house aggravated the din and begrimed the gloomy scene. The whole region was filled with panic struck people, terrified scouts roaming about and spreading alarm that the enemy were coming from Washington and Alexandria and that there was safety nowhere.

— At Leesburg, that fateful night was followed by next day's tornado, which at Leesburg, as at Washington, D.C. uprooted trees, unroofed tenements, and everywhere around superadded tempestuous to belligerent destruction and alarm.

— On the 25<sup>th</sup>, Dolley Madison traveled to a tavern 16-miles from Georgetown, where she was to meet up with her husband, President James Madison. About noon, the air was charged with the two-fold electricity of panic and of a storm. The horizon was overcast, the heavens portentously black, thunder muttered, forked lightning flashed, hurricane blasts announced the tornado which soon broke forth with tropical fury, desolating many miles round. The tavern, which Mrs. Madison was seeking shelter stood in the midst of an apple orchard, heavily laden with ripe fruit. The apples were torn by the tempest from the trees and dashed with noisy force against the windows and doors of the house.

— Terror was the order of the day and incubus of the night for both the Americans and the British. The storm drove the enemy from the capital. And the heavy rains helped to put the fire out.

On 1 September 1814 in *England*, there was a hailstorm in Warwickshire.<sup>93</sup>

On 19 October 1814, it was reported that the vintage [wine] on the Rhine River in *Western Europe* failed.<sup>128</sup>

On 1 November 1814, it was reported that the Nerbudda River, East Indies [Narmada River in central *India*], overflowed its banks and drowned fifteen villages and 3,000 people.<sup>128</sup>

On 16-17 December 1814, there was a great hurricane at Greenock, *Scotland* and that neighborhood which caused great damage. This hurricane likewise struck *Ireland*.<sup>128</sup>

On 16-17 December 1814, a tremendous storm throughout *Great Britain* and *Ireland* did immense damage and caused many ships to wreck.<sup>57, 90</sup>

The drought of 1814 in Paris, *France*, produced 5 inches (128 millimeters) less rainfall than a typical year, and twenty-eight rainy days less than in than normal.<sup>79</sup>

In 1814 heavy rains struck Roussillon, Toulouse, Marseille, Joyeuse and Viviers, in southern *France*. Toulouse received 7.9 inches (201 millimeters) rainfall above the yearly average. Viviers received 5.3 inches (135 millimeters) of rainfall above the average. There were 4 more rainy days at Toulouse, fifteen more rainy days at Joyeuse, and twelve more rainy days at Viviers than the average.<sup>79</sup>

In 1814, a hailstorm visited Sydney, *Australia*. It was one of the severest ever experienced in the colony. It began about 2 p.m., and in length of 12 minutes, it demolished nearly all the glass windows in the town and destroyed the gardens.<sup>103</sup>

In 1814, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Hupeh (now Hubei province) in central *China* at Yün, Ying-ch'êng, Ch'i-shui and Lo-t'ien.

— During the period between 6 May and 8 August, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Hsin-têng, Hu-chou and Ch'ung-tê; Hupeh province at Chung-hsiang; Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin, Nan-t'ung and T'ai; Shantung (now Shandong province) on the east coast of *China* at Lin-ch'ü; and Shensi (now Shaanxi province) in central *China* at Chên-pa. This drought was severe and all the rivers dried up.

— During the period between 15 August and 13 September, a drought engulfed Kiangsu province at Ch'ing-p'u, Soochow and Kao-ch'un.

*Also refer to the section 1812 A.D. – 1814 A.D. for information on the famine in India and Pakistan during that timeframe.*

*Also refer to the section 1813 A.D. – 1815 A.D. for information on the drought in Australia during that timeframe.*

**Winter of 1814 / 1815 A.D.** The hard winter of 1814-15 produced heavy snowfalls in Bradford County, Pennsylvania in the *United States*. Wolves were driven down from the mountains in search of food. They killed many sheep. They could be heard howling all during the night. The inhabitants were terrified by the danger posed by the wolves and many refused to travel between Milltown to Athens; even in the daytime. There was no travelling after dark, so great was the fear and danger. The sheep were often called into the dooryard and lights were kept burning for their protection. Bears and panthers were sometimes seen between the rivers. Bounties were offered for killing these animals and those that were not killed, later returned to the mountains.<sup>178</sup>

It was reported that the season was so backward this year in *Canada* that snow fell on the 20<sup>th</sup> of May 1815 and the trees were not in leaf before the 4<sup>th</sup> of June.<sup>128</sup>

**1815 A.D.** The summer of 1815 in the interior of *France* and especially in Burgundy and Bordeaux was unusual. The grape harvest began on 21 September. The wine was not very abundant, but the quality was very good. The grain harvest was very poor. Here is a table of the highest temperatures:<sup>62</sup>

Avignon, <i>France</i>	( 88.7° F, 31.5° C) on 31 July
Liège, <i>Belgium</i>	( 88.3° F, 31.3° C)
Paris, <i>France</i>	( 86.0° F, 30.0° C) on 5 August
Moens, <i>France</i>	( 82.9° F, 28.3° C) on 29 May
Mücheln, <i>Germany</i>	( 82.6° F, 28.1° C) in August
London, <i>England</i>	( 72.0° F, 22.2° C) on 14 July



On 6 June 1815, it was reported that a fleet of boats were overtaken by a storm on the Ganges River [*India*] and over sixty boats were lost.<sup>128</sup>

In July 1815, the most fearful windstorm ever known in the eastern part of Bradford County, Pennsylvania in the *United States*, swept eastward across Orwell, tearing up trees and leaving a wake of destruction nearly half a mile [0.8 km] wide. Timber on thousands of acres was blown down. The house of Luther Chaffee was carried from its foundation, thrown completely over and left standing on the roof. The schoolhouse at North Orwell, built of hewed logs, was blown to pieces and some of the roof found nearly four miles [6.4 km] away. An eyewitness to the storm wrote: "The scene was one of awful grandeur. The air for a great distance was full of limbs and tree tops, whirling in every direction, something like the flakes of snow in a March snow squall."<sup>178</sup>

On 6 August 1815 in *England*, there was a great hailstorm in Berkshire.<sup>93</sup>

A severe frost occurred in Quebec, *Canada* in 7 August 1815.<sup>2, 42, 43, 47</sup>

On 31 August – 1 September 1815, the *West Indies* islands were visited by a hurricane. About thirty sail were driven on shore at St. Bartholomew's [St. Barts]; fourteen were totally lost. The gale did not reach Barbados.<sup>146</sup>

On 3-4 September 1815, a hurricane struck North Carolina in the *United States*. The storm caused great damage and loss of life in Onslow County. There were 4 deaths in one storm surge incident.<sup>141</sup>

On 16 September 1815, it was reported that there was a drought so great in *Portugal* that ponds dried up, grass was destroyed, and the quantity of cattle lost was immense. Water was sold in Lisbon at a very high price.<sup>128</sup>

On 20 September 1815, a second hurricane unroofed and blew down about half the houses on *Turk's Island*, and destroyed about 400,000 bushels of salt. Several vessels were wrecked. One American vessel lost twenty-two of her crew and passengers.<sup>146</sup>

On 23 September 1815, a hurricane struck New England in the *United States*. The loss of life was so heavy that the newspapers did not have space enough to give all the details of the marine disasters. It was "impossible to estimate loss of live in Providence [Rhode Island]...but it was extremely heavy." There about twenty persons were drowned or killed.<sup>141</sup>

In September 1815, "The Great September Gale," the worst storm to hit New England in almost 200 years, devastated parts of Connecticut, Rhode Island and Massachusetts in the *United States*.<sup>19</sup>

On 23 September 1815, a great September gale, the only authentic West Indian hurricane up to that time in New England in the *United States*; passed between Providence and New London and, via Worcester and Connecticut River Valley, to the St. Lawrence River west of Montreal. [From "Our First Century" by R.M. Devens, C.A. Nichols & Co., Springfield, Massachusetts; A.H. Walker, Columbus, Ohio, 1877.]<sup>138</sup>

The summer of 1815 was remarkable for exceptionally violent and destructive storms all along the Atlantic coast of the *United States*. Newspaper columns were filled with accounts of great destruction of life and property both on land and at sea. The gale of 23 September 1815, however, exceeded them all in violence, and caused greater damage than any that preceded it, not that year only but since the settlement of the country. A detailed list of the damage from this storm is provided below.<sup>199</sup>

— During the storm, the winds blew with such force that buildings, fences, trees, and vessels along the

coast were swept away before it. The winds at Providence, Rhode Island blew with the force of a hurricane. During the heaviest part of the gale, fires could not exist in the houses; being blown out as fast as they were lit. Because the air was very oppressive and almost suffocating, respiration was laborious and difficult. The gale appeared to be centered in Narragansett Bay in Rhode Island. The gale was felt as far south as Delaware and inland to a considerable distance to the west of the New England states.

— The gale swept away buildings of all sizes and varieties from churches to shed and it unroofed a great number of other buildings. Great quantities of forest had their trees uprooted or broken down. The loss in timber trees was exceedingly great. It essentially brought an end to the shipbuilding industry. In order to salvage as much of the destroyed timber as possible, the trees were cut up for lumber. This lumber after seasoning was used in a major building boom of 1817-1818 in the construction of new homes, barns and other buildings.

— The winds destroyed the crops and the stored hay. Many people were killed by falling houses or trees, and others were drowned from the wrecks of vessels along the coast. A large number of animals were also killed.

— During the storm, the fierce winds drove in the water along the coast and the tide rose to a great height, deluging wharves, streets and cellars. The winds carried the salt water from the ocean inland more than 40 miles [64 kilometers] into the country. This destroyed the foliage of the trees, crisping and curling the leaves of plants, and giving to all vegetation, with which it came in contact with, the appearance of having suffered from a severe frost. The brooks and small rivers became brackish, and the rainwater that fell as far inland as Worcester and Sterling, Massachusetts, 40 miles [64 kilometers] from the sea, had a strong briny taste.

— Many ocean seabirds were driven 20 miles [32 kilometers] inland from the storm. Flocks of seagulls were seen in the meadows of Grafton and Worcester in Massachusetts. Several sea-swallows (petrels) were also seen quite a distance inland.

— At Providence, Rhode Island, the winds brought in the tide 10 to 12 feet [3.0-3.7 meters] above the height of the usual spring tides, and 7½ feet [2.3 meters] higher than ever known before. The tides overflowed and inundated the streets and wharves. The great bridge connecting the two parts of the town was swept away. All vessels were driven ashore or totally destroyed. Four ships, nine brigs, seven schooners and fifteen sloops were wrecked in the cove. On the west side of the river, the water rose nearly to the tops of the lower windows of the houses. People had to be evacuated by boats or scows from their dangerous situation. On the east side of the river, the water 3 feet [0.9 meters] deep flowed with a swift current down Weybosset Street, the main thoroughfare. On Westminster Street, the water was from 6 to 8 feet [1.8-2.4 meters] above the pavement. Many buildings were destroyed. The ship *Ganges* ran into the third story of the Washington Insurance Building. India Bridge and Mill Bridge at the foot of Constitution Hill were swept from their foundation. Five hundred buildings were destroyed by this gale and flood. The losses at Providence amounted to \$1.5 million. [In present currency, that would be equivalent to \$18.5 million in damages based on the Consumer Price Index (CPI) inflation rates.] Many people died but the exact count was unknown. After the storm many ships were found high and dry, 5 to 6 feet [1.5-1.8 meters] above the high water mark, in the streets and gardens of the town. Along the highest parts of the land were heaped together lumber, wrecks of buildings and vessels of every description, carriages, and bales of cotton, mingled with furniture, coffee, soap, candles, grain, flour, and other kinds of merchandise.

— At Bristol, Rhode Island, all the vessels were driven a great distance in on the land, and considerably damaged. The tide rose 7 feet [2.1 meters] higher than it was ever known to rise before, and the wharves were swept away. The post office and several houses and stores were swept away. A great many trees were blown down. The gristmill at Glenrock and the lighthouse at Point Judith were destroyed.

— In Pawtucket, Rhode Island, several houses were carried away and one person drowned. At Newport, all the stores on Long Wharf were washed away and 5 perished.

— The country around Buzzard's Bay in Massachusetts suffered significant damage from this storm. The tide was 8 feet [2.4 meters] higher than usual and the salt water was driven in on the land. Wells and springs that provide fresh water were ruined. Trees and buildings were blown down by the terrific winds

and vessels were driven ashore.

— At New Bedford, Massachusetts, all the vessels in port, except for two, were driven ashore, and several of them smashed to pieces. Five people perished. All the warehouses on the lower wharves were swept away. Many houses were destroyed.

— At Hyannis, Massachusetts, a brig was driven ashore. At Sandwich, a vessel was dashed against the wharf and a passenger drowned. Hundreds of vessels were lost in the storm. The newspapers did not have sufficient space to record all the marine disasters.

— In Plymouth County, Massachusetts, several barns were blown over and a number of houses damaged and one man was killed at Hingham. At Abington, several barns were blown completely down, 20 houses and barns were unroofed. The roofs were taken off entirely whole and carried a distance of 20 to 30 rods [330-500 feet, 100-150 meters] and broken to pieces. Boards and shingles flew miles away. In Norfolk County, the church at Needham was blown down and several persons were killed.

— In the neighborhood of Boston, Massachusetts, substantial damage was done. At Dorchester, 17 houses and 40 barns were unroofed, sixty chimneys were blown down, and more than 5,000 fruit and other trees were torn up by the roots. The South Church and the North Church were badly damaged. At Charlestown, the upper story of a large brick building was blown in, the Universalist Church was unroofed and the steeple of Dr. Morse's Church was blown away.

— In Massachusetts, other cities that were damaged included Reading, Newburyport, Newton, Chelsea, Boxford, Wenham, Danvers, and Saugus.

— At Newfane, Vermont, the storm destroyed two gristmills, an oil mill, a sawmill and a clothing works.

— In New Hampshire the following cities received damage: Amherst, Concord, Sanbornton and Portsmouth.

— In Maine, trees were blown down as far east as Wells, where one man was killed by a falling tree while he traveled along the highway.

— The storm was very severe at the eastern end of the Connecticut coast. At Stonington, the tide rose 17 feet [5.2 meters] higher than usual and swept entirely across the town. Twenty vessels in the harbor were either driven ashore or sunk. This included the schooners *Expert* and *Washington*, and a sloop carrying the governor of Rhode Island. At a minimum 4 people in town perished.

— In New London, Connecticut, almost every vessel in the harbor was driven on shore and stove to pieces. A new brig was upset and sunk. A gunboat drifted on the rocks and was smashed to pieces. On Main Street, the water was three feet [0.9 meters] deep. The wharves were almost totally demolished. Many buildings were carried off.

— At Groton, Connecticut, the storm destroyed three wharves, some tan works, two dwelling houses, three barns and other buildings.

— At Norwich, Connecticut, the water rose so high that it swept away several stores and damaged several warehouses. The water rose 5 to 6 feet [1.5-1.8 meters] above the Wharf Bridge. The water carried away the market house and adjoining store. The brig *Mary* and several schooners and sloops were driven ashore, in some cases knocking in the sides of the stores and ending up in the streets of the town.

— In Connecticut, two churches were blown down at Plainfield. The West Bridge on the Milford turnpike at New Haven was rendered impassable by the destruction of the causeway on either side. Long Wharf was entirely inundated and everything on it was swept away. The water in some stores was two feet [0.6 meters] deep.

— In Boston harbor in Massachusetts, around sixty vessels were damaged by the storm. This included the schooners *Nancy* and *Three Brothers*, the ship *Aridne*, and the new brig *Washington*. In town, many houses and church steeples were damaged.

— At Cambridgeport, Massachusetts, a schooner was carried up into Main Street, two houses were blown down and 40 other buildings were unroofed or damaged.

— At Marblehead, Massachusetts, fourteen vessels went ashore.

— At Salem, Massachusetts, several buildings were destroyed.

— At Gloucester, Massachusetts, 77 gunboats, 2 schooners, *New Packet* and *Washington* and a sloop were all driven ashore. Several buildings and stores were blown down or damaged.

— [Probably the question that should be asked – Was there a causal relationship between this great storm and the great volcanic eruption that occurred on 10 April 1815, called the Tambora eruption?]

On 17-18 October 1815, a hurricane struck *Jamaica* causing more than 100 deaths. [This total is based on *The London Times* report that "many seamen and white people drowned, with some hundreds of negroes." Alexander (1902), Garriott (1900), and Evans (1848) have 28 October as date.]<sup>141</sup>

In October 1815, a hurricane struck *Jamaica*. In a letter from Kingston, dated October the 28<sup>th</sup>, the following details of the hurricane are provided:<sup>146</sup>

— "On Thursday morning the weather put on a very threatening aspect, and the whole day it continued drizzling, with occasionally smart showers of rain. About one o'clock on Wednesday morning, the wind began to blow with great strength from the north, but changed in about an hour to the S.E., from which quarter it continued to blow during the remainder of that day with great violence, accompanied by heavy rain, which continued without intermission the whole of Wednesday night and until Thursday at noon, when it somewhat abated, the wind having again shifted to the north on Wednesday night, where it continued steady until the end of the storm early yesterday morning. In strength and continuation this was one of the severest storms we ever witnessed, and, we are sorry to say, had done very considerable mischief to the barrack wall, and other buildings, in this town. The roads and pastures in the vicinity are covered with branches of trees which have been torn off, and many large trees have also been torn up by the roots. Several vessels were lost, and their crews, and several other vessels were damaged."

A most tremendous hurricane struck *Jamaica* on October 18, 1815. "The whole island was deluged, many vessels wrecked, many houses washed away, and many seamen and white people drowned, with some hundreds of Negroes."<sup>42, 43</sup>

On 18-19 October 1815, a hurricane struck *Jamaica*.<sup>124</sup>

In 1815 during the period between 9 May and 6 June, floods struck Shantung (now Shandong province) on the east coast of *China* at Tsinan and Ch'ang-ch'ing. Then during the period between 7 July and 4 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing. During the period between 5 August and 2 September, a drought engulfed Hopei (now Hebei province) in northern *China* at Luan.<sup>153</sup>

*Also refer to the section 1813 A.D. – 1815 A.D. for information on the drought in Australia during that timeframe.*

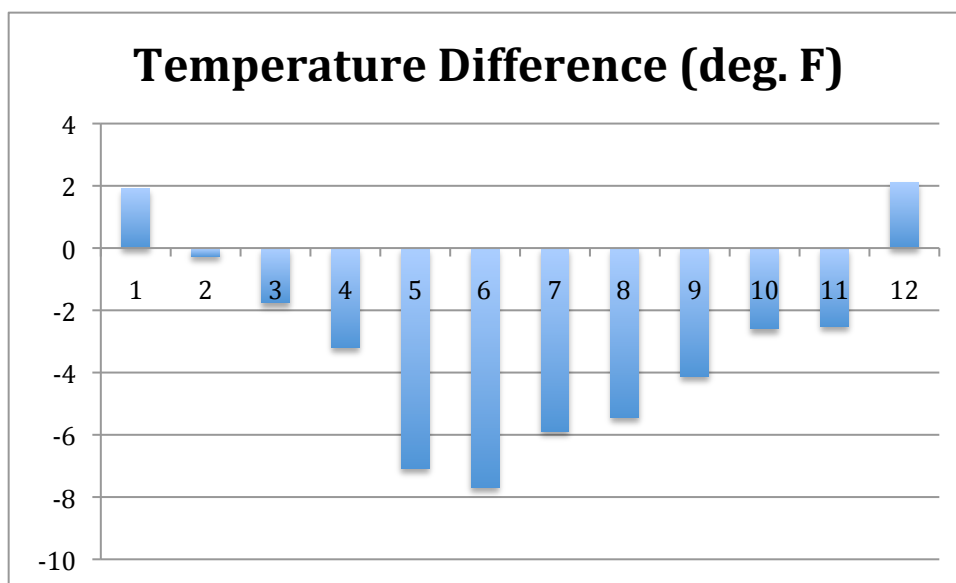
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**Winter of 1815 / 1816 A.D.** The winter of 1815-16 was very dry in Bradford County, Pennsylvania in the *United States*. The ground was dry and dusty until March when the weather turned suddenly cold and boisterous. The succeeding months were cold and frosty and the period long remembered as "The Year Without a Summer."

In London, *England*, [readings taken at Tottenham in North London] the coldest day within the years 1807-1816 occurred on 9/10 February 1816 when the temperature fell to -5° F (-21° C). [The thermometer stood a whole night 5 below zero.] At noon on the day before [9 February] the temperature had only reached 20° F (-7° C). The temperature in Paris, *France*, fell to 12.65° F (-11° C) on 11 February 1816.<sup>175</sup>

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**1816 A.D.** The Tambora eruption occurred on 10 April 1815 on Sumbawa Island in *Indonesia*. It was rated as a 7 on the Volcanic Explosivity Index (VEI).<sup>20</sup> The volcanic eruptions of this size are very rare events typically occurring on a millennium scale. Analysis of Peirce's temperature data shows that the eruption did not begin to affect Philadelphia, Pennsylvania's weather in the *United States* until 11 months later in March 1816.<sup>1</sup> Then temperatures were depressed for nine months before recovering. At its greatest extent, temperatures were 7.7° F (4.3° C) colder than average Dalton Minimum monthly averages. This year was known as the "Year Without Summer". But that does not really begin to describe the event for the people of Philadelphia, the Northeast *United States* and *Canada*. It was the year when a hard killer frost occurred in every month of the year.



This chart shows for Philadelphia, Pennsylvania the observed monthly temperatures difference between the year 1816 and the average monthly temperatures during the rest of the Dalton Minimum (years 1798-1815 and 1817-1823).

[Paris *France* experienced a very similar temperature anomaly.] The summer of 1816 was the coldest in the first half of the 19th century. The average temperature in Paris during the summer was only 59.5° F (15.3° C); that was 5.4° F (3° C) less than the average summer temperature. There were only six hot days; this is 26 less hot days than normal. The maximum temperature of 82.4° F (28.0° C) occurred on 20 July. This was a disastrous year in Paris. The average temperature during the period of vegetation:<sup>62</sup>

	Average Summer Temperature for 1816	Long Term Summer Average Temperature	Monthly Temperature Anomaly
April	(49.8° F, 9.9° C)	(49.66° F, 9.81° C)	(+0.14° F, +0.09° C)
May	(54.9° F, 12.7° C)	(58.15° F, 14.53° C)	(-3.25° F, -1.83° C)
June	(58.6° F, 14.8° C)	(63.21° F, 17.34° C)	(-4.61° F, -2.54° C)
July	(60.1° F, 15.6° C)	(66.27° F, 19.04° C)	(-6.17° F, -3.44° C)
August	(59.9° F, 15.5° C)	(65.21° F, 18.45° C)	(-5.31° F, -2.95° C)
September	(57.2° F, 14.0° C)	(59.85° F, 15.47° C)	(-2.65° F, -1.47° C)
October	(52.9° F, 11.6° C)	(51.75° F, 10.97° C)	(+1.15° F, +0.63° C)

This extreme cold year also ravaged *Europe*, *Africa*, the *West Indies* and Northern *China*. The volcanic eruption also affected the rain patterns in 1816. The cooler temperatures delayed India's summer monsoon. It brought late torrential rains to India that spawned cholera epidemics. The monsoon in *China* caused massive floods in the Yangtze Valley.<sup>1, 21</sup>



In London, *England*, the wettest year in 23 years [1797-1819] occurred in 1816 with a rainfall of 32.37 inches. The driest years were 1807 [18.01 inches of rainfall] and 1802 [18.43 inches of rainfall]. In 1816 the middle of *Europe* was suffering from excessive rains, at the same time that of the North, or the parts east of the Baltic at least, about Dantzig [now Gdańsk, *Poland*] and Riga [*Latvia*], were suffering from a drought.<sup>175</sup>

In 1816, there was the coldest summer known in New England in the *United States*. Because many of the crops failed and as a result many farmers suffered great distress, the year was generally known as the “poverty year”. There was a frost and snow in all the summer months. For this reason, the year was also known as “eighteen hundred and froze to death”. Many of the farmers in New Hampshire could not afford the high cost of corn to feed their hogs and pig and instead substituted Mackerel in place of the corn. As a result the year was also called “the mackerel year”. At the same time there was a severe drought in the northwest region of New England and this added to the disastrous effect for the season.

— For the most part, April was a dry month. On 12 April, snow fell in Warren, Maine and stayed on the ground for nearly a week providing good sleighing. Danby, Vermont saw rain for most of April. In general the weather in New England was dry, warm and fine.<sup>199</sup>

— In May, the weather was exceedingly dry in Vermont. In Rhode Island, Connecticut and the southern portion of Bristol County, Massachusetts, the ground became so dry that forest fires of great extent raged in many places. These forest fires raged at Dartmouth, Massachusetts; at Providence, Rhode Island, and at Oxford, North Haven, Bristol, Derby, and New Milford, Connecticut. The month was not only dry but also unseasonably cold and uncomfortable. At Chester, New Hampshire, on 15 May, a recently plowed field froze so hard that it bore the weight of a man. In the vicinity of Weare, New Hampshire, blossoms appeared on the fruit trees on 20 May but four days later the area was hit by freezing rain. On 22 May, it snowed in Ohio. On 30 May, there was frost as far south as Virginia.

— June had a few exceedingly hot days but also many cold ones. On 6 June, ice formed to a thickness of an eighth of an inch [3 millimeters] on bodies of standing water. The weather was cold and squally, and snow fell in Maine, New Hampshire and Vermont, and in Cheshire, Peru, Windsor and other mountain towns in Massachusetts. In Maine, the frost and cold killed the martins and other birds, froze the ground, destroyed the corn and potatoes and forced workmen to put on great coats and mittens in order to keep warm. On 7 June, 4 inches [10 centimeters] of snow fell at Newton, Massachusetts and Hopkinton, New Hampshire. Snow also fell in Hallowell, Maine. Many cities experienced snow on 8 June. Snow was at a considerable depth in Waterbury, Vermont. In Williamstown, Vermont, it was 12 inches [30 centimeters] deep and in Cabot, Vermont, it was 18 inches [46 centimeters]. On the morning of the 8<sup>th</sup>, there were drifts of snow on many hills in and around Montpelier, Vermont and on the mountains it was more than a foot [30 centimeters] deep. Many sheep perished in the cold and many birds were found dead in the fields. On 9 June in Salem, Massachusetts, ice was drawn from a well at the tollhouse on the turnpike. On 10 June, there was a frost in Salem, and the frost was so severe at Montpelier, that it killed the foliage of the trees. At Hallowell, Maine, the earth was frozen a half-inch deep [1 centimeter]. The ice on some mud puddles was a quarter-inch [6 millimeters] thick and was strong enough to bear the weight of a man. A great variety of birds including hummingbirds, yellow birds, martins, and scarlet sparrows were so numbed by the cold that they allowed themselves to be picked up by hand. A great number died in the cold. On 22 June, there was ice in the tan yard at Chester, New Hampshire. It was so cold at Gilmanston, New Hampshire, that the men who worked the field resorted to wearing overcoats and mittens. Beginning on 23 June at Salem, Massachusetts there were 3 very hot days. The hottest was 101° F [38° C].

— There were frosts in northern New England in July and snow fell in Amherst, New Hampshire. On 8 July, the frost was so severe at Franconia, New Hampshire that it destroyed the beans. At Warren, Maine, the frost destroyed the corn [grain]. On 10 July, there was frost in the lowland at Chester, New Hampshire. On 17 July, there was abundant rain in New Hampshire, Vermont and the northwestern part of Massachusetts, and the crops began to recover. July was a warm month in Massachusetts. In Vermont, the drought continued.



— In August, there was frost, and at Amherst, New Hampshire snow fell. Most of August was warm, but on 20 August, there was snow in the mountains at Goffstown, New Hampshire. On 21 August, there was a severe frost at Keene and Chester, New Hampshire that killed most of the corn, potatoes, beans and vines, and also injured many crops in Maine. It was felt as far south as Boston and the Middlesex County in eastern Massachusetts, and in the western portions of the state as far as Stockbridge. The mountains of Vermont were now covered with snow and it was very cold. By the 29<sup>th</sup>, the frost extended down to Berkshire County, Massachusetts, where it killed the Indian corn.

— On 11 September, Springfield, Massachusetts received 2 to 3 inches [5-8 centimeters] of snow. The Vermont mountains were covered with snow. On 20 September, frost killed the corn and injured the potatoes at Hallowell, Maine. In New Hampshire, there occurred four of the greatest frosts ever known. On 26 September, the temperature fell to 23° F [-5° C]; on the 27<sup>th</sup> and 28<sup>th</sup> to 20° F [-7° C]; and on the 29<sup>th</sup> to 25° F [-4° C]. The frosts were very heavy in central Massachusetts. Before the end of the month, snow fell at Boston, Massachusetts and Wiscasset, Maine.

— The drought in Vermont continued during September. The area was without rain for 120 days. Devastating fires swept through the woods of Vermont, New Hampshire and Maine. In New Hampshire, the towns of Gilmanton, Guilford, Alton, Barnstead, Grafton and Rochester suffered from these forest fires. In Maine, the fires occurred along the Kennebec River, and as far east as Frenchman's Bay. In some places the smoke was so thick that it blotted out the sun.

— On 17 October, snow fell to a depth of 12 inches [30 centimeters] at Haverhill, New Hampshire.

— There was great destitution among the people the next winter and spring. The farmers in some instances were reduced to the last extremity, and many cattle died. The poorer men could not buy corn at the exorbitant prices for which it sold. In autumn, livestock sold at extremely low prices on account of the lack of hay and corn. A pair of four-year-old cattle was sold for \$39 in Chester, New Hampshire.

The year 1816 was called "The Year Without A Summer". It was given this name because in Bradford County, Pennsylvania in the *United States* in the year 1816, in every month there was a sharp or killing frost. January was mild as was February with the exception of a few days. The greater part of March was cold and boisterous. April opened warm but grew colder as it advanced, ending with snow and ice and winter cold. In May, ice formed half an inch thick [1 cm], buds and flowers were frozen and corn killed. Frost, ice and snow were common in June. Almost every green thing was killed and the fruit was nearly all destroyed. July was accompanied with frost and ice. In August, ice formed half an inch thick [1 cm]. A cold northwest wind prevailed all summer. Corn was so frozen that much of it was cut down and dried for fodder. The first two weeks of September were mild and the balance of the month cold with frost, ice forming to the thickness of half an inch [1 cm]. October was colder more than usual with frost and ice. November was cold and blustering with snow enough for good sleighing. December was quite mild and comfortable. The destruction of crops was so general that a famine almost resulted. Early settlers referred to this unfruitful year as "eighteen hundred and starve to death." <sup>178</sup>

Charles Pierce provided the following record of the weather in 1816 in Philadelphia, Pennsylvania in the *United States*: <sup>1</sup>

— The medium temperature of January was 32° F, and from the 1<sup>st</sup> to the 16<sup>th</sup>, the weather was mild, foggy and wet. On the evening of the 16<sup>th</sup> a reaction took place, and there was a deep snow, and the bridge at the falls of the Schuylkill fell. The weather afterwards cleared mild, and the remainder of the month was pleasant winter weather, neither severely cold, nor so mild as not to need a good fire. On two or three days some light snow fell.

— The medium temperature of February was 28° F. There were a few intensely cold days; but excepting these, the weather was tolerably mild during the month. There was snow, hail and rain, but neither fell in great abundance. During some cold days, the Delaware River froze over, but soon opened again opposite and below the city. The ice above the city, at Burlington, Bristol, Trenton, etc. did not clear out until the first of March.

— The medium temperature of March was 36° F, and there was a great deal of cold, windy, boisterous, and stormy weather, until past the middle of the month; but, notwithstanding the month came in like a lion, and continued very ferocious for more than two weeks, yet it went out as mild and gentle as a lamb. A great fresh [freshet] in the Ohio and Kentucky rivers caused a rise of more than fifty feet, and produced great destruction of property.

— The medium temperature of April was 47° F. It commenced mild, but did not maintain its credit; as Jack Frost came along mounted upon a cold, boisterous northwester, and made every thing tremble and shiver before him. The blustering snow squalls, which followed, would have been more suitable for January than April. After the wind lulled, ice formed on several nights, half an inch thick, which destroyed all the buds, and almost every green thing.

— The medium temperature of May was 57° F, and she was really a frosty jade. Her frowns were many, and her smiles few. Northerly winds, with cold frosty nights prevailed, until every green thing was either killed or withered. A melancholy hue appeared to seal the fate of all vegetable life. Buds and small fruit froze upon the trees. On some mornings there was ice from a quarter to half an inch thick, in exposed situations. Corn was replanted two or three times, and very little ever came to perfection. Westerly and southwest winds prevailed but seven days during the whole month. There were two northeast rainstorms.

— The medium temperature of June was only 64° F, and it was the coldest month of June we ever remember; there were not only severe frosts on several mornings, but on one morning there was said to be ice. Every green herb was killed, and vegetables of every description very much injured. All kinds of fruit had been previously destroyed, as not a month had passed without producing ice. From six to ten inches of snow fell in various parts of Vermont; three inches in the interior of New York; and several inches in the interior of New Hampshire and Maine.

— The medium or average temperature of July was only 68° F, and it was a month of melancholy forebodings, as during every previous month since the year commenced, there were not only heavy frosts, but ice, so that very few vegetables came to perfection. It seemed as if the sun had lost its warm and cheering influences. One frosty night was succeeded by another, and thin ice formed in many exposed situations in the country. On the morning of the 5<sup>th</sup> there was ice as thick as window-glass in Pennsylvania, New York, and through New England. Indian corn was chilled and withered, and the grass was so much killed by repeated frosts, that grazing cattle would scarcely eat it. Northerly winds prevailed a great part of the month; and when the wind changed to the west, and produced a pleasant day, it was a subject of congratulation by all. Very little rain fell during the month.

— The medium temperature of August was only 66° F! and such a cheerless, desponding, melancholy summer month, the oldest inhabitant never, perhaps, experienced. This poor month entered upon its duties so perfectly chilled, as to be unable to raise one warm, foggy morning, or cheerful sunny day. It commenced with a cold northeast rainstorm, and when it cleared the atmosphere was so chilled as to produce ice in many places half an inch thick. It froze the Indian corn, which was in the milk, so hard, that it rotted up on the stock, and farmers mowed it down and dried it for cattle-fodder. Every green thing was destroyed, not only in this country but also in Europe. Newspapers received from England said, "It will ever be remembered by the present generation, that the year 1816 was a year in which there was no summer." Indian corn, raised in Pennsylvania in 1815, sold (for seed to plant in the spring of 1817) for four dollars per bushel in many places.

— The medium temperature of September was 62° F, and it produced more than two weeks of the mildest and pleasantest weather there had been during the whole season, for such a length of time; but on the 17<sup>th</sup>, after some rain fell, the wind changed to northwest, and a chilly, frosty atmosphere ensued; and the 23<sup>rd</sup> brought a cold north-east wind and a violent equinoctial rain storm, which continued for two days. After which it cleared with a brisk northwest wind, and for several succeeding nights water froze a quarter of an inch thick in shallow ponds. About five inches of rain fell during the month.

— The medium temperature of October was 52° F, and it produced more than its usual quantity of cool days and very frosty nights. On several mornings ice was a quarter of an inch thick. There was, however, one week of very mild and pleasant weather with a balmy southwest wind. About two and a half inches of rain fell during the month.

— The medium temperature of November was 41° F. This was indeed a cold blustering month, and there was rainstorms and snowstorms; cold northwest and northeast winds, with a few balmy westerly breezes, and mild days. About six inches of rain and four inches of snow fell, which made some sleighing in the country, but very little in the city. It froze very hard several nights, and some days were cold enough to sit by a good fire.

— The medium temperature of December was 32° F, and there were fourteen mild and pleasant days in the month. During the other seventeen days the weather was very variable. About six inches of snow and three inches of rain fell. The temperature of the whole year was only 49° F; it being the coldest year we have on our record. Although there was no uncommonly cold weather during the three winter months, yet there was ice during every month in the year, not excepting June, July and August. There was scarcely a vegetable came to perfection north and east of the Potomac River. The cold weather during the summer, not only extended through America, but throughout Europe. One of the most celebrated meteorologists in England, on reviewing the weather of the year, said, "it would ever be remembered that 1816 was a year in which there was no summer, and the temperature of the year (as a whole) was the lowest ever known." It was also the coldest summer ever known in the West Indies and in Africa. The medium temperature of the whole year in Philadelphia was only 49° F.

James Winchester of Vermont in the *United States* described the remarkable summer of 1816. “It is said that in June of that year snow fell to the depth of three inches in New York, Pennsylvania, and New Jersey on the 17<sup>th</sup>; five inches in all the New England States, except three inches in Vermont. There was snow and ice in every month of this year. The storm of June 17 was as severe as any that ever occurred in the depth of winter; it began about noon, increasing in fury until night, by which time the roads were impassable by reason of the snow drifts; many were bewildered in the blinding storm and frozen to death. During June, July, and August the wind was continuously from the north, fierce and cold; July was colder than June, and August colder than July; there was a heavy snowstorm August 30<sup>th</sup>. The first two weeks in September brought the first warm weather of the year, but on the 16<sup>th</sup> of that month the cold weather suddenly returned and continued increasing until winter. The year 1816 had neither spring, summer, nor autumn. The only crop of corn raised in that part of Vermont that summer was saved by keeping bonfires burning around the cornfield night and day. The crop of 1817 was raised from the seed of 1815. The summer of 1817 was one of the hottest and driest known in that region.”<sup>115</sup>

In northern *France* in 1816, the weather was unusually cold, with strong winds, cloudy skies, barometric changes and excessive moisture, without intermission.<sup>79</sup>

In Burgundy, *France*, the grape harvest began on 15 October. This was the latest harvest date since 1809. The yield was exceptionally small and the wine was of poor quality. It rained in Burgundy almost continuously from May to December. The cereal harvest was generally inadequate, and the median price of a hectoliter of grain rose to 35 francs. In the countryside of Toulouse, *France*, spring and summer were cold, wet, and rainy. The months of September and October only were dry and a little warm. The year was exceptionally cold and wet, and very strange. The summer in *France*, *Switzerland*, and *Germany* were remarkable because of the rain. In *Denmark*, *Sweden* and *Russia* the weather was very nice. To complete the description of this large climate anomaly, a drought occurred in the lower *Languedoc* the caused the failure of crops. In Sorèze in southern *France*, the harvest was late. The greater part of the grain had been stored due to the rain. The maize was sown very late and with great difficulty. When harvested, the maize earned very little. There were no grapes, no fruit, the food was alone was sufficient but spoiled. In July, corn in the south sold for 36 and 40 francs per hectoliter and the grain sold for 48 to 50 francs per hectoliter.<sup>62</sup>

Almost continual rainfall, cold and misfortune plagued northern *France* in 1816. The damp, cold weather delayed the harvests. It rained in the spring, especially in summer, then in the fall. Rain prevented the harvest in much of northern regions. Paris had its share with one hundred sixty-seven rainy days and 21.5 inches (546 millimeters) of annual rainfall. The month of July alone produced twenty-six days rainy days. The Seine River burst its banks and on December 22 was at 18 feet (5.48 meters) above low water mark of 1719. The rainfall of 1816 was observed in several localities of the southern *France*, including Toulouse, Joyeuse, and Viviers; but was incomparably weaker and less general. Marseille, in particular, received only 11.7 inches (298 millimeters) of rainfall compared to its normal 21.3 inches (540 millimeters). Montpellier received only 17.9 inches (455 millimeters) of rainfall compared to its normal annual figure of 30.1 inches (764 millimeters); with sixty-four rainy days instead of eighty-two.<sup>79</sup>

On 2 January 1816 at Strabane, *Ireland*, there was an inundation caused by the melting of the snow on the surrounding mountains. As a result, most destructive floods were occasioned.<sup>47, 90, 92</sup>

On 12 January 1816, there was an inundation at Strabane, in *Ireland*, by the melting of the snow on the surrounding mountains, the most destructive flood that had been witnessed for 20 years.<sup>43, 128</sup>

In *England* in February, great floods occurred in Northumberland and Durham.<sup>47</sup> This was the greatest flood ever remembered for this location.<sup>43</sup>

On 12 February 1816, the greatest flood ever remembered occurred in Northumberland and Durham, *England*.<sup>128</sup>

On 27 February 1816, considerable damage was done at Birmingham, Liverpool, Manchester, and other northern towns in *England*, by tremendous gales of wind.<sup>128</sup>

In March 1816, fifty-three villages in the great Werder in eastern *Germany*; forty-nine villages in the districts of Siegenhoff [Siegenhof, *Germany*]; and seventeen Elbing [Elbląg, *Poland*] villages were under water.<sup>43</sup>

On 21 March 1816 in *Germany* [now part of *Poland*], the Vistula River overflowed; many villages were laid under water, and great loss of life and property was sustained.<sup>47, 90, 92</sup>

In *Ireland* on April 21/22, there were great floods at Londonderry.<sup>47, 92</sup>

In June 1816, there was a major flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 45.5 feet (13.88 meters) above the water mark at Windsor.<sup>99, 109</sup>

On 10 June 1816 in *Bavaria*, there was a hailstorm. All the crops and produce on the banks of the Danube River, near Munich, *Germany* were destroyed for a circle of 10 leagues (30 miles, 48.3 kilometers).<sup>93</sup>

On 28 June 1816 in *Germany*, there was a dreadful hurricane near Vibbel (10 miles outside Frankfurt). The storm tore down trees and buildings. "The hail lay 2 feet (0.6 meters) deep in the streets and fields. It was so dark that it was necessary to use candles."<sup>93</sup>

A rare June snowstorms struck Vermont in the *United States* dumping six to ten inches (15-25 centimeters) of snow; the interior of New York state received three inches (8 centimeters); and several inches fell in New Hampshire and Maine.<sup>1</sup>

On 2 July 1816, a dreadful storm fell upon the town of Worschetz, in the county of Timeswar and of 2,600 buildings in the town, none escaped without damage.<sup>43</sup> [There appears to be an unresolved conflict in this passage. It is believed that the town of Worschetz is now Vršac, *Serbia*. It is also believed that the county of Timeswar now is the region around the town of Timișoara in *Romania*.]

On 11 July 1816 in *Hungary*, there was a dreadful hailstorm at the town of Worschetz. Of the 2,600 buildings of which the town was composed, a great many were seriously injured.<sup>93</sup> [Again there appears to be an unresolved conflict in the location of Worschetz.]

In *Germany* during June and July, the harvest greatly endangered from continued rains.<sup>47</sup>

On 21 July 1816 in *England*, there was a great hailstorm in Cumberland, Staffordshire, and Lancashire. The storm caused great destruction of crops, trees, and glass.<sup>93</sup>

In June and July 1816, at Thiel, Arnheim [Arnhem, *the Netherlands*], Zutphen [*the Netherlands*], and numerous other places on the continent, the harvest was nearly destroyed by inundations from continued rain.<sup>43</sup>

In Cumberland and Westmoreland, *England* in August, there was a great storm of wind and hail which desolated these counties.<sup>57</sup> Some of the pieces of ice were an inch in diameter.<sup>43</sup>

In August 1816 in *England*, there were severe hailstorms in the counties of Cumberland and Westmoreland.<sup>93</sup>

In August 1816 in *England*, there were great quantities of rain that fell. The harvest was much delayed. This also occurred on the European Continent.<sup>92</sup>

In *England* on the 31<sup>st</sup> of August, there was an awful gale, by which a great number of vessels were lost, and much damage done on the coasts.<sup>57</sup> And much damage was done to the shipping in general on the English coast.<sup>43,90</sup>

On 31 August 1816, many vessels were lost and much damage done to the shipping in general on the *English coast*, by tremendous gales of wind.<sup>128</sup>

In *England*, there was a considerable fall of snow in the counties of Cambridge and Huntingdon, by which much damage was done to the gardens on 2 September 1816.<sup>43</sup>

On 15 September 1816, it was reported that considerable damage was done at *Dominica*, on shore and among the shipping, by a gale of wind.<sup>128</sup>

In 1816, a hurricane struck *Puerto Rico*. The storm caused two deaths on land and part of the crew from 3 ships perished.<sup>141</sup>

In 1816 red snow fell on the mountains of *Italy*.<sup>128</sup>

*Ireland* suffered the effects of famine in 1816, 1822 and 1831.<sup>188</sup>

A drought struck New England in the *United States* in 1816. This summer, which was known as the cold one, was also a very dry one in many regions. In Vermont, no rain fell during May and very little in Connecticut. During June intense heats were followed by freezing weather, with snow squalls in several of the New England States. The snowfall on the 8<sup>th</sup> of June in Vermont amounted in some places to 12 and 18 inches. In July, there was abundant rain in northwestern Massachusetts and New Hampshire; from that time a drought continued until October 22, having prevailed for one hundred and twenty days in Vermont. Owing to the cold and the drought the crops were almost a complete failure.<sup>138</sup>

In 1816 during the period between 21 October and 18 November, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui.<sup>153</sup>

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**Winter of 1815 / 1816 A.D.** The winter of 1816/1817 was one of the severest in *Iceland*. From the beginning of February 1817 to the end of March, the weather produced changeable winds and heavy snow. From the beginning of April until the 1<sup>st</sup> of May, there was fine and mild weather with thaw; but on May 2 a storm from the north with much snow; and from that day until July 7 there was northerly winds with frost and cold weather. The Greenland drifting ice, which had left the northern lands in the beginning of April, returned again in the first days of May, and surrounded the whole of the western, northern and eastern land. From about July 7 the weather has been very dry and often pretty warm.<sup>175</sup>

On 18 and 19 January, the Potomac River froze completely over at Alexandria, Virginia, in the *United States*. From 20-22 February, snow fell to the depth of 3 feet (0.9 meters) on a level in Boston Massachusetts and in many parts of New England.<sup>1</sup>

On 21 January 1817, there was a dreadful storm at Plymouth, *England*. Damage done to the new Breakwater to a great amount.<sup>128</sup>



On 29 January 1817, a mist prevailed at Naples, *Italy*, so dense as to produce darkness for several hours.<sup>175</sup>

John Pintard, a resident of New York City in the *United States*, wrote to his daughter in February 1817 that with the bitter cold he was "obliged to hold my pen to the fire to thaw the ink." "Indeed my ideas are almost congealed."<sup>18</sup>

During the winter of 1816-17, Mrs. Clement Paine from Athens, Pennsylvania in the *United States* wrote in her diary: "February 15, 1817, the cold is very intense. Mr. Smith says it is the most severe winter we have had for 38 years. There are many sufferers on account of it. The extreme distress it brings is such as I have never known. Yesterday the cold really terrifying. The streams being frozen, a famine almost prevails and I am under serious apprehension that some will actually perish from want. We have baked our last bread, but it is not for myself that I fear. It is for those who have no bread nor other comfort, and many such there are around us. March 2<sup>nd</sup>, cold, famine and pestilence seem every day to increase and threaten desolation. The oldest persons of our acquaintance remembers no such time. A mother thinly clad came 3 miles [4.8 km] through the storm to beg a trifle for her children to eat. I have partially relieved three families to-day. The one best provided for had nothing save some frozen potatoes and milk—a family of nine children. March 5<sup>th</sup>, the very great and extreme severity of the weather has abated. It has been remarked by elderly people that such a severe winter has not been known since 1780."<sup>178</sup>

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**1817 A.D.** During the nights of 26 and 27 February 1817, there was a hurricane at Glasgow, *Scotland*, accompanied with rain, hail, thunder and lightning. The wind was extremely violent; the thunder awfully loud, and the deep red flashes of lightning cast a glare during the whole night. The hailstones broke the windows in all directions. This storm struck Dublin, *Ireland* on 27 February and Amsterdam, *the Netherlands* on the night of the 25<sup>th</sup>.<sup>175</sup>

On 27 February 1817, a tremendous gale of wind, which did considerable damage at Birmingham, Liverpool, Manchester, and other northern towns in *England*.<sup>43</sup>

On 27 February 1817 in *Ireland*, there was a hurricane with heavy hail.<sup>93</sup>

In February 1817, there was a major flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 46 feet (14.03 meters) above the water mark at Windsor.<sup>99, 109</sup>

On 7 March 1817 in *Germany* for some days past, the waters rose in a terrible manner on both sides of the Rhine River, and that the river had reached uncommon heights. It was about the same as it was at the end of the year 1800. The Kinzig and the Schuler Rivers were not quite so destructive as they had been two months earlier. The alarm bell was frequently sounded in the communes about Kehl, *Germany*, in order to collect people to strengthen the Rhine dikes. As a result the danger was averted; the bridge of boats at Kehl was still standing, and the communications between the two banks open. But on the left bank the accounts were melancholy. The rivers there had everywhere overflowed their banks. Great ravages have been caused about Strasburg [*Strasbourg, France*] by the Ill and Breusch Rivers. All the fields and gardens around Strasburg formed one great lake. All the streets near the river were underwater and communications were kept up by boats. The Ill has done still greater damage around Schlettstadt, *Germany*. Several persons and a quantity of cattle perished.<sup>175</sup>

On 20 March 1817, the floods were so great round Oxford, *England*, that the city appeared like an island.<sup>128</sup>



In 1817, during the spring equinox [around 20/21 March], a disastrous hurricane mixed with thunder, rain and hail, attacked Paris, *France* for nearly twenty-four hours.<sup>79</sup>

In France there was a flood. In March 1817, the Seine River in Paris, *France*, at the bridge “Pont de la Tournelle” reached a height of 6.3 meters (20.7 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

On 26 May 1817, the rains began to fall in torrents in Stutgard [Stuttgart], *Germany*. The rains continued for three days and nights. All the rivers overflowed and it produced an inundation far surpassing anything ever recollected in that country. The lower part of the small town of Constatt [Cannstatt], a league from Stutgard, was under water, and the inhabitants evacuated the suburbs. Several individuals and many animals were drowned at Constatt. The rains ceased on the evening of the 28<sup>th</sup>.<sup>175</sup>

On 21 June 1817 in *England*, there was a great hailstorm in Gloucestershire and Wiltshire.<sup>93</sup>

On 21 June 1817, the temperature reached 103° F in the shade at Gloucester, *England*. The intense heat produced thunderstorms in many parts of the country. In the vicinity of Gloucester and Tewkesbury, individuals experienced considerable loss by hail, which broke many windows. At Lyneham, near Chippenham, a waterspout inundated a considerable quantity of land, which caused a rapid rise of the River Avon. Salisbury and its neighborhood experienced the brunt of the storm. Forty sheep, of a flock belonging to Mr. Swayne of Langford were struck down by lightning, and six sheep and six lambs were killed. Several large trees were blown down by the storm at Durnford and West Harnham.<sup>175</sup>

On 23 June 1817 in *England*, there was a hailstorm in Somersetshire.<sup>93</sup>

On 23 June 1817, a violent storm struck in the vicinity of London, *England*. The rain fell in such torrents that the sewers were soon choked and the lower apartments of many houses were flooded. Almost every hot-house, green-house and skylight sustained glass damage from hailstones, many of which were two inches in circumference.<sup>175</sup>

On 25-27 June 1817, storms of rain, hail, thunder and lightning caused severe damage in *the Netherlands*.<sup>175</sup>

On 27 June 1817, several waterspouts were observed to the north of London, *England*. These waterspouts darted in and out of dark clouds.<sup>175</sup>

On 1 July 1817, a tempest with a terrible hailstorm almost entirely laid waste the fields of Horst and Viechhof in Lauenburg, *Germany*. So many windows were broken, that there was not enough glass in town to repair them. The hail was jagged, and many pieces were greater than 1-inch long.<sup>175</sup>

All the accounts from the eastern part of *Switzerland* announced the terror and damage caused by the late inundations. The storms carried desolation into the lower parts of the Canton of Glaris. The Linth River broke its dikes in three places. The bridge of Glaris and Helstal fell down. The bridge at Miolis was threatened with ruin. Gessau, Rutti, Fleriscue, and Hagelschauer in Teggenburg, felt the whole violence of the storms on 4 and 5 July 1817. All the torrents overflowed. The bridge at Aberglatt was ruined. At Basle, the Rhine River rose so much on the 6<sup>th</sup>, as to inundate the city as far as the fish markets. The citizens were forced to cross the street in boats. The Rhine River continually brought down trees, parts of buildings and drowned animals. These numerous wrecks indicated how this storm ravaged the lands upstream. At Lake Constance, the lake was much higher on the 6<sup>th</sup> than in 1666, and even some inches higher than in 1560. In spite of unremitting exertions, the bridge of Lindau was carried away. On the banks of the lake many communes were underwater. Because the vents by which the waters must run off

when the lake falls, being too small, a flood condition continued for a long time. In the Lower Rhinthal, the surface of the waters which covers the fields and the roads, and upon which one could navigate between half ruined houses, was 3 leagues [10 miles] in circumference. At Horn, and all along the lake, a great many buildings were abandoned; the waters threatened the foundations of the most solid edifices. In the Oberland, many bridges were carried away. The fields, the meadows, the plantations were entirely submerged, and pieces of the soil were seen floating about, torn up by the fury of the waters, covered with potatoes, vegetables, and hay. On the 9<sup>th</sup>, during a violent tempest, the lightning struck the village of Deterswell, and burnt a house. Near Neutingen, many cattle were killed by lightning.<sup>175</sup>

On 8 July 1817, it was reported that there were great inundations in *Switzerland*.<sup>128</sup>

On 11 July 1817, a tornado passed near Derby, *England*. It tore up a fine ash tree by the roots but passed over the city without doing harm.<sup>175</sup>

On 11 July 1817, a waterspout (tornado) entirely overturned 16 or 17 houses and caused considerable damage to several others in the village of Wattenbeck [Wattenbek], *Germany* near New Munser.<sup>175</sup>

On 11 July 1817, a dreadful hailstorm struck Pforzheim, Ispringen and Eukingen, *Germany*. The hailstones were all triangular and as large as pigeons' eggs. Many persons were severely wounded in the hand and head. A great number of windows were broken. The fine cornfields were almost entirely laid to waste in a quarter of a hour.<sup>175</sup>

On 28 July 1817 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>

On 28 July 1817 at around 6 o'clock in the evening, a dreadful hailstorm from the west struck London, *England*. The storm lasted 7 minutes and most hailstones were the size of hazel nuts. Innumerable panes of glass in houses having a western aspect were damaged.<sup>175</sup>

*Germany* and *France* suffered famines in 1817.<sup>96</sup>

In 1817, parts of *Germany* were in a state of famine.<sup>155</sup>

A very pronounced drought ruled *France* in 1817. The amount of rainfall at Viviers in 1817 dropped from the yearly average of 35.8 inches (909 millimeters) down to 30.5 inches (774 millimeters). At Toulouse, it dropped from 23.8 inches (604 millimeters) down to 19.5 inches (496 millimeters). At Montpellier, it dropped from 30.1 inches (765 millimeters) down to 21.6 inches (548 millimeters). At Marseille, it dropped from 20.8 inches (528 millimeters) down to 9.1 inches (230 millimeters). At Joyeuse, it dropped from 50.4 inches (1,281 millimeters) down to 37.3 inches (947 millimeters). Paris suffered less than the province during the drought of 1817. The amount of rainfall in Paris dropped from the yearly average of (540 millimeters) down to (505 millimeters) in 1817. The level of the Seine River in Paris on September 22, at the bridge Pont de la Tournelle fell close to the zero water mark of 1719.<sup>79</sup>

Beginning in the early part of 1817, southern *Europe* was almost desolated by a severe drought. In June, the lake of Ouveillan in southern *France* dried up. The drought drained up many fountains and wells at the mouths of the Rhône & the Var rivers, and the Lower Alps. In July, such was its intensity in the department of the Eastern Pyrénées that it converted into salt a great part of the waters of the lakes of Saint Nazaire and Villeneuve in *France*. At Marseilles and Montpellier, *France* the greatest inconvenience was also felt for the want of water.<sup>190</sup>

The year 1817 was also remembered for unusual heat. On 7 June, the thermometer at Paris, *France* rose to 26° C [79° F], where it remained the whole day. On the 18<sup>th</sup> it was at 28° C [82° F], and on the 20<sup>th</sup> it

was at 30° C [86° F]. In some parts of *Great Britain* it rose even higher. At London, *England* on the 28<sup>th</sup>, between three and five o'clock in the afternoon, it was 39° C [102° F] being 10° C above the greatest heats of ordinary summers. In the north of Asia, on the contrary, there was scarcely any summer at all this year, the cold continuing until the 21<sup>st</sup> of June, the time at which the fine season in the northern parts of *Siberia* usually terminates. In the hyperborean regions of Europe, again, the heat was so intense that the coast of *Greenland*, which had been covered for ages with enormous masses of ice, were completely liberated, and the sea was laid open as far as the mountains of Spitsbergen [archipelago in the north most part of *Norway*], and even as high as the 84° of Latitude. Enormous masses of ice descended into the Atlantic Ocean as far as the 40° of Latitude without melting. The months of June, July, August and September were of a stifling heat, especially at Rome, at Naples, and at Trieste, *Italy*, where it was impossible to go outside until the evening. The warmest day at Perpignan, *France* was on the 4<sup>th</sup> of July; at Marseilles, *France* on the 17<sup>th</sup> of August, when the temperature, exposed to the sun, remained stationary at 44° C [111° F]. In Cayenne, *French Guiana* (in South America), last winter, which normally is the rainy season in that country, was unknown. It ordinarily lasts for a total of 6 months, but last year, there were only sixty-two days of rain, and that rain was slight and intermittent.<sup>190</sup>

A series of storms stung *Europe* in 1817.<sup>190</sup>

- On 19 May, a storm struck Rheims [Reims, *France*]. After 2 hours of heavy rain, a large black cloud gathered over the city and burst upon it with a horrible crash releasing a great hailstorm. For five minutes the hail fell in torrents. Whole roofs were broken; the trees of gardens were chopped to pieces; and many small animals were killed.
- Also on 19 May, a hailstorm struck many communes along the Upper Garonne River, in southwestern *France* with equal severity.
- On 20 May, Semur in the Côte-d'Or department of *France* and the rich vineyards in its neighborhood were visited by a frightful storm. The rain and hail fell for a whole hour in a continuous flood.
- On 7 June, part of the communes of Courçon, Beaugas, Moulinet, and the Parisian suburb of Bondi, *France* was entirely laid to waste by a severe hailstorm. Not a stalk of corn [grain] was seen standing, nor a leaf remained on the vine. But the immense rainstorm that fell during the night caused even more harm. It caused the earth to become unsettled which then covered all the meadows with sand [landslides].
- Also on 7 June, a violent storm struck the canton of Zurich in *Switzerland*, the city of Pau (Lower Pyrenees) in *France*, and surrounding communities. Some hailstones fell the roofs of houses and killed animals.
- On 8 June, fourteen communes situated in the valley of Loire, *France* were nearly inundated by heavy rain and large hail.
- On 9 June, twenty-seven communes situated in the arrondissement of Ambert in central *France* were nearly inundated by heavy rain and large hail.
- On 10 June, a severe storm swept over the canton of Saint Gall [St. Gallen], in *Switzerland*. The storm threw down a great number of houses at Wittenbach, Berg, Horn, and Ober-Steinbach.
- On 12 June, a storm struck in the neighborhood of Casan [Kazan], *Russia*. The storm was concentrated in the village of Oura, inhabited by Tartars living in a state of ease and famous for their fabrics of red colored cotton. A rivulet which crossed the village grew into an immense torrent, carrying along with it men, trees and homes to the distance of 20 versts [13 miles, 21 kilometers].
- On 14 June, a storm left horrible devastation in *Belgium*. The storm was so violent that it tore up a number of large trees, overturned many granaries and some houses. It shook all the houses for the distance of a league [3 miles, 4.8 kilometers].
- On 15 June, a hailstorm struck Lierre in the Low Countries [Lier, *Belgium*]. The hailstones were the size of pigeon's eggs.
- Violent storms also struck *Europe* on 22, 26, 27 and 29 June causing great havoc.
- In June, the heat was very excessive in *England* and produced storms, which did everywhere a great deal of damage. At Tewkesbury, they were accompanied with large hail. Salisbury was struck by a storm with torrents of rain and large pieces of ice that ravaged the area. Trees were shattered, men and beasts

wounded and houses overturned.

- On 3 July, a violent storm struck the town of Agen and many communes of the department of Tarn in southwestern *France*. Another storm carried devastation into the valley between two mountains of Lure and Lemeron (the mouths of the Rhône River) over a space of more than fifteen leagues [45 miles, 72 kilometers].
- On 4 July, hail the size of filberts fell at Munich, *Germany* and Lons-le-Saunier, *France*.
- On 10 July, many leagues in the departments of Yonne and Ain, *France* were in less than an hour laid entirely to waste by hailstones the size of pigeon's eggs.
- On 11 July, a storm of great fury struck Pforzheim in southwest *Germany*. The hailstones were the size of hen's eggs. Several men and beasts were killed and the hopes of a fine harvest wholly destroyed.
- During the night of 11 July, a storm struck the cantons of Châteauneuf and Eymoutier in the department of Upper Vienne, *France*. The hail struck with such great force that even the chestnut trees were destroyed. Two days after the storm, heaps of hail still lay on the ground in abundance.
- On 31 July, hail fell at Manchester, *England* and its neighborhood. The hail was of such extraordinary size that two persons were killed by it at Pendleton, and many others were grievously wounded.
- On 16 August, in the departments of Aisne and Ardennes in northern *France*, the reapers were collecting one of the finest harvests known in a long time, when the sky became suddenly obscured by thick heavy clouds. A hailstorm struck with such impetuous force, that in ten minutes the crops and fruits of every description in the territory of four villages were torn to shreds. Some of the hailstones were three pounds in weight.
- On 22 August, after two months of excessive dryness, a dreadful tempest struck Rome, *Italy*. More than thirty of the largest trees of the villa [Pamphili?] were torn up by the roots.
- On 26 August, there was a hurricane [tornado] at the estate of Gourgivaux near Épernay in northern *France*. It only lasted 3 minutes but in that time it tore up and destroyed a number of trees, carried off several roofs, knocked the barn of the farm topsy-turvy, and scattered to the winds 300 sheaves.
- On 27 August, in the valley of Pia near Genoa, *Italy*, there was another hurricane [tornado] of a longer duration. Vines, trees of every kind, even garden walls were destroyed.
- On 3 September at Liverpool, *England*; on 11 September at Paris, *France*; on 12 September at Antwerp & Brussels, *Belgium* and several other places in the *Low Countries* [Belgium, the Netherlands, and Luxembourg]; on 22 September at Schaffhausen, *Switzerland*; and on 28 September at Memel [now Klaipėda in *Lithuania*] there were violent and destructive storms, in which in most cases the size and quantity of hail was remarkable.
- On 1 October, a remarkable storm struck the communes of Mehun-sur-Yèvre, Vasselay and others in the department of Cher in central *France*.
- On 3 October, a severe storm struck the neighborhood of Cahors in southwestern *France*.
- On 4 October, the old town of Nocera, *Italy* at the foot of the Apennine mountain range was struck by a tremendous hailstorm. This was the third time in 5 months that the area was struck. This storm destroyed all that was spared by previous tempest. Its superb olives, its fruit trees, and its [grape] vines were completely destroyed. A number of cattle were killed. This might be due to the shape of the hailstones, which were very angular in shape. The largest hailstones weighed six ounces.
- Also on 4 October, a severe storm struck Foligno, Assisi and Perugia in *Italy*.
- On 13 October, a severe storm struck Alicant [Alicante, *Spain*]. In a quarter of an hour, this town and its neighborhood, which produced a great abundance of exquisite fruit and an excellent wine, became a great wreck.

In 1817, inundations of rivers and lakes desolated almost all the countries of Europe, particularly *Switzerland*, the west of *Germany*, the *Low Countries* [*Belgium*, *the Netherlands*, and *Luxembourg*], *Holland* [now *the Netherlands*], the north of *Spain* and in the *United States* (Kentucky and New York). In the first days of June, the Rhone River tumultuously burst its banks, at the same moment that the waters of the Rhine and the Aar Rivers attained a prodigious height. The lakes and rivers and the torrents of *Switzerland*, Lake Constance, the Necker, the Mein, the Meuse, the Wahl, etc. overflowed upon all points.

The detail of the disasters, which they caused, was fearful. During the three months their waters covered whole countries, menaced the foundations of the most solid edifices, and covered the roofs of houses, while they kept constantly sweeping away trees and flocks, and a vast wreck of things of all sorts. Fields cultivated with the greatest care were converted into morasses [swamps]. Large tracts were turned into deserts of mire. The finest harvests were everywhere destroyed. On 26-28 August, a south wind, which prevailed for more than a month was followed by a hot rain, which melted the glaciers in such a manner that the Rhine River rose anew beyond all former examples, and presented, until 23 September, the appearance of a vast lake. The torrents of the Tyrol [in *Austria*] were swollen higher than their greatest height in 1789. The Sill River, which falls into the Inn at Inspruck, burst its banks and carried away several bridges, with a vast quantity of trees, houses, cattle, etc. On 9 November, a very violent storm burst upon the department of Ardèche in south-central *France*. The waters rose to a prodigious height and committed great destruction in the arrondissements of Tournon, Privas, and Argentière.<sup>190</sup>

After long intervals of heat, of abundant rain, and dreadful storms, Paris, *France* was visited on 23 August with squalls of cold rain, and weather that was truly autumnal. The equinoctial winds raged with violence. In Paris, the winds tore up the stoutest trees by the roots. On 23 September, the weather was mild, and warm. But the next day a strong wind from the northeast dried up the earth and gave all the chill of winter. On 10 October, Parisians felt as if they were in the middle of January. This unseasonable cold was also felt in the south. After more than ten months without rain, and great summer heat, on 15 October, the temperature had become suddenly icy cold and the Parisians had to start fires in order to keep warm. The damage occasioned by this unseasonable cold in the nights of 22 & 24 August to the standing crops of all descriptions, was very great in the northern provinces of *Sweden*, particularly Helsingland [Hälsingland] and the regions of [Gefle] Gävle in *Sweden* and Franconia and Wirtemberg in *Germany*. During the beginning of October, a great quantity of snow fell in *Scotland*, principally in the counties of Rose and Aberdeen, where it lay two feet deep. On 4 October, there was snow on the fertile plains of Bayreuth, *Germany* to a depth of three inches. On 9 October, it covered the mountains of Urach in *Germany*, Vosges in eastern *France* and Brisgau [Breisgau] in *Germany*. On 12 October, there was snow on the elevated plain of Woivre, in the department of Meuse, *France*. On 16 October, there was snow on the mountains of Lozère and the neighborhood of Mende in *France*. It was feared that the upcoming winter would be very severe but the months of November and December produced spring-like weather in Paris.<sup>190</sup>

On 21 October 1817, a tremendous hurricane struck the *West Indies*. The storm was particularly severe at the island of *St. Lucia*. All the vessels in the port were entirely lost. The Government-House was blown down, and all within its walls, comprising the governor, his lady, and child, his staff, secretaries, and servants, amounting to about thirty persons, were buried in its ruins. Not one survived the dreadful storm. The barracks of the officers and soldiers were demolished, and all within them (about two hundred persons) died. All the estates on the island were reduced to a heap of ashes. At the island of *Dominica*, nearly the whole town was inundated, with an immense destruction of property.<sup>191</sup>

On 21 October 1817, a hurricane struck *St. Lucia*, *Dominica* and *Barbados*. One account cites more than 252 deaths, while another cites more than 200 deaths.<sup>141</sup>

On 21 October 1817, it was reported that a dreadful hurricane struck the *West Indies*. On 23 October, it was reported that a hurricane at Barbados and *St. Lucia*. Much shipping was destroyed. The hurricane also struck Martinico, *Dominican Republic*.<sup>128</sup>

On 21 October 1817, a hurricane struck the *West Indies* and was thought to be the most destructive since 1780. The ravages appeared to have been extended in breadth at least from the 12<sup>th</sup> to the 18<sup>th</sup> degree of North Latitude, but to have affected principally the islands of *Dominica*, *Martinique*, *St. Lucia* and *St. Vincent*; and to a lesser degree *Barbadoes*, which lay to leeward with regard to the storm. The wind was



stated to have set in at daybreak from the northwest and to have raged with tremendous violence, with occasional falls of rain, until three in the afternoon, when becoming southerly it abated, but did not immediately cease. At St. Lucia, the government house and barracks were blown down and their inmates buried in the ruins. The crops and forests, in short the whole face of the island was desolate and every vessel in the port lost.<sup>175</sup>

A letter dated 23 October 1817 from L.R. Baines, the Colonial Secretary of *St. Lucia* to the Governor of Barbadoes reported the hurricane caused the following damage:<sup>175</sup>

“Scarcely a dwelling or a Negro house is left standing; the mills and outbuildings either unroofed or razed to the ground; nearly the whole crop of cane torn up by the roots, and the face of the island, which was luxuriant on the 20<sup>th</sup>, now bears the appearance of an European winter.”

“The town of Castrees [Castries] is nearly in ruins, and the vessels, about 12 sail, are on shore, not one of which is expected to be saved. The whole of the buildings of Morne Fortunée [Morne Fortune] and Pigeon Island were blown down, with the exception of the magazine and tanks.”

“His Excellency and family were taken from under the ruins of his residence (the Commandant’s quarters), where he remained in the hope that it would have resisted the gale; but he has, unfortunately, suffered for his imprudence.”

A letter dated 10 November 1817 from St. Pierre, *Martinique* reported:<sup>175</sup>

“On the 21<sup>st</sup> of October, this Colony was visited by the most furious hurricane ever witnessed here; the details of this sad disaster would be equally long, as painful. The loss of nearly 1800 lives, 25,000 hhds. [hogsheads] of sugar of the present and next crop, incalculable losses in buildings, animals, and the necessaries of life, have occasioned a general desolation, independently of the great anxiety caused by nine-tenths of the shipping, which were in different ports of this island, being either wrecked, damaged, or missing. *St. Lucia* and *Dominica* have equally suffered; the tempest reached also *St. Vincent’s* and *Grenada*. Its ravages also extended to Guadeloupe [*Guadeloupe*], as well as Porto Rico [*Puerto Rico*] and its neighbourhood, though in a less degree. The loss experienced by Martinique alone, may be very moderately calculated at 25,000,000 of francs, exclusive of the shipping. The works and buildings of entire parishes were razed to the ground; it lasted 26 hours, 12 of which with such inconceivable fury as to produce all these disasters, and to destroy buildings which had withstood all former hurricanes. – It will require many years before the colony can recover itself from this heavy calamity.”

A letter dated 12 November 1817 from an Officer on board His Majesty’s ship *Antelope* at St. Kitt’s reported:<sup>175</sup>

“We were lying at *St. Lucie* quietly at anchor, only the day before the hurricane came on, and got under sail for Barbadoes [*Barbados*] (as was our intention) about seven in the morning of the 20<sup>th</sup> [of October], it being fine weather. At twelve o’clock the night following the officer of the watch hailed the master, and said the wind had come round to the northwest, which was very unusual in this country, where easterly winds prevail all the year through, and that the weather appeared to be coming on bad; the Admiral and Captain were immediately upon deck; we took in all our sails except the fore sail, which was reefed; got the top-gallant-masts upon deck, and prepared for the worse. At three in the morning of the 21<sup>st</sup> instant, it blew very hard at west, with tremendous heavy rain; at four still harder: took in our fore-sail, and brought her to under a try-sail double-reefed; at seven yet harder, when a sea came and washed away one of our boats from the stern. When ten o’clock came it blew a perfect hurricane beyond what any of us had ever witnessed; however, the ship lay very quiet and behaved very well, but from the heaviness and quantity of rain, with the immense force of wind, all our cabins were full of water. At noon the weather abated, and at three in the afternoon it became quite moderate, when we set our sails again. – We visited *St. Lucie* sixteen days afterwards, and the scene was such as my pen cannot describe: many of the inhabitants lost their clothes, and those who are sick, are lying on the ground with no other covering than the sky, exposed to sun and rain.”

A letter dated 30 November 1817 from an Officer on board one of His Majesty’s ships at Barbados reported:<sup>175</sup>



" On our first making the Island (*St. Lucie*) we were struck with astonishment at the total change in the whole face of the country. We left it the day before the hurricane [20 October] a beautiful rich green, and every thing in a most flourishing state. It has now the appearance of a severe European winter. We went on shore on the 7th of November; the scene of destruction which then presented itself is far beyond my power of description. On Pigeon Island, three houses only are left standing out of nearly 250, the rest, with the church, are almost totally demolished; one of the three is shifted 15 feet off its foundation, without going to pieces. The two large tamarind trees, under which the Negroes always met to dance on Saturday and Sunday evenings, were torn up by the roots, which by their spread in this rather sandy soil, nearly equal the branches in circumference. The woods with which this island particularly abounds are more or less scattered, according to their exposure to the gale; many of the trees which are left standing, have only a few of the ragged stout branches remaining. In the deep ravines the wind appears to have acted in a whirl; for immense trees are completely thrown down and twisted up in heaps in a most astonishing manner. The inhabitants tell us the great hurricane in 1780 was not equal to this."

At Bombay, *India*, on 20 October 1817, the *India Gazette* reported that — Until yesterday the rain has continued, during the last week, to come down almost without intermission: the quantity which has fallen in this monsoon is uncommonly great, the accounts taken by different rain gauges give upwards of 95 inches since the 2<sup>nd</sup> of June, being above a fourth more than the average fall of former years. The weather has now cleared up, with every appearance of continuing fair and hot.<sup>175</sup>

On 21 October 1817, an immense avalanche fell from the mountain of Kasbeck [Kazbek] in *Georgia* and covered an extent of three wersts [versts] in length [2 miles], to the height of 50 fathoms [300 feet]. It completely dammed up the rapid river of Tereck [Terek]; which, however, on the third day, worked a passage for itself underneath the mass of snow. This accident for some time interrupted the communication with *Georgia*. Fortunately, there were no travelers passing when it happened. Nine years have elapsed since the last avalanche occurred: though, according to the reports of the inhabitants, they generally take place once in seven years, and in the summer.<sup>175</sup>

In the night between the 7<sup>th</sup> and 8<sup>th</sup> of December 1817, a storm raged along the coast of *France*. It destroyed 20 vessels in the Channel from the coast of Brest to Saint Malo.<sup>175</sup>

On 9-11 December 1817, a dreadful storm struck the Bay of Biscay. A vessel was wrecked on the bar of Bayonne, *France*. The plains of the Adour and the Nive Rivers were inundated. At St. Jean de Luz, the dike, which defended the town from the ocean, was seriously damaged and the inhabitants were alarmed.<sup>175</sup>

The fog of 31 December 1817 was confined to the Metropolis of London, *England* and the immediate vicinity. No further to the northward than the back of Euston-square, the weather was clear and even bright. A gentleman, who came to town from Enfield, saw no fog till he approached London. Southward of London, it extended as far as Clapham, and it was rather thicker in some of the environs, than in the Metropolis itself. Upon the average, ten feet was the distance, at which objects became visible, out of doors. Within doors it was impossible to read without a candle. Another report shows that the fog was just as thick in Dublin, *Ireland* as it was in London, *England* on the same day. The oldest person living had no recollection of a fog so thick as enveloped Dublin last evening during the hours of six and nine. It was denser in some streets than in others, and where this was the case it was impossible to pass with convenience without the aid of opened lanterns.<sup>175</sup>

In 1817 during the period between 16 May and 14 June, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ü-yang. During the period between 8 August and 8 November, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ch'ang-ch'ing, Kuan-ch'êng and Po-hsing; Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow; Hopei province at

Ting, Ku-an, Wu-ch'iang, Pao-ting, Wu-chi, Kuang-tsung and Cho; and Chu-wan [uncertain name and province].<sup>153</sup>

In 1817 during the period between 13 August and 10 September, floods struck Hupeh (now Hubei province) in central *China* at I-ch'êng and Ku-ch'êng; and Ying-wu [uncertain name and uncertain province].<sup>153</sup>

**Winter of 1817 / 1818 A.D.** Miss Ellen D. Larned described the New England winter of 1817-18 at Thompson, Connecticut in the *United States* — No snow of any perceptible amount until 21 December 1817; violent northerly snowstorm, but not much snow; very cold. On 10 January 1818 - first sleighing of the winter; about 4 inches of snow fell; very good sleighing for so little snow; snowed sharp for a few hours; sleighing continued until March 2. March 28<sup>th</sup> - much of a snowstorm: good sleighing for several days.<sup>116</sup>

During the winter of 1817-18, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 108 days. This winter was long and intensely cold. On 3 March 1818, the ice moved in a body downstream for some distance and then was blocked. The river was not completely clear until March 25<sup>th</sup>.<sup>202</sup>

**1818 A.D.** On the night of 12 January 1818, a most severe gale struck Edinburgh, *Scotland*. It began to blow about 10 o'clock from the southwest, accompanied by heavy rain, and continued to increase during the night until it became a perfect hurricane.<sup>175</sup>

On 15 January 1818 the barometer fell 8/10<sup>th</sup> of an inch in Edinburgh, *Scotland*. It then blew very hard, and during the whole course of the day slates and chimney pots were flying about in all directions. In the evening the gale increased, and about 5 o'clock it blew a perfect hurricane. In houses fronting the west a good deal of mischief was done in breaking the panes of glass, stripping the lead from the roof, dashing the cupola windows from their frames, and shivering them to atoms. In the course of the forenoon, two of the small minarets on the top of St. John's Chapel, at the west end of Prince's Street, gave way, and fell without doing any material damage to that beautiful building. Not so, however, the effects of the evening—the violence of the wind carried off the whole of the minarets, large and small, leaving the summit of the tower a perfect ruin. Such was the force of the wind, that the masses of masonry were carried 30 feet beyond the base of the tower, penetrating not only the roof of the church, but also the floor, and breaking through the vaults to the foundation. One of the solid bars or bats of copper by which one of the pinnacles was bound to the top of the tower, was above an inch broad, and 5/6<sup>th</sup> of an inch thick; and though the pinnacle to which it belongs was only six feet high, with a medium breadth of about eight inches, so as to expose a surface of merely four square feet, yet such was the power of the wind, that it tore the copper bar from its place, and twisted one of its arms, which was eight inches long, through an arch of 90 degrees, as if it had been a slender piece of lead. This effect resembles more that which is sometimes produced by lightning than by any other agent.<sup>175</sup>

On 15 January 1818, a violent storm struck Hamburg, *Germany*, accompanied by hail and rain. The Elbe River rose so high, that all the lower parts of the town were inundated, and the streets could only be passed in boats. Much damage was sustained, and melancholy accounts were expected from sea. About this timeframe, another account indicated the storms struck the northern parts of the Continent [Europe]. At Adensee, Stettin [now Szczecin, *Poland*], Königsberg [Königsberg, Bavaria, *Germany*], etc. much damage was sustained. About this timeframe, another report stated the Eden, Petterill and Caldew rivers in *England* were much swollen by mountain torrents.<sup>175</sup>

A hurricane struck the island of *Mauritius* in the Indian Ocean from 28 February to 1 March 1818. Every ship in Port Louis, Mauritius was cast ashore on the island except for the ship *Jason*.<sup>198</sup>

On 1 March 1818, a severe hurricane struck Marseilles, *France*; upwards of forty sail of ships driven onshore, and the fruits of the earth were destroyed.<sup>128</sup>

On 4 March 1818, a destructive hurricane took place in London and throughout *England*. Scarcely a county escaped considerable damage, and numerous vessels wrecked or sunk round the coasts. The wind blew from the south to the southwest and ravages continued from eight in the evening till after midnight, accompanied by much lightning. The tempest also extended to various parts of *Europe*.<sup>128</sup>

On 4 March 1818, a tremendous hurricane throughout *England*, which did considerable damage to the shipping at the ports.<sup>43</sup>

On 4 March 1818, a storm was felt over the whole of South Britain, and caused much damage and loss of lives both at sea and land. The storm caused considerable damage in various parts of London, *England*. It caused considerable damage to the shipping at Great Yarmouth. Deal reported that several vessels in the Downs suffered. It caused the highest spring tides at Portsmouth ever remembered. The greater part of the pier and several houses were demolished by the storm at Ryde. Much damage was sustained in Leicester. The storm was also felt in Plymouth, Hull, Milford, Penzance, Dartmouth, and Exmouth.<sup>175</sup>

On 7 April 1818, there was a storm in *Sweden*, which threw down several churches, many houses and greatly injured the forests.<sup>128</sup>

On 26 April 1818 in *England*, there was a great hailstorm in Bedfordshire and Middlesex.<sup>93</sup>

On 26 April 1818, a tornado struck in the county of Middlesex, *England*. It uprooted trees, unroofed houses, threw down walls, and in short removed everything that impeded its progress. Another report stated that a tremendous storm of hail and rain accompanied by thunder and lightning struck Hampstead. The effects were severely felt at Hendon and the adjacent villages. Upwards of twelve large trees were blown down at Hendon. Then the storm struck Dunstable, Redburn and Market-street, where hailstones were so large as to break the church windows.<sup>175</sup>

About the end of April 1818, parties were still making their way to Stockholm, *Sweden* in sledges [a carriage mounted upon runners instead of wheels, and generally used for travelling over snow or ice]. In St. Petersburg, *Russia*, the people were walking and driving carriages on the ice over the Neva River. Then a few days later, they were complaining of the heat at Vienna, *Austria*.<sup>175</sup>

On 8 May 1818, there was a dense rain, which continued for 24 hours that flooded all the lower parts of the kingdom [*Great Britain*].<sup>128</sup>

A dreadful hailstorm struck *France* sometime prior to 16 May 1818. It ravaged Saone and Loire. The hailstones were as large as pullet's eggs. The game was everywhere found dead in the fields; and several persons were severely wounded by the hail. In one vineyard alone, between Orleans and Beaugency, the damage done by the storm was estimated at 4,000 pipes [420,000 gallons] of wine.<sup>175</sup>

From February to June of 1818, a number of ships travelling between New York City and England in the *Atlantic Ocean* reported many icebergs. Some of these islands of ice were up to 400 feet high and some were  $\frac{3}{4}$  miles in length. These icebergs traveled as far south as the West Indies; a very extensive one was observed in the neighborhood of the Bahamas.<sup>175</sup>

In *Ireland*, there were great floods; waterspout in Clare.<sup>47, 92</sup>

On 19 July 1818 in *England*, there was a great hailstorm in Cumberland.<sup>93</sup>

The summer of 1818 in *Russia* was more remarkable than in the regions of *Central and Southern Europe*. In Odessa, Ukraine, people were swimming on 18 May. A botanist wrote to the Library in Geneva that it was an extraordinary natural phenomenon that brown and green tea bloomed in the garden of the Empress Dowager of *Russia* in Pawlowsk [Pavlovsk Palace in the now district of Pavlovsk in St. Petersburg]. In *Sweden, England, Germany* and *Belgium* a very large and annoying heat wave struck for several days. In *Denmark*, rye was harvested on 27 July. In all of *Germany* there was a very abundant grain harvest.<sup>62</sup>

On 27 July 1818 in *England*, there was a hailstorm in Norfolk.<sup>93</sup>

In *France*, up until May was a wet year but then suddenly turned into a drought. From north to south, the summer of 1818 became one of the driest that had been experienced. In Paris, on 7 September the Seine River was 5 centimeters (2 inches) above the lowest water level of 1719. The small rivers and the cisterns were almost all dry.<sup>62</sup>

The year 1818 remained moist and temperate until May 15. Dry heat and bright skies appeared immediately after, with a serene sky almost always during the remainder of spring, the three summer months and the first half of autumn. We had not seen in living memory, a longer series of beautiful days. In Paris, *France*, the peak temperature of 94.1° F (34.5° C) was observed on 24 July.<sup>79</sup>

In 1818 after cold and rainy winter, which caused general misery and had driven the cost of food to the utmost, so that a hectoliter of grain cost 36 francs; *France* received magnificent weather. These blessings of the seasons spread throughout all of *Europe*. The summer in Paris, *France* was characterized by:

Hot days	37 days
Very hot days	3 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Mechelen, <i>Belgium</i>	( 99.5° F, 37.5° C) in July
Marseille, <i>France</i>	( 98.4° F, 36.9° C) on 7 July
Alais, <i>France</i>	( 97.7° F, 36.5° C) in August
Maastricht, <i>the Netherlands</i>	( 96.8° F, 36.0° C) on 25 July
Paris, <i>France</i>	( 94.1° F, 34.5° C) on 24 July
Avignon, <i>France</i>	( 93.2° F, 34.0° C) on 27 July
Strasbourg, <i>France</i>	( 92.8° F, 33.8° C)
Liège, <i>Belgium</i>	( 90.5° F, 32.5° C)
Moens, <i>France</i>	( 88.3° F, 31.3° C) on 24 July
London, <i>England</i>	( 80.1° F, 26.7° C) on 16 July

In 1818, in many parts of *England* and *France*, the trees blossomed twice or three times, and at Paris, the thermometer rose to 98° F.<sup>128</sup>

In *England* in August, great quantities of rain fell; harvest much delayed. Also on the continent.<sup>47</sup>

During the week before 8 August 1818, a tornado passed over the village of Howell, in Lincolnshire, *England*. It appeared like a body of smoke, was preceded by a small black cloud, passed very near the earth, and completely unroofed a low building, and tore the boughs from the trees as it passed, and carried them a considerable way. Coming in contact with a large ash tree, it split a piece from the trunk 12 feet long, and as thick as a man's body, carrying it at least 100 yards.<sup>175</sup>

On 3 September 1818, on this day the weather broke up after 108 hot and clear days, during which the thermometer averaged 65° F [in *England*].<sup>128</sup>

In September 1818, a hurricane struck Galveston, Texas in the *United States*. Women died from drowning, not killed by the roof cannon falling on them from the Red House of Jean Laffite [Lafitte].<sup>141</sup> [Jean Lafitte was a pirate that captured the largely uninhabited Galveston Island (Campeche) turning it into his base of operations. A hurricane in September covered almost all the island in water, killing several people and destroying four ships and most buildings. Only six homes were habitable afterwards. Around 1821 he was run out the city but only after burning the entire settlement to the ground. All that remains of Maison Rouge is the foundation, located at 1417 Avenue A near the Galveston wharf.]

In Burgundy, *France*, the grape harvest began on 24 September, 9 days earlier than average. But the drought affected the grapes in some regions. The wine was very abundant in Burgundy and of fairly good quality. But the Bordeaux wine was not good. The grain harvest was satisfactory.<sup>62</sup>

On 24 October 1818, a violent hurricane struck Madras [now Chennai, *India*]. The *Queen Charlotte* East Indiaman was lost and all her crew and the *Lady Castlereagh* and *Cornwall*, so much injured as to be condemned.<sup>128</sup>

In Stockholm, *Sweden*, it was reported in November 1818, that the uncommonly serene and mild autumnal weather still continues, and now supplies us in abundance of garden produce, of which we were deprived during the summer by the great drought. To be without fire in the stoves [for heating], and to have the meadows covered with verdure instead of snow, is a strange phenomenon here in the month of November.<sup>175</sup>

On 8-12 November 1818, a hurricane struck *Jamaica*. There were heavy loss of life on the ships and some loss of life on the island.<sup>141</sup>

On 18-20 November 1818, a hurricane struck *Jamaica*.<sup>124</sup>

In *England*, the autumn/early winter weather of 1818 was unusually warm. It was reported on 28 September that a single tree in the orchard at Newton, near Carlisle produced ten thousand apples. At Kensington, it was reported on November 12, an apple tree had produced a second full crop of apples that year. In Shugborough, it was reported on 1 December, that a thorn tree was in full blossom, and the whole tree presented a May-like appearance. In Berwickshire, it was reported on 2 December, a tulip tree was in full blossom, which is but the second time it was ever known to be in that state. The last time this tree was in blossom was in the year 1720, being 98 years ago. In Clapham Common, it was reported on 18 December, that green peas of full growth and flavor were gathered a day or two ago, and the haulm still remains in full bloom.<sup>175</sup>

In 1818, there was a hailstorm in Azamgarh in the state of Uttar Pradesh, *India*, which almost caused a general famine.<sup>181</sup>

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**Winter of 1818 / 1819 A.D.** The Meuse River was frozen in December 1818.<sup>62</sup>

On 28 December 1818, for two or three days, the metropolis [London, *England*], as well as the country round was enveloped in a thick impenetrable fog, which obstructed all traveling, and caused a number of fatal accidents.<sup>128</sup>

The winter of 1818-19 was cold primarily in the month of December, with some violent days. In Madrid, *Spain*, the cold was very severe. In the northern countries of *Europe*, the winter was not unusual. The

Meuse River froze on 17 December, after which the frost only lasted six days. The coldest temperatures during the winter were:<sup>62</sup>

Maastricht, <i>the Netherlands</i>	( 13.5° F, -10.3° C) on 18 December 1818
<i>Ibid.</i>	( 14.0° F, -10.0° C) on 8 February 1819
Brussels, <i>Belgium</i>	( 13.8° F, -10.1° C)
Moens, <i>France</i>	( 16.2° F, -8.8° C) on 18 December 1818
Paris, <i>France</i>	( 20.5° F, -6.4° C) on 27 December 1818
<i>Ibid.</i>	( 20.7° F, -6.3° C) on 1 & 31 January 1819
Orange, <i>France</i>	( 23.9° F, -4.5° C) on 28 & 29 December 1818
London, <i>England</i>	( 24.1° F, -4.4° C) on 17 December 1818
Avignon, <i>France</i>	( 29.7° F, -1.3° C) on 7 January 1819
Hyères, <i>France</i>	( 32.0° F, 0.0° C) on 14 December 1818

St. Petersburg, *Russia* reported on 5 January 1819, that the weather there was most extraordinary for that climate. Currently they were experiencing a thaw, a circumstance not remembered in that region for that date by any person living. Great quantities of frozen meat were brought from the interior and were spoiling in the warm weather.<sup>175</sup>

During the winter of 1818-19, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 110 days.<sup>202</sup>

Miss Ellen D. Larned described the New England winter of 1818-19 at Thompson, Connecticut in the *United States* — On 18 November 1818, snowed large and moist; no sleighing over most of the winter, save a few days after a violent storm of sleet and rain. On 25 February 1819, there was a succession of moderate snows. Snow on March 6, 8, and 9 made good sleighing. On March 16<sup>th</sup> - severe storm, coldest day of winter, excellent sleighing for a week.<sup>116</sup>

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**1819 A.D.** In *Ireland*, great floods in the north.<sup>47, 92</sup>

In February and again in June 1819, there were major floods at Hawkesbury/Nepean Valley in New South Wales, *Australia*. Each time the water level was recorded at 46 feet (14.03 meters) above the water mark at Windsor.<sup>99, 109</sup>

On 28 March 1819, it was reported that the Isle of France [*Mauritius*] was laid waste by a severe hurricane, being the third within 13 months.<sup>128</sup>

In *England* in June, large tracts of land flooded in the Fen Country.<sup>47, 92</sup>

In June 1819 in *England*, an inundation caused 5,000 acres to be deluged in the Fen countries [Lincolnshire].<sup>90</sup>

On 4 July 1819 in *England*, there was a hailstorm in Yorkshire and Norfolk.<sup>93</sup>

On 7 July 1819 in central *France*, there was a terrific hailstorm in the arrondissement of Montargis. The storm destroyed all fruit and grain crops within 20 leagues [60 miles, 97 kilometers]. Two days afterwards hailstones were found which were the size of a fowl's egg. The damage was estimated at over 4 millions francs (£170,000). Other parts of France also experienced very destructive storms.<sup>93</sup>

On 10 July 1819, during a violent storm at Châteauneuf, *France*; the church was struck by lightning, by which the curate and nine persons were killed, and forty wounded.<sup>128</sup> [Châteauneuf is the Châteauneuf-du-Faou in Brittany in northwestern *France*.]



On 11 July 1819, lightning struck a church of Chateaufort-de-Moustiers [Châteaufort-lès-Moustiers, France] killing 9 persons and wounding 82.<sup>271</sup>

On 13 July 1819 in *England*, there was a severe hailstorm in the town of Dereham, in Norfolk. The storm struck between 2 and 4 P.M. There was great damage to crops, trees, gardens, and glass.<sup>93</sup>

In July 1819, the heat of the weather was so great at Vienna, *Austria*; Bagdad, *Iraq* and other places that several persons dropped down dead in the streets.<sup>128</sup>

On 24 July 1819, there were great thunderstorms in the northern counties of *England* and in *Scotland* as far as Glasgow. Several persons killed by lightning and many bridges destroyed.<sup>128</sup>

On 24 July 1819 in *England*, there was a hailstorm in Lincolnshire.<sup>93</sup>

On 26 July 1819 a powerful rainstorm struck Catskill, New York in the *United States*. During the height of the storm, approximately 12 inches of rain fell in 30 minutes. The section of country in which the rain descended with peculiar violence is estimated at 80 square miles. On a considerable part of this tract, there is reason to believe, that the total rainfall quantity exceeded eighteen inches during the storm. From the banks of a brook which crosses the turnpike road, about one quarter mile above the north end of Main street and empties into the creek, some thousands of tons of earth and stone and rocks in solid mass were washed out and deposited on the flats. Houses, blacksmith shop, a large distillery, a plaster mill, a bridge, a grist mill were destroyed by the raging creeks and streams. The water uprooted trees, formed deep ravines, created landslides. On the west side of Kaaterskill, a small creek became a raging river that eroded over a hundred thousand tons of earth and stone, leaving behind a deep ravine. Some of the rocks washed out weighed six to ten tons each. The damage done in the township exceeded fifty thousand dollars. [In present currency, that would be equivalent to \$740,000 in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>191</sup>

On 27-28 July 1819, a hurricane struck Louisiana, Mississippi and Alabama in the *United States* causing 43 deaths.<sup>141</sup>

On 17 August 1819, a whirlwind at Aldborough, Suffolk, *England*, carried up a quantity of barley from a field to a great height.<sup>128</sup>

On 25-28 August 1819, a great destructive hurricane struck Louisiana and Alabama in the *United States*.<sup>117</sup>

In September 1819 in *Ireland*, there were great thunder and hailstorm in County Kilkenny. There was extensive injury to potatoes and corn.<sup>93</sup>

On 21 and 22 September 1819, there was a destructive hurricane in the *West Indies*, which did considerable damage in the Leeward Islands.<sup>128</sup>

On 21-22 September 1819, a hurricane struck the Virgin Islands in the *Lesser Antilles*. Many, many lives were lost.<sup>141</sup>

From 20-22 September 1819, a dreadful hurricane ravaged the Leeward Islands [in the Lesser Antilles in the *West Indies*]. At the island of St. Thomas alone, 104 vessels were lost.<sup>57, 90</sup> [St. Thomas is in the Virgin Islands.]

In *India* in 1819, there was a great scarcity in the Allahabad and neighboring districts, under the following circumstances: “The rains set in late, but when they did come they appeared to have fallen in abundance. The land which had hitherto been so dried up by the heat that sowing had to be undertaken twice without any effect, became so drenched that a third sowing was not possible till the middle of September. In Bundelkhand [central India], the kharif [autumn harvest] of 1819 failed extensively, and frost nipped the spring crops in the beginning of 1820.”<sup>57</sup>

In 1819, there was a famine in the Northwest Provinces in *India* and Bundelcund [now the states of Uttar Pradesh and Madhya Pradesh].<sup>156</sup>

In 1819, there was a minor famine in Bundelkhand [now the states of Uttar Pradesh and Madhya Pradesh in central *India*], Nagpore [now Nagpur in central *India*] and the North-Western Provinces of *India*.<sup>179</sup>

In 1819, there was a famine in Kandeish [now Khandesh, *India*].<sup>182</sup>

The summer of 1819 produced heat greater than 98.6° F (37° C) in Provence, *France*. The duration of the heat was sustained and extended into autumn.<sup>79</sup>

The year 1819 produced heavy rainfalls and a greater number of rainy days in southern *France*.<sup>79</sup>

In 1819, three rainbows were seen distinctly in Boston, in the *United States*.<sup>128</sup>

In 1819, a shower of red and rose colored snow fell in Carniola [now Kranjska, *Slovenia*], and the neighboring counties. The red matter consisted of silex [pure form of silica or silicate], alumina, and oxide of iron.<sup>128</sup>

In 1819 during the period between 24 April and 25 May, floods struck Shantung (now Shandong province) on the east coast of *China* at Huang and Hopei (now Hebei province) in northern *China* at Luan and T'ang-shan. At Huang, the houses were damaged by the floodwaters and many people drowned. Then during the period between 22 July and 20 August, a drought engulfed Kweichow (now Guizhou province) in southwestern *China* at Kweiyang and Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou and Ch'ung-tê. During the period between 19 September and 18 October, a drought engulfed Hupeh (now Hubei province) in central *China* at Ying-shan and Ma-ch'êng. During the period between 19 October and 17 November, a drought engulfed Hupeh province at Huang-p'o.<sup>153</sup>

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**Winter of 1819 / 1820 A.D.** In November 1819, a black rain and snow fell at Montreal, *Canada* and the northern part of the *United States*. This fall was accompanied by an extraordinary darkening of the sky, shocks similar to those felt during an earthquake, detonations, and very powerful flashes of lightning. It was thought that the origin was a meteor bolide impact.<sup>205</sup>

At Thompson, Connecticut in the *United States*, the first significant snowstorm of the season in 1819 occurred on 29 November. Last night we had considerable snow.<sup>116</sup>

During the winter of 1819-20, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 102 days.<sup>202</sup>

Miss Ellen D. Larned described the New England winter of 1819-20 at Thompson, Connecticut in the *United States* — On 25 October 1819 - snowed all night. November 28<sup>th</sup> - snowed all night and the next day, but no sleighing. December 30<sup>th</sup> - a cold, tedious snowstorm, wind very high. December 31<sup>st</sup> - high cold wind, snow blew violently, poor sleighing. On 11 January 1820 - a violent snowstorm. January 17<sup>th</sup> - most violent snowstorm with very high winds. January 22<sup>nd</sup> - snowed in the morning, which improved

sleighting. February 9<sup>th</sup> - most violent storm all day; no stirring about; greatest fall of snow this winter, roads all blocked up. February 10<sup>th</sup> - heavy fall of snow in the night. February 11<sup>th</sup> - snows in the morning; blows hard; roads all filled up. February 12<sup>th</sup> - all hands breaking roads: a thaw follows, but not sufficient to mar the sleighting. March 4<sup>th</sup> - pretty good sleighting. March 8<sup>th</sup> - snow, hail, and rain violent all day. March 9<sup>th</sup> - rain continues. March 10<sup>th</sup> - trees very heavily laden, snow slips off without much damage. March 12<sup>th</sup> - cold and clear, roads were frozen, and crust was thick enough to bear the weight of horses, sleighs, and teams. March 16<sup>th</sup> - good sleighting. March 17<sup>th</sup> - snows prettily. March 19<sup>th</sup> - snow falls, almost all gone.<sup>116</sup>

The Seine River in Paris, *France* froze from 12 to 19 January 1820 in all its breadth. Only the small arm of the river at Hôtel-Dieu was not frozen. On 13 January, individuals traveled on foot on the ice. Several rivers, among others, the Garonne, the Gard and the Rhône also iced in the south. In *Denmark*, individuals traveled on the ice from Aarøe to Funen Island, and from Thorseng in Svendborg and Langeland island.<sup>62</sup>

The winter of 1820 was nowhere in *France* neither long nor supported. An unusual heat and drought preceded this winter. The winter began with small frost, followed suddenly with a very violent cold from January 7 to 9. The coldest days occurred from 11 to 12 January. The observed low temperature in Paris was 6.3° F (-14.3° C); in Toulouse 7.2° F (-13.8° C); in Viviers 10.4° F (-12° C); in Alais 10° F (-12.2° C); in Montpellier 11.8° F (-11.2° C); in Joyeuse -5° F (-15° C); in Bordeaux 16.2° F (-8.8° C). The cold was more intense in the southern and northern *France*. But mainly the winter displayed its rigor in Provence where the thermometer went down to 3.9° F (-15.6° C), and Marseille in particular, where it dropped down to 0.5° F (-17.5° C). This harsh frost lasted little more than eight or ten days. A real thaw has generally underway by January 18<sup>th</sup>. The cold winter killed all the orange [trees] and damaged the vineyards and olive groves.<sup>79</sup>

The winter of 1819-20 in Europe was cold and extremely violent. But the extreme severity did not last long. In Paris, *France*, there were 47 frost days; including 19 consecutive from 30 December 1819 to 17 January 1820. The lowest temperature in Paris occurred on 11 January at ( 6.3° F, -14.3° C). From 12 to 19 January, the Seine River was frozen. The Saône, the Rhône, the Rhine, the Danube, the Garonne, and the Thames rivers, and the lagoons of Venice, and the Sound were frozen to the thickness that individuals could cross them on the ice. The lowest temperatures observed in different cities were:<sup>62, 70</sup>

St. Petersburg, <i>Russia</i>	(-25.6° F, -32.0° C) on 18 January
Berlin, <i>Germany</i>	(-11.9° F, -24.4° C) on 10 January
Maastricht, <i>the Netherlands</i>	( 11.1° F, -11.6° C) on 8 December
<i>Ibid.</i>	( -2.7° F, -19.3° C) on 10 January
Strasbourg, <i>France</i>	( -1.8° F, -18.8° C) on 15 January
Commercy, <i>France</i>	( -1.8° F, -18.8° C) on 12 January
Mechelen, <i>Belgium</i>	( -0.6° F, -18.1° C) in January
La Chapelle, <i>France</i>	( 0.1° F, -17.7° C) on 15 January
Marseille, <i>France</i>	( 0.5° F, -17.5° C) on 12 January
Metz, <i>France</i>	( 2.7° F, -16.3° C) on 10 January
Moens, <i>France</i>	( 3.9° F, -15.6° C) on 11 and 15 January
Riez, <i>France</i>	( 5.0° F, -15.0° C) on 12 January
Joyeuse, <i>France</i>	( 5.0° F, -15.0° C) on 11 January
Paris, <i>France</i>	( 6.3° F, -14.3° C) on 11 January
Toulouse, <i>France</i>	( 7.2° F, -13.8° C) on 11 January
Orange, <i>France</i>	( 8.6° F, -13.0° C) on 11 January
Alais, <i>France</i>	( 9.9° F, -12.3° C) on 12 January
Piemont, <i>Italy</i>	(10.4° F, -12.0° C)
Hyères, <i>France</i>	(10.6° F, -11.9° C) on 11 January
Vence, <i>France</i>	(11.7° F, -11.3° C) on 11 January
Avignon, <i>France</i>	(11.7° F, -11.3° C) on 11 January

Montpellier, <i>France</i>	( 12.2° F, -11.0° C ) on 12 January
London, <i>England</i>	( 18.0° F, -7.8° C ) on 11 December 1819
<i>Ibid.</i>	( 19.0° F, -7.2° C ) on 5 January 1820

The effects of cold [in *Europe*] were terrible, partly due to the intensity of the cold, partly because of the spring thaw, which brought large masses of ice and accumulated snow melts that happened too quickly.<sup>62</sup>

In *Sweden* they rarely experienced a more severe cold and had never seen this amount of considerable snowfall. In *Denmark*, the sea was frozen completely around the island of Funen in such a way that one could travel from Arrøe to Funen, and from Svendborg, *Denmark* to Thorseng in Funen and to Langeland island on the ice. A woman with her babies was found frozen on the way from Randers to Aarhus in *Denmark*. Since the *Sound* was frozen between the coasts of *Sweden* and *Denmark*, the area became a very vibrant marketplace to those with sleds. At St. Petersburg, *Russia* it was reported that in one night, a large number of sentries, they say 170, were found frozen to death. In several districts of this city, wolves driven by hunger entered.<sup>62</sup>

In *Germany*, the cold was also severe. In Berlin, several sentries were found frozen to death along with many travelers on the road. The ice of the Danube River in the area around Vienna, *Austria* caused great devastation. Wolves broke into the city Bucharest, *Romania*.<sup>62</sup>

In Holland [now *the Netherlands*], the melting ice of the Meuse, the Rhine, and the Waal rivers overflowed their banks and produced large floods. In *Belgium*, at the entrance of the Scheldt River, the river during spring thaw for two days carried drifting debris of all kinds, including animals and human corpses.<sup>62</sup>

In *England*, the intensity of the cold was so great that any communication with Deptford, Woolwich and at other stations of the River Thames and vessels at anchor became almost impossible. Only with great effort and work was it possible to resupply the ships at anchor. But when the ice thickness had reached nearly two meters (6.6 feet) the river at Deptford and in other places became a marketplace. The effects of the cold above the bridges of London, Lambeth and further upstream one could see pieces of ice 4 meters (13 feet) thick. Below the bridge of the River Thames with Kew, the ice thickness reached 0.5 meters (1.6 feet). The ice caused major accidents and more than 400 ships were damaged and swept downstream.<sup>62</sup> [Deptford and Woolwich are now part of London.]

In *France*, the severe winter cold was first announced by the arrival of a great many of the northernmost birds, swans and wild ducks of various plumage off the coast at the Strait of Calais. The severity of the cold caused several people to freeze to death: a man at the Pas-de-Calais; a gamekeeper at Nogent; a woman and a man in Cote d'Or; two travelers on the road from Breuil; a woman and a child on the road from Etain to Verdun; six people near Château-Salins; two little Savoyards on the road from Clermont to Chalons-sur-Saone. At the artillery school at Metz, several soldiers suffered frozen hands or ears. The wine froze in many basements. The Gardon River was frozen to the thickness that mules traveled over the river on the ice. The ice conditions of the Seine caused serious accidents. In Paris between the bridges Pont d'Austerlitz and the Pont d'Iéna, 25 vessels were destroyed. The Promenade de la Grève and Onnes were flooded. A dike was breached on the Robec River and carried away a bridge pillar to Rouen. The ice conditions of the Saône River destroyed many vessels and put the suburb Borstadt Vaise at Lyons underwater.<sup>62, 70</sup> [Cote d'Or is located in eastern *France*. Etain and Verdun are both located in northeastern *France*. Château-Salins is in northeastern *France*. Clermont is in central *France*. Chalons-sur-Saone is in southeastern *France*. Metz is located in northeastern *France*. The Gardon River is in southern *France*. The Robec River is in Normandy in northern *France*.]

*Italy* was struck by the cold winter to the same degree of frost and ice. Venice was trapped by the ice for several days. The sea froze so thick that individuals could travel across the ice from the city to the mainland. Rome was covered with snow for three days. The Arno River was partly frozen. When the Tiber River thawed, it overflowed its banks.<sup>62</sup>

In Provence, a large portion of the olive trees was damaged. All the orange trees of Hyeres and Nice, *France*, had to be cut to the ground, and since the year 1787 they had not suffered so much damage.<sup>62</sup>

The strong frosts in Gard in southern *France* had the following effect: "The holly oak trees were scorched, and the fig trees, we had held collectively for dead, drifted back with more than half of the main branches, and some suggested the root. Many laurels, myrtles, all of our gardens, and several other shrubs were destroyed. On 10 January, a large number of mulberry trees burst from the strain and crashed to its full length. We noticed that 4 to 10 millimeter (0.16 to 0.40 inches) wide cracks were all on the south side, no doubt because the wood was loose and the sap was more abundant than on the north side; and when the sap froze the fibers tore. The youngest trees had probably more elasticity, and the old trees more strength. The trees most affected by the frost were 10 to 30 years old. The cracks remained open until the thaw and then completely closed again. The scarred bark and the trees lived on. The biggest disaster that the severe cold induced in January was the loss of our olive trees. However, it appears that the greater part of the old trees will again turn out, but more than half of young trees, and in some places all that have been planted since the past one or two years are dead." The [grape] vines were damaged in the neighborhood of Manosque in southeastern *France*, and on the banks of the Durance River and around Bordeaux.<sup>62</sup>

On 5 January 1820, there was a hurricane in Newfoundland, *Canada*.<sup>128</sup>

On 6 January 1820, there was an intense frost at Glasgow, *Scotland*.<sup>128</sup>

On 14 January 1820, the thermometer fell to 14° F (18° F below the freezing point) in London, *England*. Then on 15 January, the thermometer fell to 9° F (-12.8° C). On 17 January, shipping damaged by ice on the River Thames. The tides were very high and flowed an hour beyond stated times.<sup>128</sup>

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**1820 A.D.** In *India* during 1820-22, there was a famine in Upper Sind [Sindh, now *Pakistan*] and neighboring provinces, cause only partially by drought. "In 1819 there was a failure of crops in Ahmedabad, caused by unseasonable weather after the monsoon; whilst in Sawunt Warru it was occasioned by a sudden and unusual fall of rain, accompanied by a terrific storm – the former destroying the ground crops, and the latter the bagayut [orchard] produce."<sup>57</sup>

In 1820-22, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

In 1820, there was a famine in southern *India*.<sup>182</sup>

During the famine in *India* in 1820, frost caused considerable damage in Bundelkhand [now the states of Uttar Pradesh and Madhya Pradesh in central *India*].<sup>179</sup>

On 7 July 1820 a powerful storm struck *France*, when ten communes in Montargis were laid desolate, and everything destroyed for the space of 20 leagues (60 miles, 97 kilometers). The damage was estimated at 170,000*l.* sterling.<sup>43</sup>

On 30 July 1820 in *England*, there was a great hailstorm in Essex.<sup>93</sup>

On 31 July 1820 in *England*, there was a hailstorm in Norfolk, Suffolk, Shropshire, and Sussex.<sup>93</sup>

On 20 September 1820, a destructive gale was reported in the *West Indies*.<sup>128</sup>

In 1820, the Hunter River in New South Wales, *Australia*, flooded and the river reached a height of 37 feet above the high water mark.<sup>103</sup>

In 1820, a drought engulfed many regions of *China* including:<sup>153</sup>

- During the period between 14 March and 6 September, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hsin-têng [uncertain name, “Hsin-ch’êng”].
- During the period between 11 June and 9 July, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Huang-mei.
- During the period between 7 September and 6 October, a drought engulfed Chekiang province at Ch’êng, Li-shui, Chin-yün, Chin-hua and Ch’ang-shan; Kiangsi (now Jiangxi province) in southern *China* at Nan-ch’ang, Yung-hsiu, Ch’ing-chiang, Kan and I-ch’un; Hupeh province at Ao-ch’êng, Hsien-ning and Ch’ung-yang.

In 1820, several regions of *China* experienced flooding including:<sup>153</sup>

- Chahar province (now eastern *Inner Mongolia*) at Hsüan-hua, Wan-ch’üan, Huai-an, Yang-yüan, Huai-lai and Cho-lu.
- Hopei (now Hebei province) in northern *China* at Ning-chin, Ning-ho, Pao-ti, Wên-an, An-tz’ü, Cho, Kao-yang, An-hsin, Ching-hai, Ts’ang, Ta-ming, Nan-yüeh, Ch’ang-yüan, Hsin-ho and Fêng-jun.
- Pu-shan. [uncertain name and uncertain province]
- During the period between 10 July and 8 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui.

**Winter of 1820 / 1821 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1820 occurred on 12 November. Snowed in the night and all day; a right winter-cold snowstorm about 8 inches on the level and very solid; hard sleighing; good sledding for a week.<sup>116</sup>

Miss Ellen D. Larned described the New England winter of 1820-21 at Thompson, Connecticut in the *United States* — On Sunday 12 November 1820 - snows in the night and all day; a right wintry, cold storm; no meeting; snow about 8 inches or more on the level. November 13<sup>th</sup> - very cold, snowy morning, some rain or sleet, cleared off at noon, hard sleighing. November 14<sup>th</sup> - break into the woods with sled and haul two loads of wood; sleighing and sledding continued through the week. This November snowstorm of 1820 was handed down to posterity as exceeding in severity anything ever before experienced by the oldest inhabitant so early in the season, and it is believed that the record in this vicinity, at least, remains unbroken. On 7 January 1821 - a terrible, cold snowstorm; first sleighing of the new year. January 14<sup>th</sup> - very high, rough storm of snow. January 22<sup>nd</sup> - snows about 4 inches in the night. February 6<sup>th</sup> - sleighing gone. February 15<sup>th</sup> - snows again; pretty good sleighing, continuing some days.<sup>116</sup>

During the winter of 1820-21, the Hudson River between New York and Powles’ Hook [now called Paulus Hook, Jersey City, New Jersey] in the *United States* was frozen and was crossed on the ice. [Manhattan, New York is located 1 mile across the Hudson River from Powles’ Hook. “Crossed on the ice” generally means the ice was sufficiently thick to allow foot and wagon traffic.] [This is only one of four winters when the Hudson River was completely frozen over during the century from 1740-1840. The other winters were 1740-41, 1764-65, and 1779-80.] During this winter, the Hudson River at Albany, New York was closed to river traffic because it was frozen or obstructed by ice for 123 days.<sup>202</sup>



January 1821 was one of the coldest in the *United States*. On nine mornings at sunrise, the mercury was below 0° F (-18° C) in Philadelphia and vicinity (the coldest temperature on two mornings was -10° F (-23° C)). The following are the lowest temperatures observed in different cities: <sup>1</sup>

Brunswick, Maine	( -39° F, -39° C)
<i>Canada</i>	( -38° F, -39° C)
Concord, New Hampshire	( -37° F, -38° C)
Bangor, Maine	( -34° F, -37° C)
Gardner, Maine	( -33° F, -36° C)
Exeter, New Hampshire	( -32° F, -36° C)
Lowell, Massachusetts	( -29° F, -34° C)
Vermont	( -23° F, -31° C)
Salem, Massachusetts	( -20° F, -29° C)
Newburyport, Massachusetts	( -20° F, -29° C)
Boston, Massachusetts	( -17° F, -27° C)
Buffalo, New York	( -16° F, -27° C)
New Haven, Connecticut	( -15° F, -26° C)
Hartford, Connecticut	( -15° F, -26° C)
Saratoga, New York	( -15° F, -26° C)
Albany, New York	( -14° F, -26° C)
Long Island, New York	( -13° F, -25° C)
New York City, New York	( -7° F, -22° C)

In the *United States* at Brunswick, the mercury became stiff in the bulb. The North river, leading from New York to Albany, was so firmly frozen, as to be passable on the ice from one city to the other, 160 miles, and for several days the Hudson was crossed from New York to Jersey City on the ice, by numerous persons. But three other instances of this kind have occurred during the last century – in 1741, 1765 and 1780. The sleighing was said to be good from Buffalo to the extreme part of the State of Maine; and from St. John's, New Brunswick, through Canada to Michigan, and from Michigan, a thousand miles to the west. Every harbor was ice-bound from Alexandria, Virginia to Eastport, Maine, except for the harbor of Portsmouth, New Hampshire.<sup>1</sup>

In the *United States* in Virginia, on 26 January 1821, the river from Norfolk to Portsmouth, and down to the bite of Craney Island was completely frozen.<sup>38</sup>

In the *United States*, a Great January Coastal Storm brought rain and sleet to Charleston, South Carolina on 6-7 January 1821, which became snow over eastern Virginia. Washington D.C. received 12-18 inches (30-46 centimeters) of snow. Snow piled up to 18 inches (46 centimeters) in Philadelphia, Pennsylvania.<sup>27</sup>

During the winter of 1820-21, the Seine River in Paris, *France* was frozen beginning on 31 December 1820. On 7 January 1821, the ice conditions were met. The Rhine River in *Germany* was also frozen and on the 3<sup>rd</sup> of January, wagons rode on the ice.<sup>62</sup>

The winter of 1820-21 was only severe in northern *France* and in *Germany*. Paris, *France*, experienced 54 frost days, including 15 that were consecutive. The Seine River froze beginning 31 December 1820. The Rhine River also froze, and on 3 January near *Düsseldorf*, Germany a coach crossed the river on the ice. The coldest temperatures this winter occurred during the period from 31 December to 3 January. The coldest temperatures observed were: <sup>62</sup>

Mechelen, <i>Belgium</i>	( 5.0° F, -15.0° C) in January
La Chapelle (near Dieppe), <i>France</i>	( 7.2° F, -13.8° C) on 1 January
Paris, <i>France</i>	( 8.6° F, -13.0° C) on 31 December
Maastricht, <i>the Netherlands</i>	( 10.4° F, -12.0° C) on 1 January
Moens, <i>France</i>	( 16.2° F, -8.8° C) on 1 & 2 January

Orange, *France*

( 23.0° F, -5.0° C) on 2 January

**1821 A.D.** In *England*, disastrous rains and floods.<sup>47, 92</sup>

The year 1821 was a dry year in southern *France*. In Toulouse, for example, there were 5.7 inches (144 millimeters) less rainfall and 16 less rainy days than in the average year.<sup>79</sup>

On 30 June 1821, there was a great whirlwind [tornado] at Northfield, Massachusetts in the *United States*. Also on 9 September 1821, other tornadoes struck in New Hampshire and Massachusetts. [From Perley "Historic Storms of New England", Salem, 1891]<sup>138</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Maskat, <i>Oman</i>	(122.0° F, 50.0° C) in June
Honolulu, <i>Hawaii</i>	( 87.1° F, 30.6° C) in September

In *Ireland* during August and September, there were serious floods and rains throughout the west; not only was hay and grain washed away, but also the potatoes were swept up out of the ground. During October, there were heavy rains and floods. And in November, incessant rains and floods; River Shannon rose greatly. Also floods in Dublin.<sup>47, 92</sup>

On 1-3 September 1821, a hurricane struck Guadeloupe in the *Lesser Antilles* and the northeast coast of the *United States* causing more than 200 deaths.<sup>141</sup>

A small but extremely violent hurricane was first encountered off *Turk's Island* in 1 September 1821. It traveled to the north of *the Bahamas* on the 2<sup>nd</sup>, to the coast of the Carolinas in the *United States* early in the morning of the 3<sup>rd</sup>; and then during the course of the day, along the sea coast to New York and Long Island; and then continued its course across the states of Connecticut, Massachusetts, New Hampshire, and Maine. It traveled approximately 1,800 miles in 60 hours.<sup>228</sup>

On 9 September 1821, a hurricane struck St. Kitts in the *West Indies*.<sup>144</sup>

On 9 September 1821, several tornados struck the *United States*. One strong tornado struck New Hampshire and the other struck Massachusetts. It was thought that these tornados originated at Lake Champlain. There was also a tornado spotted at Berlin, Vermont. One tornado entered New Hampshire at Cornish. It then passed east of the Grantham Mountain in Croydon, then over Sunapee, Sunapee Lake, New London, Sutton, the west branch of the Kearsarge Mountain, Warner, Salisbury, and Boscawen. In places this tornado was a half-mile [0.8 kilometers] wide. At New London, the tornado split a large rock in two. The rock was 100 feet long, 50 feet wide, and 20 feet high [30 by 15 by 6 meters]. At Sutton, trees were stripped of their bark and limbs. The second tornado crossed the Connecticut River where Vermont, New Hampshire and Massachusetts meet, and then in Massachusetts over the towns of Northfield, Warwick, Orange, Royalston, Winchendon, Ashburnham and Fitchburg. This tornado was up to 120 rods [3/8 mile, 0.6 kilometer] wide in places. At least 5 people were killed outright in New Hampshire and at least 3 in Massachusetts and many injured including at least one mortally. The tornado destroyed houses, barns, buildings, a tavern, a blacksmith shop, forests and orchards, crops and a bridge and killed many domestic animals.<sup>199</sup>

On 15 September 1821, a hurricane struck Mississippi in the *United States* causing 35 deaths.<sup>141</sup>

On 17 September 1821, a powerful tornado struck New Hampshire in the *United States*. Most of the damage extended from Croydon, Wendell, New London, Sutton and Warner. The violent storm killed or injured many people, destroyed houses, barns, trees and fences. The wind was able to overturn stones

buried in the earth. It moved a 500-pound stone several feet. A 60-foot hemlock log which was half buried in the earth was carried 6 rods [99 feet, 30 meters] forward while a knot from the same log was carried 15 paces back and driven with great force two feet under the turf. Trees were stripped of bark.<sup>191</sup>

In New South Wales, *Australia*, there was a drought from September 1821 to February 1822.<sup>103</sup>

On November 1821 a great storm struck along the coast from Durham to Cornwall in *England*. Many vessels were lost.<sup>57, 90</sup>

In 1821, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 2 April and 1 May, floods struck Hopei (now Hebei province) in northern *China* at Ning-chin.

— During the period between 31 May and 28 June, floods struck Hupeh (now Hubei province) in central *China* at Pao-k'ang and Sui; and Shantung (now Shandong province) on the east coast of *China* at Chi-mo and Po-hsing

— During the period between 8 August and 8 November, floods struck Shantung province at Hui-min, Tsinan, Shang-ho and Chan-hua; and Hupeh province at Ch'ien-chiang and Pao-k'ang [possible misprint, Jên-k'ang].

In 1821 during the period between 8 August and 8 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Huang-yen and Lung-ch'üan.<sup>153</sup>

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**Winter of 1821 / 1822 A.D.** The winter of 1822 was mild throughout *Europe*. In St. Petersburg, *Russia*, the winters usually last for four consecutive months and are very severe, and to a lesser degree for two additional months. So generally the winters last at least six months. But this winter was comprised of only a month and a few days. The first accumulating snows fell on Christmas day, and generally disappeared in the first days of February. Since then the temperatures were very mild. The overcast sky was often rainy; it snowed from time to time a little; and some cheerful days were interspersed with violent storms from the southwest. The rain-swollen rivers brought the water levels up in the channels; and threatened the deeper parts of the city with the greatest danger from flooding. In Siberia, where winter is generally very severe, this year was weak. And from Tobolsk in west-central *Russia* and points further north; warm winds prevailed. There was an absence of snow everywhere. From Berezov (Beryozovo) in north-central *Russia* to one of the northernmost towns in our areas, it was raining heavily on 8 December; the elderly residents had never seen anything like it.<sup>62</sup>

In different parts of the *Russian Empire*, the temperature was anomalous. At the end of November 1821 new violets were picked from the ground in Riga, *Latvia*. By 10 December, the cold still had not been felt in *Poland*, *Central Russia* and Moscow. But the continuous rains made the roads impassable because of the bottomless mud. The winter did not begin in St. Petersburg until 4 December. On that day the thermometer fell to 9.5° F (-12.5° C). Towards the end of the month, the temperatures were 39.2° to 46.4° F (4.0° to 8.0° C).<sup>62</sup>

In *England*, violets and primroses were sold in the streets of London in mid-December. There followed a long period of rain, but on Christmas the weather was wonderful. In *Ireland*, the potato crop was damaged by the abundant rainfall this winter.<sup>62</sup>

Major storms reigned in *France* in 1821. On the night of December 21, 1821 was marked in the Alps to the Pyrenees and from the Mediterranean Sea to the Atlantic Ocean by storms, torrents of rain, hail, lightning and thunder. All meteorological instruments documented the disruption. The barometer was down tremendously especially in Paris, Dieppe, Toulouse, Montpellier.<sup>79</sup>

On the night of 21 December 1821 there was a great atmospheric disturbance. In Toulouse, *France* the barometer fell to 719 millimeters and in Montpellier it fell to 721 millimeters.<sup>79</sup>

In the south of *France*, *Italy* and *Spain*, the temperature was very mild with only one occurrence of cold weather combined with strong winds at the beginning of the season. A hurricane struck on 5 November and then the winter weather disappeared. As a result, several trees were in bloom and others produced new fruits. By the end of December, the water level had raised in the lagoons by over 1 meter (3.3 feet).<sup>62</sup>

Southern *France* experienced a very harsh winter in 1821-22. The winter destroyed a large quantity of olives trees.<sup>79</sup>

In Paris, *France* there wasn't a single day of cold to the end of 1821. In December, the mean temperature for the month was 45.5° F (+7.5° C). The highest 55.4° F (+13.0° C) occurred on 3 December, and the coldest 35.2° F (+1.8° C) on 7 December. In January there were five days of frost. The mean temperature for the month of January was 39.9° F (+4.4° C). The highest temperature 48.9° F (+9.4° C) occurred on 25 January and the lowest 25.7° F (-3.5° C) on 7 January. In January, the sky was generally overcast. In February there were three days of frost. The mean temperature for February was 43.0° F (+6.1° C). The highest temperature of 53.6° F (+12.0° C) occurred on 8 February and the lowest 25.2° F (-3.8° C) on 1 February. In February the sky was overcast, but less than in January. In March there was only one day of frost. The mean temperature for March was 49.8° F (+9.9° C). The highest temperature of 71.2° F (+21.8° C) occurred on 28 March and the lowest 29.3° F (-1.5° C) on 1 March. The mean temperature for the month of April was 52.0° F (+11.1° C). The highest temperature was 73.9° F (+23.3° C) on 15 April and the lowest 34.3° F (+1.3° C) on 3 April.<sup>62</sup>

On 25 January 1822, M. de Thielau who was going to Freyberg [Freyburg, *Germany*?] during a great downfall of snow observed that the ends of the branches of all the trees had slightly colored blue lights emanating from the tips [St. Elmo's Fire].<sup>271</sup>

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1821 occurred on 30 November. Snowed all day and night.<sup>116</sup>

During the winter of 1821-22, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 92 days.<sup>202</sup>

Miss Ellen D. Larned described the New England winter of 1821-22 at Thompson, Connecticut in the *United States* — On 30 November 1821 - snowed all day, light; high wind. December 14<sup>th</sup> - first sleighing, pretty good but rough, duration doubtful. Good sleighing reported early in February in 1822. February 18<sup>th</sup> - snowed all day. February 21<sup>st</sup> - very rainy, high freshet.<sup>116</sup>

In the winter of 1821-22 in Bradford County, Pennsylvania in the *United States* the snow, which fell in the beginning of November, continued through the rest of the winter.<sup>178</sup>

Towards the end of 1821, the winter climate in *Canada* was severe cold. The Lawrence River was frozen from Montreal.<sup>62</sup>

In February 1822, the cold was so intense in West Florida in the *United States* that all the fruit trees were killed to the ground; but this season was comparatively mild in East Florida.<sup>139</sup>

Mercury can become a solid in extreme cold, although it is not very malleable in this state. Mercury begins to freeze within a hundredth of a degree of (-39.5° C, -39.1° F). In Melville Island [*Canada*], mercury, exposed to free air froze during the course of five months during the year. The same material

was frozen in the Island of Ingloolik [Ingloolik Island, *Canada*] in December, January, February and March 1822.<sup>80</sup>

**1822 A.D.** In *Great Britain* in January, there were great storms and floods through the British Islands generally.<sup>47, 92</sup>

In Geneva, *Switzerland*, there were great floods; serious damage.<sup>47, 92</sup>

*Russia* suffered from a major famine in 1822.<sup>96</sup>

In 1822, the Brazos River in Texas in the *United States* flooded. Very little is known of the flood of 1822, except that it was the greatest that had occurred for several years prior to that time. "The Brazos River had not been out of its banks for over thirty years until 1822, when there was a great overflow."<sup>123</sup>

On 7 May 1822 in west-central *Germany*, there was a hailstorm at Bonn. The hailstones weighed from 12 to 13 ounces (340 to 369 grams).<sup>93</sup>

On 25 May 1822 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>

On 30 May 1822 in *England*, there was a hailstorm in Worcestershire.<sup>93</sup>

On 6 June 1822, a great cyclone struck Bombay [now Mumbai], *India*. As many as 100,000 of the inhabitants destroyed by the tidal wave (storm surge), and probably an equal number of cattle.<sup>47, 57</sup>

In 1822, a powerful cyclone struck Barisal in southern *Bangladesh* causing 50,000 deaths.<sup>98</sup>

In 1822, a terrible cyclone, followed by strong tidal waves, burst upon the seaboard of Bengal [today this is *Bangladesh* and the state of West Bengal in *India*] and caused not only the destruction of all crops but also a large number of human lives and heads of cattle.<sup>179</sup>

The summer of 1822 in Paris, *France* was characterized by:

Hot days	55 days
Very hot days	3 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Mechelen, <i>Belgium</i>	(101.8° F, 38.8° C) in July
Joyeuse, <i>France</i>	( 99.1° F, 37.3° C) on 23 June
Alais, <i>France</i>	( 97.7° F, 36.5° C) on 14 and 23 June
Liège, <i>Belgium</i>	( 95.0° F, 35.0° C)
Maastricht, <i>the Netherlands</i>	( 93.2° F, 34.0° C) on 11 June
Paris, <i>France</i>	( 92.8° F, 33.8° C) on 10 June
Avignon, <i>France</i>	( 91.9° F, 33.3° C) on 14 July
Strasbourg, <i>France</i>	( 90.5° F, 32.5° C)
La Chapelle, <i>France</i>	( 87.3° F, 30.7° C) on 21 August
Brussels, <i>Belgium</i>	( 84.9° F, 29.4° C) on 10 June
London, <i>England</i>	( 81.0° F, 27.2° C) on 10 June

The summer season began early over almost all of *Europe*. *Russia* enjoyed a glorious spring from the first days of May. The early onset of heat caused the fruit to reach a surprising early maturity. In *England*, the heat in early June was so great, that 11 post horses fell in one week on the road to Cheltenham. In Barcelona, *Spain* the temperature reached 86° F (30° C) on 1 June. In *Italy*, the heat and

drought of the summer was considered outrageous. And the grapes reached maturity 40 days earlier than normal.<sup>62</sup>

The drought during the hot season in *France* was very great. From 21 August to 26 September 1822, the water level on the Seine River at the bridge "Pont de la Tournelle" remained almost constantly below zero [the low water mark of the year 1719]. The drought was so severe that beginning in March in southern *France*, farmers drove mules great distances to bring back water for their cattle. The spring temperatures were similar to the temperature normally observed in August. The harvest ended before 23 June in Languedoc. There were few sheaves, but very good ears. In Burgundy, the year produced unusual beauty in the sky. The grape harvest began on 2 September (although it could as easily started in 15 August). In the neighborhood of Vesoul, the grape harvest started on 19 August. The yield was fairly abundant and the wine of a very excellent quality. The cereal harvest was generally less abundant than in previous years.<sup>62</sup>

In Joyeuse, *France*, in June, the mercury rose to 90.5° F (32.5° C) eight times, to over 95.0° F (35.0° C) three times, and once on June 23 to 99.1° F (37.3° C). The mean of the maxima for the month of June was 90.0° F (32.2° C). In all parts of *France*, especially in the south, the heat during the month of June was excessive. When the mean temperature of June was compared to the mean temperatures for the same month for the 10 preceding years; the June of 1822 was 9.0° F (5.0° C) warmer. The extremely high temperature coincided with a very prominent electrical state in the atmosphere. Although no rain fell, storms produced significant lightning and sometimes hail. These storms inflicted much damage to the vineyards on the northern and eastern shore of the lake [Lake Geneva] and a number of municipalities in the canton of Vaud in southwestern *Switzerland*.<sup>62</sup>

The year 1822 in Bradford County, Pennsylvania in the *United States* was remembered as the "summer of drought and deaths." On 31 August 1822, the newspaper "The Settler" reported from Towanda: "It has been our unpleasant task to record more deaths within a few months than any other period of time of the same length for years. This is undoubtedly owing to the peculiarity of the season—the extreme drought and heat, which have so long prevailed. A parallel to it is not in the recollection of the oldest inhabitant in the county. Week after week has passed away and not a drop of rain has reached us. The earth parched, meadows and pastures dried up, streams and springs, never before known to fail, now dry, cold chilling nights, a continuous gloomy and sultry heat during the day, has been the peculiar character of the whole season. For 40 days there has not been a cloud in the horizon."<sup>178</sup>

In 1822 during the first half of spring, the heat abruptly came to an end with violent gusts of snow and rain. Some thunderstorms followed by rain interrupted the transient heat. The harvest was advanced over a month. The wheat harvest took place on June 25. The maximum temperature arrived in Paris, *France* on June 10, with a reading of 92.8° F (33.8° C).<sup>79</sup>

Major storms reigned in *France* in 1822.<sup>79</sup>

In Havana, *Cuba*, there was a great deluge.<sup>47, 92</sup>

The great gale of 1822, caused the loss of 200 lives in Georgetown County, South Carolina in the *United States*.<sup>118</sup>

On 27 September 1822, Charleston, South Carolina in the *United States* was struck by a destructive hurricane.<sup>124</sup>

On 27 and 28 September 1822, a strong gale [hurricane] struck South Carolina in the *United States*. The loss of life was very great for those early days; forty were drowned at North Inlet; twenty on Murphy



Island, and probably in all 200 at various points along the coast. The storm began about 10 p.m. on the 27<sup>th</sup> and was all over by daylight of the 28<sup>th</sup>. After that gale several planters built, storm towers of brick for their slaves to take refuge in.<sup>117</sup>

On 27-28 September 1822, a hurricane struck South Carolina in the *United States*. Most accounts cite 200 deaths but one-account claims 300.<sup>141</sup>

On 20-22 October 1822, a hurricane struck offshore of Virginia in the *United States*. A schooner foundered off Richmond, Virginia.<sup>141</sup>

In *Ireland* in 1822, there was a dreadful famine caused by the failure of the potato crop. “While, however, the agriculturists of the continent were suffering from an abundance, a grievous famine arose in *Ireland*, showing the anomalies of her situation, resulting either from the staple food of her population differing from that of surrounding nations, or the limitation of her commercial exchanges with her neighbors. Her distresses from scarcity were aggravated by the agrarian outrages, originating in the pressure of tithes and rack-rents on the peasantry and small farmers. Several of the ringleaders of these disorders were apprehended by the civil and military power, and great numbers executed or transported.”<sup>57</sup>

*Ireland* suffered the effects of famine in 1816, 1822 and 1831.<sup>188</sup>

In 1822 in *Ireland*, there was a dreadful famine, produced by failure of the potato crop.<sup>91</sup>

In *Ireland*, there were great storms and inundations at Wexford and Cork.<sup>47, 92</sup>

In *Ireland* on the 12<sup>th</sup> of December, there was a great storm and considerable destruction of property, particularly in the neighborhood of Dublin.<sup>57</sup>

On 12 December 1822, a storm struck *Ireland*, particularly in the vicinity of Dublin, many houses were thrown down, and vast numbers unroofed.<sup>90</sup>

On 12 December 1822, a hurricane struck Dublin, *Ireland* and its vicinity. From forty to fifty lives were lost and \$1,000,000 of property destroyed.<sup>197</sup>

In 1822, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 23 January and 21 February, floods struck Hupeh (now Hubei province) in central *China* at Chung-hsiang and Ch’ien-chiang. At Chung-hsiang, the dikes were damaged.

— During the period between 19 June and 17 July, floods struck Hupeh province at Kuang-hua, Chu-shan and Yün.

— During the period between 18 July and 16 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Wu-ch’êng and Hopei (now Hebei province) in northern *China* at Li, Wu-ch’iang, Pao-ting, T’ang-shan, Jên-ch’iu and Ch’ü-yang.

— During the period between 17 August and 14 September, floods struck Shensi (now Shaanxi province) in central *China* at Chên-pa and Hupeh province at Ying-ch’êng.

— During the period between 15 September and 14 October, floods struck Shantung province at Ho-tsê, Chan-hua, Liao-ch’êng, Ch’ang-ch’ing, Jih-chao, Kuan-ch’êng and Chü-yeh. At Liao-ch’êng, the fields were damaged.

In 1822 during the period between 5 February and 6 May, a drought engulfed Hupeh (now Hubei province) in central *China* at I-tu and Shantung (now Shandong province) on the east coast of *China* at Jih-chao. During the period between 6 May and 8 August, a drought engulfed Chekiang (now Zhejiang

province) on the east coast of *China* at Chia-hsing and Hu-chou.<sup>153</sup>

**Winter of 1822 / 1823 A.D.** The Seine River in *France* froze from 30 December 1822 until 8 January 1823 and froze a second time from 15 to 29 January. The Meuse River froze from 17 December 1822 until the 30<sup>th</sup> of January 1823.<sup>62</sup>

The winter of 1822-23 was severe in *France* and *Belgium*. In Paris, *France*, there were 53 frost days, including 21 consecutive. The frost began on 8 December 1822, and held until 2 January 1823 with a break of two days (11 and 12 December); the frost then occurred between 9 and 25 January. The Seine River was frozen twice. The first time was from 30 December to 8 January and the second time from 15 to 29 January. In southwest *Germany*, the Neckar River also froze twice and carriage crossed the river on the ice; just as it was with the Rhine River that experienced a moderate freeze under temperatures of 10° to 12° F (-11° to -12° C). The Meuse River froze. The Scheldt River experienced very large ice floes. In Holland [now *the Netherlands*] wagons with their heaviest loads crossed on the ice on the River Leck. In the interior of *France* the river ice was not very strong, and the newspapers reported numerous cases of skaters falling through the ice at Rouen and Moens, *France*. In the Alps, in Piemont in northwest *Italy* and the Roman States [the Papal States in northern *Italy*] there was much snow. At Domo d'Ossola (Domodossolain) in northern *Italy*, the snow fell for 48 hours without interruption and in such quantity that avalanches blocked roads and several persons were buried with a large number of animals under the snow. The lowest observed temperatures at different locations are:<sup>62</sup>

St. Petersburg, <i>Russia</i>	(-22.7° F, -30.4° C) on 7 February 1823
Mechelen, <i>Belgium</i>	(-11.9° F, -24.4° C) in January 1823
Maastricht, <i>the Netherlands</i>	( -9.2° F, -22.9° C) on 23 January 1823
Brussels, <i>Belgium</i>	( 24.1° F, -4.4° C) on 16 December 1822
<i>Ibid.</i>	( 0.5° F, -17.5° C) on 25 January 1823
Paris, <i>France</i>	( 16.2° F, -8.8° C) on 27 December 1822
<i>Ibid.</i>	( 5.7° F, -14.6° C) on 14 January 1823
La Chapelle (near Dieppe), <i>France</i>	( 14.2° F, -9.9° C) on 30 December 1822
<i>Ibid.</i>	( 12.0° F, -11.1° C) on 22 January 1823
Orange, <i>France</i>	( 24.8° F, -4.0° C) on 2 December 1822
<i>Ibid.</i>	( 20.0° F, -6.7° C) on 13 January 1823
Avignon, <i>France</i>	( 20.8° F, -6.2° C) on 14 January 1823
London, <i>England</i>	( 25.0° F, -3.9° C) on 30 December 1822
<i>Ibid.</i>	( 21.9° F, -5.6° C) on 22 January 1823
Rome, <i>Italy</i>	( 24.8° F, -4.0° C) on 29 and 30 December 1822
Hyères, <i>France</i>	( 29.8° F, -1.2° C) on 13 January 1823

In the *United States* during the winter of 1822-23, the temperature at Fort Howard (Green Bay, Wisconsin) fell to -38° F in February.<sup>113</sup>

Miss Ellen D. Larned described the New England winter of 1822-23 at Thompson, Connecticut in the *United States* — On 3 December 1822 - snowed hard in the night; folks began to sleigh, but could not keep it up. On 1 January 1823 - violent blowing storm; resumed sledding. January 5<sup>th</sup> - violent storm of snow and hail. January 19<sup>th</sup> - snow wastes away fast; violent rain. February 3<sup>rd</sup> - more snow and sleighing. February 12<sup>th</sup> - deep snow and very level. February 14<sup>th</sup> & 15<sup>th</sup> - very great snowstorm; a man perished on the meadow. February 24<sup>th</sup> - a violent snowstorm all day; roads terribly blocked up; all hands out to shovel. March 2<sup>nd</sup> - threatens to thaw. March 3<sup>rd</sup> - cold as Greenland and grows colder all day. March 6<sup>th</sup> - violent rain and snow. March 20<sup>th</sup> - snow; good sleighing.<sup>116</sup>

In the winter of 1822-23 in Bradford County, Pennsylvania in the *United States*, on 23 March 1823 according to the pioneers there was "a great snow storm."<sup>178</sup>

During the winter of 1822-23, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 90 days.<sup>202</sup>

In March 1823, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 1<sup>st</sup> (24° F); 4<sup>th</sup> (28° F). There was frost on the March 9<sup>th</sup> and 26<sup>th</sup>. It snowed on the March 2<sup>nd</sup>.<sup>116</sup>

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**1823 A.D.** On 17 February 1823, there was a terrific hailstorm in New South Wales, *Australia*.<sup>103</sup>

On 6 March 1823, there was a disastrous flood in Rhode Island and Connecticut in the *United States*. Very deep snow covered the ground in southern New England during the end of February. On 5 March, it rained heavily for 24 hours. This caused the freshet. The bridge at Natick, Rhode Island was carried away whole by the floodwaters. The bridge on the old road, commonly called the Natick Bridge, and a bridge in Olneyville in Rhode Island were also destroyed. The bridge at the Arkwright factory and a bridge at the Hope factory were severely damaged. In Connecticut, the six bridges that span the Yantic River were all carried away. The oil mill at Bean Hill was swept away. The oil mill and a machine shop near the falls at Norwich were seriously damaged.<sup>199</sup>

The maximum temperature during the summer in Ambikūl [Ambikol in northern *Sudan*] was 116.4° F (46.9° C) on 31 May.<sup>62</sup>

Grain prices rose suddenly in the autumn of 1823 at Injeram, *India* due to a failure of the rains. By December, a famine was taking hold in Madras [now Chennai]. There were several deaths due to starvation. Many children were abandoned in despair by their parents. A serious grain riot took place in the town, rendering it necessary to call out the military. The failure of the periodic rains affected the Carnatic and western districts of India and caused grain prices to double. In September at Vizagapatam [now Visakhapatnam on the southeast coast of *India*], starving parents became so desperate that they began selling their infant children.<sup>188</sup>

On 5 June 1823 in *England*, there was a great hailstorm in Buckinghamshire.<sup>93</sup>

In 1823, many regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 11 April and 10 May, floods struck Hupeh (now Hubei province) in central *China* at Shih-shou and Chiang-ling; and Hopei (now Hebei province) in northern *China* at P'ing-hsiang, Ku-an, Wu-ch'ing, P'ing-ku, Pao-ting, Li, Jên-ch'iu, Ch'ing, Ch'ü-yang, Yü-t'ien and Pa. At Chiang-ling, the dikes were damaged.

— During the period between 8 July and 5 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Wu-ch'êng, Chü-yeh and Liao-ch'êng; Hopei province at T'ung; Chekiang (now Zhejiang province) on the east coast of *China* at Chiang-shan; and Hupeh province at Huang-mei.

— During the period between 6 August and 4 September, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow, Kao-ch'un and T'ai Lake. At T'ai Lake, the crops were damaged by the floodwaters.

In 1823 during the period between 6 May and 8 August, a severe drought engulfed Shantung (now Shandong province) on the east coast of *China* at T'êng.<sup>153</sup>

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**Winter of 1823 / 1824 A.D.** The winter of 1823-24 was mild in *Northern Europe*. In January in *Russia*, there were green vegetables in the markets. On 4 February in *Russia* the temperature fell to 9.5° F (-12.5° C). During the winter, there were violent storms and much snow fell. The navigation of the straits remained open. In Stockholm, *Sweden*, the mean temperature of January was 34.7° F (+1.5° C). The thermometer fell during that month only one time to 20.3° F (-6.5° C) and increased to 44.6° F

(+7.0° C).<sup>62</sup>

In *France*, the winter was mild. There were only 31 days of frost, with 5 consecutive. The minimum temperature was 23.4° F (-4.8° C) on 14 January.<sup>62</sup>

In *Spain* in January, the almond trees were in full bloom, but then violent storms caused the flower to fall off. In *Italy*, it was much colder, and the mountains in the vicinity of Rome were covered with snow. On 5 February, the thermometer fell to 28.6° F (-1.9° C).<sup>62</sup>

A fall of snow occurred in *Jamaica* at Annotobay on 15 December 1823.<sup>43</sup>

During the winter of 1823-24, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 78 days.<sup>202</sup>

Miss Ellen D. Larned described the New England winter of 1823-24 at Thompson, Connecticut in the *United States* — For these six years (1823-1829) there was no record of the winter. It was during this interval that the editor of the National Weather Bureau was inclined to place a snowless term of years referred to in family reminiscences as the time when snowstorms were supposed to have permanently gone out of fashion and people talked of selling their sleighs.<sup>116</sup>

The winter of 1823-24 in Bradford County, Pennsylvania in the *United States* was very mild with only a few biting cold days. On 30 & 31 March 1824, there was a snowfall of over 24 inches [0.6 m].<sup>178</sup>

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**1824 A.D.** On 14 January 1824 at Gothen [Gothenburg, *Sweden*], Mr. Maxadorf observed the fires of St. Elmo. The phenomena occurred at the close of a storm. There was a wagon loaded with straw in the middle of the field over which hung a large black cloud. Every stalk stood out straight and seemed on fire. Even the whip of the driver threw off a vivid light. The phenomena lasted 10 minutes until the winds blew the cloud away.<sup>205</sup>

On 23 February 1824, a hurricane struck the island of *Mauritius* in the Indian Ocean. It caused great loss to the shipping in the harbor. Thirty sails were driven ashore during the storm.<sup>198</sup>

In *India*, there was a severe drought in the Delhi, and some other districts.<sup>47</sup>

In *India* during 1824-25, there was a famine in several districts. In Delhi and neighboring provinces, it was due to a severe drought. In the Madras Presidency, and more particularly in the Carnatic and Western districts, the cause was a failure of rains at the usual seasons. In Hindustan, the same.<sup>57</sup> [The Delhi is located in northern *India*. Madras Presidency is in southeastern *India*. Carnatic is in southern *India*. Hindustan is in northern *India*.]

In 1824, there was a minor famine in Delhi and the neighborhood and in the North-Western Provinces of *India*.<sup>179</sup>

In 1824, there was a famine in Kandeish [now Khandesh, *India*] and southern *India*.<sup>182</sup>

In 1824 in *Australia*, due to a severe drought, the crops failed in New South Wales.<sup>101</sup>

In *Ireland*, there were great floods at Belfast.<sup>47, 92</sup>

On 22 May 1824 in *England*, there was a hailstorm in Somersetshire.<sup>93</sup>



In St. Petersburg, *Russia* on November 19, the city was flooded from an overflow of the Neva River. The river rose to the first story of the houses in this city. Carriages and horses were swept away, and a regiment of Carabineers, who had climbed to the roof of their barracks, were drowned. At Cronstadt, a 100-gun ship of the line was left in the middle of the marketplace. In the two places more than 10,000 lives were lost, and property to the amount of many millions of rubles was destroyed. The Neva River had overflowed in 1728, 1729, 1735, 1740, 1742, and 1777; but none of these occasions was equal to that of 1824.<sup>47, 92</sup> [The carabineers are the mounted Karabinary regiments of the Russian Imperial army. Cronstadt or Kronstadt is the port of St Petersburg at the mouth of the Neva River in northern *Russia*.]

On 23 November 1824, a tremendous hurricane throughout *England*.<sup>43</sup>

In New South Wales, *Australia*, turnips failed through the extreme drought of 1824.<sup>103</sup>

In 1824, there was a great storm that passed over the district of Prospect and the Pennant Hills in New South Wales, *Australia*. It was accompanied by thunder, lightning, and hail; and so great was the fall of hailstones that they were 10 feet deep in some parts of the low grounds. Four days later, a piece of ice [hailstone] was found still 12 inches in circumference.<sup>103</sup>

In 1824, a drought engulfed Hupeh (now Hubei province) in central *China* at Fang and Ma-ch'êng; and Shantung (now Shandong province) on the east coast of *China* at Ts'ao. Then during the period 1-29 March, floods struck Hopei (now Hebei province) in northern *China* at Ta-hsing and Wan-p'ing. Then during the period between 29 April and 25 July, a drought engulfed Hupeh province at I-ch'êng. During the period between 8 August and 8 November, a drought engulfed Shantung province at Chang-ch'iu and Jung-ch'êng.<sup>153</sup>

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**Winter of 1824 / 1825 A.D.** Miss Ellen D. Larned described the New England winter of 1824-25 at Thompson, Connecticut in the *United States* — For these six years (1823-1829) there was no record of the winter. It was during this interval that the editor of the National Weather Bureau was inclined to place a snowless term of years referred to in family reminiscences as the time when snowstorms were supposed to have permanently gone out of fashion and people talked of selling their sleighs.<sup>116</sup>

During the winter of 1824-25, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 60 days.<sup>202</sup>

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**1825 A.D.** In *Denmark*, during a violent storm the sea broke through the isthmus between the North Sea and Lymfjord, thereby making the north part of Jutland an island.<sup>47, 92</sup>

In Rotterdam, Holland [now *the Netherlands*], the Meuse River overflowed, doing considerable damage.<sup>47, 92</sup>

In *India* during 1825-26, there was a famine in the northwest provinces, caused by a failure of rains. There was scarcity in Sangor and Nerbada territories caused by blight and a succession of heavy thunderstorms.<sup>57</sup> [The Saugor and Nerbudda Territories was a region of British India, located in central part of present-day Madhya Pradesh state in central *India*.]

In 1825-27, there was a famine in the Northwest Provinces in *India*. During this period the famine sometimes also affected Bundelcund to the south, Rajputana to the west and Punjab to the north. But to the east at Oudh and Rohilcund, the area enjoyed relative immunity from this disaster.<sup>156</sup>

In 1825, the scarcity in the North-Western Provinces and some parts of the central provinces in *India* was caused by a thunderstorm.<sup>179</sup>



A correspondent in *Jameson's Journal* mentions a hailstorm, which occurred in *India* in May 1825, in which hailstones varied in size from a filbert to that of a pigeon's egg.<sup>43</sup>

On 4 June 1825, a storm struck New York in the *United States*. The schooner *Hornet* foundered during the storm with loss of her entire crew.<sup>141</sup>

On 10 July 1825 in *Ireland*, there was a dreadful hailstorm in Londonderry.<sup>93</sup>

The Brussels, *Belgium* newspapers dated 23 July 1825 say: The heat is so excessive that men and a woman died [from heatstroke] in the country while they were harvesting wheat.<sup>80</sup>

On 25 July 1825, a hurricane struck *Guadeloupe* in the Leeward Islands, in the Lesser Antilles. "The wind at the moment of its greatest intensity seemed luminous; a silvery flame streamed through the chinks in the walls, the key-holes, and other openings, and made one think, in the darkness inside the houses, that the heavens were on fire."<sup>205</sup>

On 26 July 1825, a great Atlantic hurricane struck the islands of *Guadeloupe* and *Puerto Rico* causing approximately 1,300 deaths.<sup>107</sup>

On 26 July 1825, a hurricane struck *Guadeloupe* in the *Leeward Islands* and *Puerto Rico*. [Various accounts list the number of deaths as >1300, >500, 374, and 372.]<sup>141</sup>

The great drought of 1825 in *France* began in November 1824 and lasted, without interruption, until October 1825. The drought was reported from south to north and from east to west, notably in Paris, Metz, Rouen, Strasbourg, Nantes, Berzé-la-Ville, Tarbes, Joyeuse, Orange, and Marseille. The number of rainy days and amount of rainfall were everywhere lower than average. The effect of the drought was greater in Paris, in Chalons, in Bordeaux, in Nevers, and in Arles. The low level of the water in the river reached or fell below the zero water mark.<sup>79</sup>

Intense heat, long and sustained, also marked the year 1825. Spring, summer and fall produced almost anywhere in *France* a high temperature. The peak temperatures occurred generally from 18 to 23 July, and reached 93.9° F (34.4° C).<sup>79</sup>

The heat of the summer of 1825 extended over *France, Italy, Spain* and even the *United States*. The drought was unfortunately excessive in *France*. The Seine River in Paris at the bridge "Pont de la Tournelle" remained below zero [the low water mark of the year 1719] from 26 July to 17 August and from 28 September to 21 October. The summer of 1825 in Paris, *France* was characterized by:

Hot days	37 days
Very hot days	7 days
Extremely hot days	2 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Paris, <i>France</i>	( 97.3° F, 36.3° C) on 19 July
Maastricht, <i>the Netherlands</i>	( 96.3° F, 35.7° C) on 19 July
Vire, <i>France</i>	( 95.0° F, 35.0° C) in July
Avignon, <i>France</i>	( 95.0° F, 35.0° C) on 21 July
Strasbourg, <i>France</i>	( 93.9° F, 34.4° C)
Pont de Souillac, <i>France</i>	( 93.9° F, 34.4° C) on 19 July
Metz, <i>France</i>	( 93.2° F, 34.0° C) on 18 & 19 July
La Chapelle, <i>France</i>	( 92.3° F, 33.5° C) on 18 July

Saint George Del Mina, <i>Ghana</i>	( 90.0° F, 32.2° C) on 26 March
Brussels, <i>Belgium</i>	( 88.3° F, 31.3° C) on 19 July
London, <i>England</i>	( 87.1° F, 30.6° C) on 19 July
Marseille, <i>France</i>	( 86.0° F, 30.0° C)

In Burgundy, *France*, the summer was hot, and punctuated by small rainstorms. Unfortunately, a hailstorm caused widespread devastation between Dijon to Chalons. The grape harvest began on 20 September. The crop was poor but the wine was of very excellent quality. In the vicinity of Bordeaux, the wine was very abundant, was sold at enormous prices, not for its age but its quality. In *France*, the corn harvest was satisfactory.<sup>62</sup>

On 17-18 November 1825, a storm struck the coast of North Carolina in the *United States*. The schooner *Harvest* was wrecked. Five or more persons were lost in what may have been a late season hurricane. Five of 15 people on board were lost and a rowboat carrying rescuers overturned in the surf.<sup>141</sup>

In 1825 during the period between 16 July and 13 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Ying-shan. During the period between 14 August and 11 September, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Tsinan and Huang.<sup>153</sup>

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**Winter of 1825 / 1826 A.D.** In the *United States* during the winter of 1825-26, the temperature at Portland, Maine fell to -24° F in February.<sup>113</sup>

During the winter of 1825-26, the Hudson River at Albany, New York was closed to river traffic because it was frozen or obstructed by ice for 75 days.<sup>202</sup>

Miss Ellen D. Larned described the New England winter of 1825-26 at Thompson, Connecticut in the *United States* — For these six years (1823-1829) there was no record of the winter. It was during this interval that the editor of the National Weather Bureau was inclined to place a snowless term of years referred to in family reminiscences as the time when snowstorms were supposed to have permanently gone out of fashion and people talked of selling their sleighs.<sup>116</sup>

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### 1826 A.D. – 1829 A.D. Australia. Drought

A severe drought struck New South Wales in *Australia*. Many crops failed. Even the aborigines began to die from lack of food. Lake George dried up. The Darling River, according to the explorer Sturt, was said to be dry.<sup>101</sup>

In 1828 in New South Wales, *Australia*, the drought was so bad that livestock had to be removed from 30,000 acres at Camden for want of water.<sup>103</sup>

On 29 November 1828 in Sydney, *Australia*, “the heat and hot winds of Saturday last excelled all that we ever experienced in the colony. On board the *Volage*, man-of-war, in the shade, the thermometer was 106° F, and on the shore it was, in some parts of the town, 100° F, and in others 104° F. To traverse the streets was truly dreadful, the dust rose in thick columns, and the N.W. wind, from which quarter our hot winds invariably proceed, was assisted in its heat by the surrounding country being all on fire, so that those who were compelled to travel felt themselves encircled with lambent flames. Sydney was more like the mouth of Vesuvius than anything else. Sunday, however, brought a change of wind, since when the weather has been somewhat more endurable.”<sup>103</sup>

In Sydney, *Australia*, in March, 1829, “we are all burnt up: it is frightful to go into the garden. Not a drop of water but what we send for from Botany Swamps. Four pence per gallon was paid for water in Sydney during 1829.”<sup>103</sup>

On March 1829, during Sturt's Expedition in *Australia*, it was written, "I saw rivers cease to flow and sheets of water disappear."<sup>103</sup>

**1826 A.D.** On 24 March 1826, a gale produced such rainfall, that the torrents seemed as if the very floodgates of heaven were opened. It caused an extensive flood in *Canada*, and in the *United States* in New York and the northern New England states.<sup>199</sup>

— In Vermont, the bridges over the West River between Brattleboro and Newfane were destroyed. At Weathersfield, the Black River rose so high that it flooded barnyards and drowned 80 merino sheep. At Bellow Falls, many buildings were destroyed including a paper mill, a sawmill, two bridges, and a dye-house. In the neighborhood of Woodstock, two bridges over the Williams' River were carried away. In Montpelier, the entire village was inundated and the turnpike between Montpelier and Royalton was washed away in so many places, that the road was impassable.

— In Maine, the flood on the Kennebec River was very devastating. Before the storm, the ice on the river was 20 inches [0.5 meters] thick. When the ice broke up, the water raged down on the wharves at Gardiner. The water covered the wharves 4 to 5 feet [1.2-1.5 meters] deep. A great body of ice then pressed down on the wharves. The warehouse at Long Wharf was swept away. At 4 p.m., a great body of ice above the city broke loose and almost destroyed the wharves but an icehouse with 4,000 tons of ice blocked the surge. Sheets of ice leaped twenty feet [6 meters] from the surface of the water and fell against the building, but it held. At Gardiner, 4 or 5 schooners were driven from their moorings. At Hallowell, an ice dam formed and flooded the town, sweeping away buildings and flooding stores on the lower rooms of stores. All the vessels on the stocks were swept away. The bridge at Waterville was destroyed, and 2 or 3 other small bridges between Waterville and Augusta were very damaged.

The year 1826 was a wet year in New England in the *United States*. During the first week of July, a great rain had dislodged a large mass of stone and gravel from one mountain, and the landslide filled up the road at Notch, New Hampshire. The month of August was wet in Massachusetts, Rhode Island and Connecticut. On 14 August, 8.7 inches [22 centimeters] of rain fell at Salem, Massachusetts. The total for the month at Salem was 14 inches [36 centimeters]. The lowlands were inundated and the milldams damaged. On 28 August, a cold heavy rain struck the White Mountains. As a result five of the bridges over the Ammonoosuc River were swept away. The Contoocook River rose higher at Henniker, New Hampshire than it was ever known before. Several bridges and mills on the Souhegan and Merrimack Rivers were swept away. The rainstorm produced a great flood in the mountain region. The Saco River at Notch was sixteen feet [5 meters] above its usual height and had spread to three times its width. And then 30 slides took place on the mountains. The turnpike at Notch was buried by earth and stone 30 feet [9 meters] deep in many areas. At least 9 people were buried at the pass at Notch by the mudslides.<sup>199</sup>

In Paris, *France*, the summer of 1826 was just as warm and dry as the previous summer. In southern *France*, there was abundant rain. The temperature was very high in the north. The summer in Paris was characterized by:

Hot days	36 days
Very hot days	7 days
Extremely hot days	2 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Maastricht, <i>the Netherlands</i>	(101.8° F, 38.8° C) on 2 August
Épinal, <i>France</i>	( 97.7° F, 36.5° C) on 1 July
Paris, <i>France</i>	( 97.2° F, 36.2° C) on 1 August
Metz, <i>France</i>	( 97.0° F, 36.1° C) on 3 August
Geneva, <i>Switzerland</i>	( 94.3° F, 34.6° C) on 3 August
Strasbourg, <i>France</i>	( 93.6° F, 34.2° C)

Basel, <i>Switzerland</i>	( 93.2° F, 34.0° C ) on 3 August
Warsaw, <i>Poland</i>	( 92.8° F, 33.8° C ) in July
Avignon, <i>France</i>	( 91.4° F, 33.0° C ) on 2 July
Liège, <i>Belgium</i>	( 90.5° F, 32.5° C )
Brussels, <i>Belgium</i>	( 88.3° F, 31.3° C ) on 2 August
London, <i>England</i>	( 87.4° F, 30.8° C ) on 27 June
Marseille, <i>France</i>	( 86.4° F, 30.2° C )
La Chapelle, <i>France</i>	( 86.2° F, 30.1° C ) on 2 August

The summer of 1826 was hotter than the year 1819. The hot summer was reported in Toulon, Marseille, Joyeuse, and Toulouse, *France*. Everywhere in southern *France* and in several northern countries, the heat was intense, continuous and long.<sup>79</sup>

A drought in 1826 was recorded in Paris, Rouen, Metz, and Strasbourg, *France*. The drought occurred mainly during the spring and summer. There were twenty-two fewer rainy days in the year than normal.<sup>79</sup>

On 12 June 1826 in *England*, there was a hailstorm in Sussex.<sup>93</sup>

On 18 June 1826 in *England*, there was a great hailstorm in Buckinghamshire.<sup>93</sup>

On 27 June 1826 in *England*, there was a hailstorm in Hertfordshire.<sup>93</sup>

On 28 June 1826 in *England*, there was a great hailstorm in Berkshire, Essex, Middlesex, Shropshire, and Surrey.<sup>93</sup>

In *Sweden* and *Denmark*, a long drought combined with exceptional heat has been devastating to agriculture. From Stockholm, *Sweden*, a letter of 27 June: "All hope of a harvest is gone from us. The gardens are without fruit and almost without leaves; the fields show no trace of green anymore. Scorched by the heat of the sun the ears [of grain] are rapidly deteriorating. To this comes a sad sight; for three days, spread over the horizon there is darkness from the smoke from the forest fires. One of these fires is two mile and the other fire three miles from our capital."<sup>62</sup>

On 27 August 1826, a hurricane struck western *Cuba* causing 33 deaths.<sup>141</sup>

In 1826, a hurricane struck *Cuba*. General Laborde lost his fleet in *Cuba* or the southern coast.<sup>141</sup>

In 1826, a hurricane struck the Cayman Islands in the *Caribbean Sea*. The women of the east end were left widowed when their husbands were lost at sea.<sup>141</sup>

The drought in northern *France* was also very severe. The Seine River in Paris [at the bridge "Pont de la Tournelle"] remained below zero [the low water mark of the year 1719] from 2 August to 7 September and then again for an additional 14 days beginning towards the end of September.<sup>62</sup>

In *Languedoc*, the spring was dry and cold, and later cold and wet. July and August were warm. The harvest was poor. The rain from the summer thunderstorms spoiled the sheaves. The harvest of corn was good, but the wine bad. Burgundy, *France* sustained very great heat. The grapes were scorched and partially eaten by the worms. The grapes were harvested on 2 October. The yield of the harvest was nonetheless ample; but the wine had a foul taste.<sup>62</sup>

In 1826, there was a minor famine in the Central and North-Western Provinces of *India*.<sup>179</sup>

In 1826 during the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Chu-ch'êng and Tung-a. During the period between 5 July and 3 August, a drought engulfed Kiangsi (now Jiangxi province) in southern *China* at Yung-fêng and Wan-an.<sup>153</sup>

Also refer to the section **1826 A.D. – 1829 A.D.** for information on the drought in Australia during that timeframe.

**Winter of 1826 / 1827 A.D.** The winter of 1826-27 had an unusual amount of rain and snow, and was remarkable during the last half of December 1826 and the first half of January 1827 in *Germany*, *France*, in *Provence*, in *Italy* and as far away as Constantinople (now Istanbul, *Turkey*). Paris, *France* experienced 51 days of frost, including 33 frost days without interruption. The cold began on 3 January 1827 and lasted till the 6th, began again on the 17th and lasted, with the exception of a single day (20 February) until the 25<sup>th</sup> of February. In the Auvergne, *France*, an extraordinary amount of snow fell. In *Belgium*, the months of January and February were very cold, and the thaw only began on 27 February and the Meuse River was completely frozen at Dinant and Maastricht. [Dinant is located in southern *Belgium*. Maastricht is in *the Netherlands*.] The lowest temperatures recorded in different cities this winter:<sup>62</sup>

Great St. Bernard Hospice, <i>Switzerland</i>	(-11.2° F, -24.0° C) on 20 January
Basel, <i>Switzerland</i>	( -5.8° F, -21.0° C) on 18 February
Metz, <i>France</i>	( -4.4° F, -20.2° C) on 18 February
Geneva, <i>Switzerland</i>	( -1.7° F, -18.7° C) on 25 January
Maastricht, <i>the Netherlands</i>	( -0.8° F, -18.2° C) on 15 February
Strasbourg, <i>France</i>	( 5.0° F, -15.0° C) on 17 February
Brussels, <i>Belgium</i>	( 6.1° F, -14.4° C) on 16 February
Lyon, <i>France</i>	( 8.6° F, -13.0° C) on 23 January
Joyeuse, <i>France</i>	( 8.6° F, -13.0° C) on 24 January
Paris, <i>France</i>	( 9.0° F, -12.8° C) on 18 February
Laon, <i>France</i>	( 10.4° F, -12.0° C) on 18 February
La Chapelle (near Dieppe), <i>France</i>	( 11.5° F, -11.4° C) on 18 February
Avignon, <i>France</i>	( 11.7° F, -11.3° C) on 21 January
Orange, <i>France</i>	( 12.9° F, -10.6° C) on 25 January
London, <i>England</i>	( 16.0° F, -8.9° C) on 3 January
Alais, <i>France</i>	( 16.2° F, -8.8° C) on 24 January
Madrid, <i>Spain</i>	( 22.1° F, -5.5° C) on 3 January
Hyères, <i>France</i>	( 25.5° F, -3.6° C) on 24 January

The cold affected plants in *Provence*: The winter did not damage the oats because it was covered with snow. The myrtles and oleanders were frozen down to the trunk. The olive trees were damaged at only certain locations. The sainfoin sown in the autumn was frozen. The winter of 1827 had been extraordinary because the snow fell in abundance, and he remained on the ground until the middle of February.<sup>62</sup>

January 1827 was extremely cold in New England in the *United States*. Lakes were frozen very thick with ice. Several persons were frozen to death and many lost their hands or feet to frostbite. Along the coast, many vessels had their cables cut by the ice and forced out to sea, or onto the rocks and beaches.<sup>199</sup>

In the *United States* in Virginia on 21 January, the river was frozen across from Norfolk to Portsmouth, and on the succeeding day from Lambert's Point to Craney Island.<sup>38</sup>

During the winter of 1826-27, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 86 days.<sup>202</sup>

On 21 January 1827, the temperature in Albany, New York in the *United States* fell to  $-23^{\circ}\text{F}$  [ $-31^{\circ}\text{C}$ ].<sup>207</sup>

Miss Ellen D. Larned described the New England winter of 1826-27 at Thompson, Connecticut in the *United States* — For these six years (1823-1829) there was no record of the winter. It was during this interval that the editor of the National Weather Bureau was inclined to place a snowless term of years referred to in family reminiscences as the time when snowstorms were supposed to have permanently gone out of fashion and people talked of selling their sleighs.<sup>116</sup>

In March 1827, at Princess Anne, Maryland in the *United States* the temperature did not fall below freezing but there was a frost on March 31<sup>st</sup>.<sup>116</sup>

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**1827 A.D.** In Naples, *Italy*, there were a destructive inundations.<sup>47, 92</sup>

On 24 April 1827, a severe storm struck the coast of Maine and New Hampshire in the *United States*. Vessels were driven ashore at Portsmouth and Portland. In Portland harbor, many vessels collided with other vessels during the storm, sinking some and damaging others. The flooding on land was also severe. At Cape Neddock, Maine, a woolen factory, a gristmill and a bridge were swept away. Five miles [8 kilometers] upstream, four other bridges were swept away. At Kennebunk, a fulling mill and gristmill were swept away. The Saco River flooded. Fifteen families were rescued off the islands above the Spring's bridge because the water was higher than the first story windows. At Poor-House Island, three families were carried off on men's backs. At Biddeford, Maine, a bridge was swept away. The Presumpscot River was greatly flooded and mills and bridges on it were destroyed. The Winslow's Bridge at Falmouth and the Congin Bridge at Westbrook, Maine, were carried away. At Saccarappa [now Westbrook], Maine, a bridge and gristmill were swept away. A bridge between Brunswick and Topsham, Maine on the Androscoggin River along with two sawmills were swept away. Two hundred thousand dollars of logs were swept away and never recovered. [In present currency, that would be equivalent to \$4 million in lost lumber based on the Consumer Price Index (CPI) inflation rates.]<sup>199</sup>

On 1 May 1827 in *England*, there was a hailstorm in Surrey.<sup>93</sup>

In 1827, the packet-boat *New York* was struck by lightning. The lightning strike affected various parts of steel, which were used in the construction of chronometers, particularly their balance. When the vessel arrived at Liverpool, *England*, it was advanced thirty-three minutes fifty-eight seconds on the time it should have indicated if the vessel had not been struck by lightning.<sup>271</sup>

In July 1827 in *France*, there was a great hailstorm; injured vines and grain.<sup>93</sup>

The maximum temperature during the summer in Geneva, *Switzerland* was  $97.2^{\circ}\text{F}$  ( $36.2^{\circ}\text{C}$ ) on 30 July.<sup>62</sup>

On 17 August 1827 in *England*, there was a hailstorm in Suffolk.<sup>93</sup>

On 17 August 1827, a hurricane struck St. Kitts in the *West Indies*.<sup>144</sup>

A destructive hurricane swept over the Windward Islands [in the *Lesser Antilles*] on 17 August 1827. It visited *St. Martin's* and *St. Thomas'* on the 18<sup>th</sup>; passed the northeast coast of Hayti [*Haiti*] on the 19<sup>th</sup>; *Turks' Island* on the 20<sup>th</sup>; *the Bahamas* on the 21<sup>st</sup> and 22<sup>nd</sup>; was encountered off the coast of Florida and South Carolina in the *United States* on the 23<sup>rd</sup> and 24<sup>th</sup>; off Cape Hatteras [in North Carolina] on the 25<sup>th</sup>; off the Delaware coast on the 26<sup>th</sup>; off Nantucket [in Massachusetts] on the 27<sup>th</sup>; and off Sable Island [off Nova Scotia, *Canada*], and the Porpoise Bank on the 28<sup>th</sup>. The hurricane traveled 3,000 miles in about 11 days.<sup>228</sup>



On 26 August 1827, a storm struck Chesapeake Bay in the *United States*. [The Chesapeake Bay is the largest estuary in the United States. It lies off the Atlantic Ocean, surrounded by Maryland and Virginia.] The vessel *Flag* lost all hands and the passengers perished in the storm.<sup>141</sup>

The year 1827 produced heavy rainfalls and a greater number of rainy days in southern *France*. There was 3.9 inches (100 millimeters) annual rainfall above the average in Marseilles. There was 5.9 inches (150 millimeters) annual rainfall above average in Tarbes. There was 36.7 inches (933 millimeters) annual rainfall above average in Joyeuse.<sup>79</sup>

In *India* in 1827-28, there was a famine in parts of Hindustan. “The autumn of 1827 and the following spring were marked by drought across the Jumna [Yamuna River]. In Pergunnahs, Ranees, and Sirsa, the rains commenced suspiciously, but stopped abruptly early in July, and did not begin again till the 22<sup>nd</sup> September. It was then too late to reclaim the damage, which the drought had already caused; and to add to the general distress there was every chance of a failure in the wheat. This was the staple rubbee [rupee] crop in these regions, and its success was mainly dependent on the river Ganges overflowing its banks, but on this occasion the usual inundations did not occur.”<sup>57</sup> [The Jumna River is a tributary river of the Ganges (Ganga) in northern *India*. Pergunnahs is in northern *India*. Ranees (Rania) and Sirsa are in northwestern *India*.]

In 1827, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 26 May and 23 June, floods struck Hupeh (now Hubei province) in central *China* at Fang, Ch’i-ch’un and Chiang-ling. At Fang, the fields were damaged and innumerable houses were damaged by the floodwaters. At Ch’i-ch’un, the houses and fields were damaged by the floodwaters and people and cattle drowned.

— During the period between 24 July and 21 August, floods struck Hupeh province at Chih-chiang and Shantung (now Shandong province) on the east coast of *China* at Jih-chao.

— During the period between 21 September and 19 October, floods struck Hupeh province at Ch’ung-yang and Ch’ien-chiang. At Ch’ien-chiang, the dikes were damaged.

In 1827 during the period between 22 August and 20 September, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Nei-ch’iu.<sup>153</sup>

*Also refer to the section 1826 A.D. – 1829 A.D. for information on the drought in Australia during that timeframe.*

**Winter of 1827 / 1828 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1827 occurred on 6 November. Severe snowstorm, about 9 inches.<sup>116</sup>

In Bradford County, Pennsylvania in the *United States*, the autumn of 1827 was one of the coldest ever remembered, but it was followed by one of the mildest winters of the past 27 years. The winter produced scarcely any snow, but instead much rain. In January the average temperature was 37° F [3° C].<sup>178</sup>

During the winter of 1827-28, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for about 50 days. The river opened and closed repeatedly during this winter.<sup>202</sup>

January 1828 was unseasonably warm in Tennessee and throughout the Atlantic and Gulf States of the *United States*.<sup>140</sup>

**1828 A.D.** In *England* on the 12<sup>th</sup> and 13<sup>th</sup> of January, there was an awful storm on the English coast; many vessels lost.<sup>57</sup>

On 13 January 1828, a powerful storm struck Plymouth, *England*, casting 13 vessels ashore.<sup>43</sup>

On 12-13 January 1828, an awful storm struck the coast of *England*. Many vessels were lost, and 13 driven ashore and wrecked at Plymouth alone.<sup>90</sup>

In *Gibraltar* on the 18<sup>th</sup> of February, there was a great storm; more than 100 vessels destroyed.<sup>57, 90</sup>

On 18 February 1828, a storm struck on the coast of *Spain*. Between 160 and 180 sail of merchantmen were lost at *Gibraltar*.<sup>43</sup>

East Florida in the *United States* suffered exceedingly from a violent frost on the 6<sup>th</sup> of April 1828; on this bitter night crops of cotton, corn, and fruits were all destroyed. The thermometer at Six Mile Creek, on the St. John's, stood at 27° F, and the ice made an inch thick. The crops of corn and cotton were cut off as far south as Tomoko [in present day Volusia County, Florida].<sup>139</sup>

On the 6 April 1828, a heavy frost was very destructive to vegetation; the temperature at Picolata, Florida in the *United States* was as low as 28° F. [In 1987, the small village of Picolata is a barely noticed community on the St. Johns' eastern shore, near flashing daybeacon #25.]<sup>115</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Maastricht, <i>the Netherlands</i>	(101.8° F, 38.8° C)	on 2 August	
Saint George Del Mina, <i>Ghana</i>	( 90.0° F, 32.2° C)	on 12 May	[now Elmina]

In northern *France* in 1828, the variable weather was troubled by alternating periods of rain, wind, heat, cold, humidity, drought, storms and calm, serene days and cloudy days. This was especially true for the months July, August and September.<sup>79</sup>

In 1828 long rains reigned in northern *France*. They were mentioned in Strasbourg, Paris, Rouen and Metz. They did not extend to the southern *France*.<sup>79</sup>

In 1828, thunderstorms and rainstorms filled southern *France*. These occurred during spring, summer and autumn. Most of these storms were accompanied by hail.<sup>79</sup>

A dry heat fills the spring and summer of 1828. The heat was localized to southern *France*.<sup>79</sup>

Southern *France* suffered a severe drought during the spring and summer of 1828. There was significantly less rainfall in Marseille, Orange, and Joyeuse. There was not any rainfall in Marseille during the month of June. Orange received only 0.2 inches (5 millimeters) of rainfall during June.<sup>79</sup>

On 12 September 1828 in *England*, there was a hailstorm in Kent.<sup>93</sup>

On 13 September 1828, a hurricane struck near *Bermuda*. Three ships were lost.<sup>141</sup>

In *Ireland*, there was a great rise of the River Shannon; Cork also flooded.<sup>47, 92</sup>

In 1828, a powerful cyclone struck Nagasaki, *Japan* causing 15,000 deaths.<sup>98</sup>

Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>

*Also refer to the section 1826 A.D. – 1829 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1828 / 1829 A.D.** In 1829 after the temperature fell to 1° F ( -17° C), the Seine River in *France* froze at the Bridge “Pont de la Tournelle” in Paris from 25 to 28 January 1829. The Meuse River was towards the end of January frozen at Maastricht, the *Netherlands*.<sup>62</sup>

The winter of 1828-29 was not as severe in *France* as it were in *Belgium*, *Germany* and the *Danube countries*. Paris, *France* had 60 days of frost. The cold began on 6 January 1829 and lasted 21 continuous days with a very heavy frost. The frost began anew on 31 January and held until 11 February (with a break of 3 days) but was less intense. From time to time, the frost reappeared until the end of March. In Rouen, *France*, the Seine River froze on 18 January near Caudebec; in Paris, the cold came on 25 January, and the ice on the river on the 28th. The Meuse River was frozen from mid-January to mid February completely. The Rhine River was frozen, and during spring thaw it produced a major flood in Grünthal in Bavaria in southern *Germany*. The Danube River began to freeze in November. The port of Reval (now Tallinn, *Estonia*) was blocked by ice on 8 December. There was ample snow on the banks of the Danube River, at Strasbourg, Geneva and in *Spain*.<sup>62</sup>

The lowest temperatures recorded in different cities this winter: <sup>62</sup>

Berlin, <i>Germany</i>	( -13.0° F, -25.0° C ) on 24 January
Frankfurt, <i>Germany</i>	( -6.2° F, -21.2° C ) on 23 January
Basel, <i>Switzerland</i>	( -2.4° F, -19.1° C ) on 12 February
Great St. Bernard Hospice, <i>Switzerland</i>	( -0.8° F, -18.2° C ) on 1 February
Paris, <i>France</i>	( 1.4° F, -17.0° C ) on 24 January
La Chapelle (near Dieppe), <i>France</i>	( 2.7° F, -16.3° C ) on 23 January
Metz, <i>France</i>	( 6.8° F, -14.0° C ) on 22 January
Quillebeuf, <i>France</i>	( 6.8° F, -14.0° C ) on 24 & 25 January
Geneva, <i>Switzerland</i>	( 7.0° F, -13.9° C ) on 1 February
Orange, <i>France</i>	( 10.2° F, -12.1° C ) on 26 January
Joyeuse, <i>France</i>	( 11.3° F, -11.5° C ) on 25 January
Alais, <i>France</i>	( 12.6° F, -10.8° C ) in February
Brussels, <i>Belgium</i>	( 15.1° F, -9.4° C ) on 21 December
Avignon, <i>France</i>	( 27.9° F, -2.3° C ) on 15 December
Hyères, <i>France</i>	( 30.9° F, -0.6° C ) on 13 February

At Orange, *France*, the earth was covered with snow since the 10 January, and this seems to have protected the green including standing grain from damage. The ice has done significant damage to the mulberry trees. The winter at Marseille and the coast of Provence was very mild. But there were a lot of snow and severe frosts in the region of Toulouse.<sup>62</sup>

During the winter of 1828-29, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 100 days.<sup>202</sup>

Miss Ellen D. Larned described the New England winter of 1828-29 at Thompson, Connecticut in the *United States* — For these six years (1823-1829) there was no record of the winter. It was during this interval that the editor of the National Weather Bureau was inclined to place a snowless term of years referred to in family reminiscences as the time when snowstorms were supposed to have permanently gone out of fashion and people talked of selling their sleighs.<sup>116</sup>

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**1829 A.D.** On 11 January 1829, there was the most violent storm of wind and hail ever known in New South Wales, *Australia*.<sup>103</sup>

In Dantzic (Gdańsk, *Poland*) on April 9<sup>th</sup>, the Vistula River broke through its dikes, by which some 4,000 houses were destroyed and many of their occupants drowned. About 10,000 head of cattle were lost.<sup>47, 92</sup>

On 9 April 1829, an inundation at Dantzig [Gdańsk, *Poland*], occasioned by the Vistula River breaking through some of its dikes, by which 10,000 head of cattle and 4,000 houses were destroyed, and numerous lives lost.<sup>90</sup>

The rains of 1829 in *France* extended from north to south and from east to west. The high rainfalls were reported in Paris, Rouen, Metz, Strasbourg, Berzé-la-Ville, near Macon, Nantes, Joyeuse, Marseille, and Arles. No part of the country escaped. The total annual rainfall surpassed almost all the normal rainfall figures. The measured annual rainfall for the year 1829 was 24.1 inches (611 millimeters) in Paris on the terrace of the Observatory; 44.2 inches (1123 millimeters) in Rouen; 28.8 inches (732 millimeters) in Metz; 30 inches (761 millimeters) in Strasbourg; 38.2 inches (970 millimeters) in Berzel City; 61.7 inches (1,567 millimeters) in Nantes; 54.5 inches (1,385 millimeters) at Joyeuse; 23.5 inches (596 millimeters) at Marseilles; and 33.5 inches (851 millimeters) in Arles. Rain fell over the entire year. But the autumn, spring and summer experienced the greatest rainfalls.<sup>79</sup>

Major storms reigned in *France* in 1829.<sup>79</sup>

In June 1829 in southern *Spain*, there was a great hailstorm in Cazorta [Cazorla]. Blocks of ice weighing nearly 5 pounds (2.3 kilograms) fell during a hailstorm.<sup>93</sup>

On 14 July 1829 in *England*, there was a hailstorm in Kent.<sup>93</sup>

On 31 July 1829 in *England*, there was a hailstorm in Lincolnshire and Sussex.<sup>93</sup>

In *Scotland* on August 9<sup>th</sup>, the “Moray Floods” caused by rainfall, when the rivers Spey and Findhorn rose in some places 50 feet (15 meters) above their ordinary level, and caused great destruction of property. Many lives were lost.<sup>47, 92</sup>

On 3, 4 and 27 August 1829, the “Moray Floods” in *Scotland* were caused by rainfall, when the Spey and Findhorn rivers rose in some places 50 feet above their ordinary level, and caused great destruction of property. Many lives were lost, and whole families who took refuge on elevated places were with difficulty rescued.<sup>90</sup>

There was an inundation in Moray, *Scotland* in 1829, when over 5,000 square miles [12,950 square kilometers] were flooded.<sup>43</sup>

In *Ireland*, there were great floods in the south.<sup>47, 92</sup>

On 26 October 1829, a hurricane struck off St. Barthélemy [St. Barts] in the *Leeward Islands*. Two vessels slipped their anchors and went to sea. One returned, and the other was never heard from again.<sup>141</sup>

In 1829 during the period between 6 May and 8 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou. Then during the period between 8 August and 8 November, floods struck Shantung (now Shandong province) on the east coast of *China* at Chan-hua and Ch’ang-ch’ing. Then during the period between 29 August and 25 November, a drought engulfed Hupeh (now Hubei province) in central *China* at I-ch’êng.<sup>153</sup>

*Also refer to the section 1826 A.D. – 1829 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1829 / 1830 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1829 occurred on 27 November. Snowed considerable.<sup>116</sup>

During the winter of 1829-30, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 63 days.<sup>202</sup>

Miss Ellen D. Larned described the New England winter of 1829-30 at Thompson, Connecticut in the *United States* — On 14 November 1829 - snow, changing to rain. November 16<sup>th</sup> - snows considerable; remarkably warm Christmas weather; twelve days all fine and warm. On 25 January 1830 - term of snow. February 3<sup>rd</sup> - sleigh ride to Woodstock. February 10<sup>th</sup> - great sleigh ride. February 22<sup>nd</sup> - sleighing done. March 23<sup>rd</sup> - snow. March 26<sup>th</sup> - violent storm of snow all day.<sup>116</sup>

The winter of 1829-30 in Bradford County, Pennsylvania in the *United States* was mild until the 23<sup>rd</sup> of January when the weather suddenly became intensely cold. On November 15, a foot [30 cm] of snow fell. This allowed continuous sleighing until February.<sup>178</sup>

In March 1830, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 10<sup>th</sup> (32° F). There was frost on March 5<sup>th</sup>, 10<sup>th</sup>, and 20<sup>th</sup>.<sup>116</sup>

The *Baltic Sea* froze.<sup>37</sup>

During the winter of 1829-30, the *Baltic Sea* was completely covered with ice.<sup>68</sup>

In 1829, the Seine River in *France* was entirely frozen over.<sup>38</sup>

During the winter of 1829-30, most rivers of *France* were frozen. The Seine River in *France* was frozen to its full width from 28 December 1829 to 26 January 1830. The Seine froze for a second time from 5 to 10 February. The Meuse River was frozen from 18 December 1829 to 22 January 1830 and for a second time from 30 January to 9 February. The Rhine River, the Garonne River and the Rhône River near Avignon were completely frozen.<sup>62</sup>

The winter of 1829-30 began during the first days of October. The cold alternately between extreme and light cold on three occasions. Almost all the rivers in *France* were completely frozen two or three times during the winter. They were covered with firm ice in the months of December and February; including the Seine, the Rhine and the Rhône rivers. Only in April did it stop freezing. This cold, with snow was as hard as extended. Men and animals died of cold in the countryside and in the cities. The fieldwork was suspended for three whole months. Olive trees and grapevines could not resist the violence of frosts. Fruit trees died by the hundreds. Chestnut and oak trees suffered the same fate of vines and fruit trees.<sup>79</sup>

The winter of 1829-30 is remarkable because of its early onset of winter and its long persistent. The effect of this winter wrath spread all over *Europe*. A large number of rivers froze and the thaw brought devastating floods strengthened by the breakup of large ice flows. Many people and animals were killed by these floods, and the fieldwork was long lost. The following summarizes the length of the cold frost:<sup>62</sup>

22 October 1829	Jassy, <i>Romania</i>	heavy frost
3 November	Warsaw, <i>Poland</i>	( 23.0° F, -5.0° C)
21 November	Paris, <i>France</i>	( 22.5° F, -5.3° C)
22 December	St. Petersburg, <i>Russia</i>	(-22.0° F, -30.0° C)
23 December	Berlin, <i>Germany</i>	( -5.8° F, -21.0° C)
24 December	Geneva, <i>Switzerland</i>	( -0.8° F, -18.2° C)
25 December	Berlin, <i>Germany</i>	( -5.8° F, -21.0° C)
25 December	Geneva, <i>Switzerland</i>	( 2.3° F, -16.5° C)
25 December	Orange, <i>France</i>	( 10.0° F, -12.2° C)
26 December	Maastricht, <i>the Netherlands</i>	( -0.6° F, -18.1° C)

26 December	Orange, <i>France</i>	( 10.0° F, -12.2° C)
26 December	Paris, <i>France</i>	( 10.4° F, -12.0° C)
26 December	Toulouse, <i>France</i>	( 13.5° F, -10.3° C)
26 December	Bordeaux, <i>France</i>	( 14.0° F, -10.0° C)
27 December	Aurillac, <i>France</i>	(-10.5° F, -23.6° C)
27 December	Pau, <i>France</i>	( 0.5° F, -17.5° C)
27 December	Paris, <i>France</i>	( 6.4° F, -14.2° C)
27 December	Avignon, <i>France</i>	( 8.6° F, -13.0° C)
27 December	Toulouse, <i>France</i>	( 9.5° F, -12.5° C)
27 December	Lyon, <i>France</i>	( 10.4° F, -12.0° C)
28 December	Paris, <i>France</i>	( 5.9° F, -14.5° C)
28 December	Alais, <i>France</i>	( 12.6° F, -10.8° C)
28 December	Marseille, <i>France</i>	( 13.8° F, -10.1° C)
28 December	London, <i>England</i>	( 18.3° F, -7.6° C)
28 December	Hyères, <i>France</i>	( 22.5° F, -5.3° C)
29 December	St. Petersburg, <i>Russia</i>	(-26.5° F, -32.5° C)
29 December	Metz, <i>France</i>	( 2.3° F, -16.5° C)
29 December	Joyeuse, <i>France</i>	( 3.9° F, -15.6° C)
29 December	Toulouse, <i>France</i>	( 5.0° F, -15.0° C)
29 December	Paris, <i>France</i>	( 7.7° F, -13.5° C)
30 December	Avignon, <i>France</i>	( 12.2° F, -11.0° C)
30 December	Marseille, <i>France</i>	( 16.2° F, -8.8° C)
31 December	Madrid, <i>Spain</i>	( 11.8° F, -11.2° C)
31 December	Bordeaux, <i>France</i>	( 12.9° F, -10.6° C)
1 January 1830	Paris, <i>France</i>	( 10.8° F, -11.8° C)
1 January	Rome, <i>Italy</i>	( 27.5° F, -2.5° C)
3 January	Joyeuse, <i>France</i>	( 11.3° F, -11.5° C)
5 January	Alais, <i>France</i>	( 14.4° F, -9.8° C)
8 January	Orange, <i>France</i>	( 9.5° F, -12.5° C)
10 January	Geneva, <i>Switzerland</i>	( 2.3° F, -16.5° C)
11 January	Paris, <i>France</i>	( 29.8° F, -1.2° C)
12 January	Paris, <i>France</i>	( 22.5° F, -5.3° C)
13 January	Maastricht, <i>the Netherlands</i>	( 1.8° F, -16.8° C)
13 January	Paris, <i>France</i>	( 16.7° F, -8.5° C)
14 January	Paris, <i>France</i>	( 9.9° F, -12.3° C)
15 January	Paris, <i>France</i>	( 9.7° F, -12.4° C)
16 January	Paris, <i>France</i>	( 6.8° F, -14.0° C)
17 January	Paris, <i>France</i>	( 1.0° F, -17.2° C)
18 January	Paris, <i>France</i>	( 13.1° F, -10.5° C)
19 January	Paris, <i>France</i>	( 19.9° F, -6.7° C)
31 January	Metz, <i>France</i>	( -4.9° F, -20.5° C)
31 January	Berlin, <i>Germany</i>	( -4.0° F, -20.0° C)
31 January	Maastricht, <i>the Netherlands</i>	( -1.1° F, -18.4° C)
31 January	Brussels, <i>Belgium</i>	( -1.1° F, -18.4° C)
31 January	Geneva, <i>Switzerland</i>	( 3.6° F, -15.8° C)
31 January	Paris, <i>France</i>	( 11.3° F, -11.5° C)
31 January	Rouen, <i>France</i>	( 14.9° F, -9.5° C)
1 February	Yverdon, <i>Switzerland</i>	( -5.8° F, -21.0° C)
1 February	Valence, <i>France</i>	( 10.4° F, -12.0° C)
1 February	Paris, <i>France</i>	( 14.0° F, -10.0° C)
2 February	St. Bernard Hospice, <i>Switzerland</i>	( -5.1° F, -20.6° C)
2 February	Metz, <i>France</i>	( -3.6° F, -19.8° C)
2 February	Maastricht, <i>the Netherlands</i>	( -2.7° F, -19.3° C)
2 February	Paris, <i>France</i>	( 5.2° F, -14.9° C)
2 February	Joyeuse, <i>France</i>	( 11.3° F, -11.5° C)
2 February	Avignon, <i>France</i>	( 11.3° F, -11.5° C)



2 February	Marseille, <i>France</i>	( 13.8° F, -10.1° C)
2 February	Hyères, <i>France</i>	( 22.5° F, -5.3° C)
3 February	Mulhouse, <i>France</i>	(-18.6° F, -28.1° C)
3 February	Basle, <i>Switzerland</i>	(-16.6° F, -27.0° C)
3 February	Nancy, <i>France</i>	(-15.3° F, -26.3° C)
3 February	Épinal, <i>France</i>	(-14.1° F, -25.6° C)
3 February	Strasbourg, <i>France</i>	(-10.1° F, -23.4° C)
3 February	La Chapelle, <i>France</i>	( -3.6° F, -19.8° C)
3 February	Maastricht, <i>the Netherlands</i>	( -2.7° F, -19.3° C)
3 February	Freiburg, <i>Germany</i>	( -1.3° F, -18.5° C)
3 February	Paris, <i>France</i>	( 5.0° F, -15.0° C)
4 February	Paris, <i>France</i>	( 6.3° F, -14.3° C)
5 February	Paris, <i>France</i>	( 7.7° F, -13.5° C)
6 February	Paris, <i>France</i>	( 3.9° F, -15.6° C)
6 February	London, <i>England</i>	( 15.6° F, -9.1° C)
7 February	Paris, <i>France</i>	( 13.6° F, -10.2° C)
21 February	Maastricht, <i>the Netherlands</i>	( 20.7° F, -6.3° C)
21 February	Paris, <i>France</i>	( 24.8° F, -4.0° C)
8 March	Maastricht, <i>the Netherlands</i>	( 20.7° F, -6.3° C)
8 March	Paris, <i>France</i>	( 27.9° F, -2.3° C)

The winter weather arrived in Moldova at the end of October. It arrived in *Poland* in early November. On 2 November in Warsaw, *Poland*, so much snow had already fallen that one could travel the streets of the city using a sledge. On the following day the thermometer sank to 23.0° F (-5.0° C).<sup>62</sup>

In St. Petersburg, *Russia* the cold during December was indeed severe, but not unusual. On 22 December the temperature dropped to -22.0° F (-30.0° C), and on 29 December the temperature dropped to -26.5° F (-32.5° C). In January, where in the temperate southern climates there was severe cold; the winter in *Russia* was very mild with observed temperatures of only 23° to 25° F (-4° to -5° C). A severe frost struck the shores of the *Black Sea* on 11 December.<sup>62</sup>

In December heavily laden sledges crossed the Sound, seven to eight leagues (21 to 24 miles, 34 to 39 kilometers) broad, between *Sweden* and *Denmark* because of the thickness of the ice in *the Belts*. In January, the ice in *the Belts* interrupted the shipping on only 12 days. In January, the direct transport across the ice between Elsinore and Helsingborg was interrupted by the violence of the currents. Because the severity of the cold during the month, tours on the ice became very dangerous.<sup>62</sup>

In *Prussia*, there was significant snowfall and the thermometer was during a portion of December and January below -4° F (-20° C). At the end of January in the streets of Berlin, *Germany*, the snow was 0.50 meters (1.6 feet) deep.<sup>62</sup>

In *Holland* and *the Netherlands*, the cold was very persistent and took the same course as in *Southern Europe*. The frost began at Maastricht, *the Netherlands* on 3 December, and dropped down to 17.6° to 26.6° F (-3° to -8° C) every night. From 25 December, the cold dropped into the range of -0.6° to 9.9° F (-12.3° to -18.1° C). For 3 or 4 days beginning on 7 & 8 January 1830, the weather was a bit milder. But then it began to frost again. On 13 January, the weather was particularly violent. During the night, the cold would reach down to 1.8° to 15.8° F (-9° to -16.8° C). After a break of several days, the temperature was 14.9° F (-9.5° C) on 29 January and -1.1° F (-18.4° C) on 31 January. In February, the first four nights fell to -0.9° to -2.7° F (-18.3° to -19.3° C). The temperature on 4 and 5 February was 5.0° to 10.4° F (-12.0° to -15.0° C). Later, it froze from time to time at night, but the coldest was only 20.7° F (-6.3° C) on 21 February. During the first third of March the nighttime temperatures would dip down to 26.6° to 30.2° F (-1.0° to -3.0° C).<sup>62</sup>

In Paris, *France*, the thermometer dropped below zero from 17 to 22 November, and again on 24 and 25 November. From 26 November to 5 December, it was not cold. The cold began again on 6 December, and held with great severity, without interruption until 19 January. From 20 to 27 January, the temperature was slightly above freezing. But on 28 January to 7 February the frost began anew. It was fairly warm between 8 to 10 February. There was frost on 11 days in February and four days in March. The lowest temperatures for each month were: on 21 November 1829 (22.5° F, -5.3° C); on 28 December (5.9° F, -14.5° C); on 17 January 1830 (1.0° F, -17.2° C); on 6 February (3.9° F, -15.6° C); and on 8 March (27.9° F, -2.3° C). On the whole, there were 77 frost days, including 32 days in succession.<sup>62</sup>

In the south of *France* at Alais [now Alès] on the mornings of 27 and 28 December, the temperature fell to 14° F (-10° C) and 12.7° F (-10.75° C) respectively. This was the coldest December since the year 1802. (Previous December temperatures fell to 23° F (-5° C) in 1821 and 1825.) January 1830 was a very cold month because it froze every day, without exception. In February it froze until 24 February. On 2 or 3 mornings, the temperature fell to 15.8° F (-9° C), and on several days the temperature was in the range of 17.6° to 23° F (-5° to -8° C). On 22 December, there was heavy snowfall. Snow also fell on 27 & 28 December, 16 & 18 January, and on 4, 14 & 15 February. The snow stayed on the ground for 54 days.<sup>62</sup>

The winter in Orange, *France* was severe. "The terrible temperature in January and February, the entire population has moved into inactivity. The ice had a thickness of 0.38 meters (1.3 feet); the ground was frozen to 0.64 meters (2.1 feet). The Rhône River is crossed on the ice. The lowest observed temperature was 10.0° F (-12.2° C) on 25 and 26 December 1829, and 9.5° F (-12.5° C) on 8 January 1830."<sup>62</sup>

In the region of Toulouse, *France*, the winter was severely cold, which held without interruption from 25 December until 17 January. It was renewed, but with somewhat less intensity, in the first days of February. The rest of the winter was wet.<sup>62</sup>

In *Switzerland*, the winter at high elevations was very severe. At Freiburg in southwest *Germany*, there were 115 frost days, including 69 consecutive. The coldest temperature at Freiburg was -1.3° F (-18.5° C). Polar snow from low hanging crystals falling only at very low temperatures was observed. In the valley of Chamouny, at the foot of Mont Blanc, and on St. Bernard, there was no snow. While high in the streets of Geneva, *Switzerland*, more than 30 centimeters (1 foot) fell. In *Corsica* and *Italy* on a few occasions the thermometer fell to 23° to 26.6° F (-3° to -5° C), and there were great snowfalls. In *Spain*, winter began at the end of November with abundant and persistent rains. In Madrid, *Spain* and in the provinces at the end of December, the temperature fell to 19.4° F (-7° C), 15.8° F (-9° C), and 11.78° F (-11.2° C). In Bilbao in northern *Spain*, northern swans were sighted. In some valleys [in Spain], the snow was 3 meters (9.8 feet) deep. In *Portugal*, the temperature at one point during the winter dropped down to 10.4° F (-12° C).<sup>62</sup>

The following summarizes the lowest observed temperatures in various cities during the winter of 1829-1830:<sup>62</sup>

St. Petersburg, <i>Russia</i>	(-26.5° F, -32.5° C) on 29 December 1829
Mulhouse, <i>France</i>	(-18.6° F, -28.1° C) on 3 February 1830
Basel, <i>Switzerland</i>	(-16.6° F, -27.0° C) on 3 February 1830
Nancy, <i>France</i>	(-15.3° F, -26.3° C) on 3 February 1830
Épinal, <i>France</i>	(-14.1° F, -25.6° C) on 3 February 1830
Innsbruck, <i>Austria</i>	(-13.0° F, -25.0° C) in January 1830
Aurillac, <i>France</i>	(-10.5° F, -23.6° C) on 27 December 1829
Strasbourg, <i>France</i>	(-10.1° F, -23.4° C) on 3 February 1830
Berlin, <i>Germany</i>	( -5.8° F, -21.0° C) on 25 December 1829
Yverdon, <i>Switzerland</i>	( -5.8° F, -21.0° C) on 1 February 1830
Great St. Bernard Hospice, <i>Switzerland</i>	( -5.1° F, -20.6° C) on 2 February 1830

Metz, <i>France</i>	( -4.9° F, -20.5° C ) on 31 January 1830
La Chapelle (near Dieppe), <i>France</i>	( -3.6° F, -19.8° C ) on 3 February 1830
Maastricht, <i>the Netherlands</i>	( -2.7° F, -19.3° C ) on 3 & 4 February 1830
Freiburg, <i>Germany</i>	( -1.3° F, -18.5° C )
Brussels, <i>Belgium</i>	( -1.1° F, -18.4° C ) on 31 January 1830
Colmar, <i>France</i>	( -0.4° F, -18.0° C ) in February 1830
Paris, <i>France</i>	( 1.0° F, -17.2° C ) on 17 January 1830
Geneva, <i>Switzerland</i>	( 2.3° F, -16.5° C ) on 25 December 1829
Joyeuse, <i>France</i>	( 3.9° F, -15.6° C ) on 29 December 1829
Rouen, <i>France</i>	( 5.9° F, -14.5° C ) in February 1830
Avignon, <i>France</i>	( 8.6° F, -13.0° C ) on 27 December 1829
Orange, <i>France</i>	( 9.5° F, -12.5° C ) on 8 January 1830
Toulouse, <i>France</i>	( 10.0° F, -12.2° C ) on 27 December 1829
Gibraltar	( 10.2° F, -12.1° C ) on 1 January 1830
Lyon, <i>France</i>	( 10.4° F, -12.0° C ) on 27 December 1829
Madrid, <i>Spain</i>	( 11.8° F, -11.2° C ) on 31 December 1829
Alais, <i>France</i>	( 12.6° F, -10.8° C ) on 28 December 1829
Marseille, <i>France</i>	( 13.8° F, -10.1° C ) on 2 February 1830
Bordeaux, <i>France</i>	( 14.0° F, -10.0° C ) on 26 December 1829
London, <i>England</i>	( 15.6° F, -9.1° C ) on 6 February 1830
Andalucía, <i>Spain</i>	( 16.3° F, -8.7° C )
Hyères, <i>France</i>	( 22.5° F, -5.3° C ) on 28 Dec. 1829 & 2 Feb. 1830
Valencia, <i>Spain</i>	( 23.0° F, -5.0° C )
Seville, <i>Spain</i>	( 23.0° F, -5.0° C )
Rome, <i>Italy</i>	( 27.5° F, -2.5° C ) on 1 January 1830

The Seine River froze the first time for 29 days from 28 December to 26 January. It froze again from 5 to 10 February for a total of 34 days. This is the same length of time as in the year 1763. At Havre, *France*, the Seine River first froze on 27 December; and on 18 January a market was set up on the ice at Rouen, *France*. On 25 January the ice began to thaw and break up in the rivers and started coming down through the Paris suburbs Eorbeil and Melun to the bridge at Choisy, and there the ice formed a 5 meter (16.4 foot) high wall and the pillar stood up to the crown under water and the city became a lake.<sup>70</sup> In Paris the swelling of the river became noticeable at 9 o'clock in the evening. By 10 o'clock there was a weak movement of the ice above the bridge Pont d'Austerlitz. At 3 o'clock in the morning, the ice waters broke loose and drove for a half hour. A huge pile of debris formed against the upper decks and against the pilings of the island of St. Louis. In the great port were about 60 large coal ships and a host of other vessels loaded with commercial goods. At 5:30 in the morning the ice began to move again with an indescribable violence against the newly installed posts and straps reinforced piles. They suffered a terrible blow and were pushed back 0.30 meters and the stone abutments of the wharf, on which it was anchored, gave way. It resisted as if by a miracle, and thus protects not only the many commercial vessels that filled the harbor, but also the bridges of the great arm, which had a huge pile of floating ice and debris which threatened to carry it away. For such a terrible ice conditions, there was relatively only minor losses: the bleachery la Sirene, which was demolished by the ice, several Marne-boats, some light vessels, a portion of the pole plant in Bath Vigier, the piles of the port of Grenelle, two arches of the Pont du Pecq to St. Germain, and a pillar of the Fontainebleau to Melun bridge. Due to the fact that the ice waters backed-up at Choisy-le-Roi, the flood damage downstream was weakened. The floodwaters reached to height of 6.0 meters at the bridge Pont de la Tournelle. The next day, 27 January, was the height of the water was down to 4 meters. The second flood occurred in February but caused little damage.<sup>62</sup>

Ice began to appear on the Meuse River on 8 December. It froze entirely on 28 December. The ice broke up on 22 January. The river froze for a second time between 30 January and 9 February. On 10 January, the ice broke in an instant at Schiedam in southern *Netherlands*. This happened when over 400 people

were on the river; two persons were killed. The Rhine River was frozen at several locations, especially at Breisach, *Germany* on the second of February. The ice in the Rhine River pressed against the Strasbourg Bridge and tore away a portion of it. This interrupted all traffic between Strasbourg, *France* and Kehl in southwest *Germany*. The Inn River was frozen until Hall in western *Austria*. Lake Geneva near Geneva, *Switzerland* was frozen from 3 to 8 February. The Loire, Vienne and Orne rivers in *France* froze. In the south, the Garonne, the Dordogne, the Durance rivers along with the Canal of Languedoc were covered with ice. Ice sheets on the Rhône River destroyed two of the leading arm of the great bridge of Avignon, *France* and swept away two mills at Lyon, *France*. The Saône River froze twice. In Bayonne in southwestern *France* individuals skated on the frozen Adour and the Nive rivers. In the port of Bordeaux, *France*, the ships suffered greatly from the ice. The port of Odessa, *Ukraine* on the *Black Sea* was frozen on 8 December. In *Germany*, there was ice of the Danube River and its tributaries. And when the snow and ice melted it produced a great floods that swept away bridges and devastated urban neighborhoods. On 4 March, 30 corpses were recovered from the Danube River.<sup>62</sup>

The severity of the cold in *France* during this winter was demonstrated by the following facts: In Paris, on the night of the 26 December, a soldier froze to death while standing guard. The mayors of the 7th and 10 District set up heated public shelters on 15 January. Many teamsters disappeared in the snow in Normandy when the snow reached the height of 2 meters. At Rouen, a child froze to death in February. In Alsace, soldiers were sent out against the unfortunates who plundered the forests and woods for firewood, in order to keep warm. At Guebwiller in northeastern *France*, the suppression of firewood thefts led to an uprising on 10 February. The King Charles X found himself compelled to grant amnesty on 4 March for the timber theft crimes committed during the duration of the winter. In Avignon at the end of December because of the severe weather, the workshops were closed. In Montreuil, two men were found frozen to death on 1 January. At Marseille on 12 January, five people likewise succumbed to the cold on the roadways, a coachman, military personnel, etc. Several smugglers attempting to cross the Pyrenean froze to death.<sup>62</sup>

Since the end of December all wagons and carriages were converted into sleighs in Berlin, *Germany*. The hospitals and workhouses filled with unfortunates who were overwhelmed by the misery and cold. In *Germany*, it was necessary, as in *France*, to send detachments of troops into the woods to track the timber thieves stealing firewood. In *Spain*, the transportation was disrupted; guards, shepherds and carters froze to death. The mortality in the flocks was extraordinary. In Andalusia, *Spain*, it was estimated 14,000 head of cattle perished. At Pena de Orduna [Peña de Orduña in northern *Spain*], 14 mule drivers and 35 mules perished in the cold. The wolves, which were driven from the snow of the mountains to the plains below caused cruel havoc among the flocks, and attacked a large number of people.<sup>62</sup>

In Vienna, *Austria* in February, the dwellings of 50,000 inhabitants were under water.<sup>47, 90, 92</sup>

In Coblenz, Prussia (now Koblenz, *Germany*), in the spring the waters of the Moselle River thawed before those of the Rhine River, and being stopped by the ice, did very considerable damage.<sup>47, 92</sup>

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**1830 A.D.** One wrongly cries out about the heat in northern *France* in 1830. This memorable year was instead, rather extremely variable. The cold of the winter suddenly stopped on the first day of March. This unusual warmth was replaced for a few days with rainy cold weather until April 7. Then the warmth and serenity resumed. Soon came early waves of thunderstorms. The weather alternated between stifling heat and penetrating cold, storms and calms, rain and good weather. Cold rain replaced the normally hot months of May and June. On 25 June alone unbearable heat was momentarily interrupted by cold, rain and disturbances. A violent storm broke out on July 11, at eight o'clock at night, and rain showers continued to the consecutive night. Thinning threatened, with a sultry heat that still ruled during the day. But there was even a downpour at midday. However the atmosphere is gradually refined, the air became dry, and free heat came. The sun began to shine on July 24<sup>th</sup>. The sky seemed fine, very pure skies and

warmth, but the heat from the sun soon eclipsed history. The great heat died on the eleventh day after a terrible storm on the night of August 4. Atmospheric disturbances began again on August 5. There were other storms, accompanied by rain. On the 9<sup>th</sup> and 10<sup>th</sup> of August, the wind, rain, cold mixed with and alternating brief moments of calm, drought and heat. And finally, the year ended in early frost, excessive moisture, mist and snow.<sup>79</sup>

On 26 March 1830, a strong storm struck New England in the *United States*, causing great tides.<sup>199</sup>

— At Portland, Maine, several wharves were carried away. Many vessels were driven ashore or greatly damaged. A long storehouse at Union Wharf was swept away.

— At Portsmouth, New Hampshire, the wharves were damaged and several vessels were driven ashore.

— At Newburyport, Massachusetts, the wharves were overflowed but escaped with little damage. The schooner *Lady Howard* was driven ashore at Salisbury.

— At Gloucester, Massachusetts, 2 to 3 feet [0.6-0.9 meters] of water covered the wharves. The sloop *William Swain* was driven ashore at Sandy Bay and was a total loss.

— At Beverly, Massachusetts, the schooners *Agawam* and *Abigail* collided and were damaged.

— At Salem, Massachusetts, a store on Derby wharf and a store on Crowninshield's wharf were overthrown by the water. The waves rolled several feet above the wharves. The brig *Washington* was driven ashore at the foot of Hardy Street. At high tide, the water was four feet [1.2 meters] deep on the isthmus connecting the Neck with the town at the head of Fort Avenue.

— At Marblehead, Massachusetts, several vessels were driven ashore.

— At Lynn, Massachusetts, the schooner *Adventurer* was driven ashore on the beach at Nahant.

— The tide at Boston, Massachusetts, was 1½ inches [4 centimeters] higher than the great tide of December 1786, which was 10 inches [25 centimeters] higher than the highest that any person then living remembered. Water broke through the dam along the Roxbury canal. At Roxbury, the water rose six feet [1.8 meters] above the floors in the houses and about eighty women and children were rescued by boat and taken to higher ground. Large quantities of rice, flour and coal were either washed away or ruined. Much property was set afloat at Charlestown and Cambridgeport. The Navy Yard was overflowed, and the tide broke through the cofferdam, about three feet [0.9 meters] of water coming into the dry docks. The sloop *Globe* and the schooner *Edward* went ashore at Scituate beach.

In May 1830 in *Western Australia*, the city of Perth flooded.<sup>101</sup>

In May 1830, unexpected severe flooding caused heavy damage to the fledgling Swan River settlement in *Western Australia*.<sup>99</sup>

On 25 June 1830 in *England*, there was a hailstorm in Norfolk and Suffolk.<sup>93</sup>

In July 1830 in *Ireland*, the month was exceedingly unnatural, with hail, rain, and storm.<sup>93</sup>

There was a great freshet in Vermont and New Hampshire in the *United States* in July 1830. The summer of 1830 in Vermont had been cold and wet. But the weather changed during the middle of July. Suddenly the temperature was between 90° F and 94° F [32°-34° C]. Beginning on 24 July a five-day rainstorm struck. During that time at Burlington Vermont, over seven inches [18 centimeters] of rain fell. The rivers were swollen to a height never before known, their banks being overflowed, and much property including bridges and mills were destroyed. A person wrote from Burlington at that time that he doubted if any manufacturing establishment of a large size remained within fifty miles [80 kilometers] of Burlington, so great was this flood. In New Hampshire, the Merrimack River was very swollen by the rains causing flood damage. The flood was as disastrous to the New York side of Lake Champlain as it was in Vermont.<sup>199</sup>

— The Missisquoi and Lamoille Rivers overflowed their banks. At Milton, Vermont, the floods destroyed the bridge, a trip-hammer shop, a fulling mill, and damaged a gristmill.



— The Winooski or Onion River flooded. At Northfield, Vermont, the mills and a factory were damaged. In Berlin, Vermont on the Mad River, not a mill was left standing and on the Dog River, all the bridges were carried away. Montpelier received considerable flood damage. Two bridges were swept away along with a mill, a barber's shop and another building. One person drowned. At Middlesex, the mills, carding and cloth-dressing works and a bridge was destroyed. From Middlesex to Lake Champlain, not a bridge was left standing. At Moreton [Moretown], a number of houses and barns were swept away and one person drowned. In Bolton, barns and a house were swept away. At Hubbells Falls, a toll bridge, clothing works, carding machine, hemp machine, and sawmill were destroyed. At Colchester, a bridge, a sawmill, an oil mill and a woolen factory were swept away. At Burlington, a bridge, plaster mill, sawmill, blacksmith shop, coalhouse, crops, a dam and other buildings were destroyed.

— On the White River, all the bridges from Roxbury to Royalton, Vermont, were carried away. At Braintree, three sawmills were swept away. At West Randolph, a woolen factory and gristmill and two houses were destroyed. At Bethel, a store was demolished by the floodwaters.

— On the Middlebury River, a farmer at Cornwall, Vermont, lost a flock of a hundred sheep that were drowned. Two bridges at Cornwall were swept away. At Weybridge, a sawmill and a bridge were swept away and another farmer lost 100 sheep on the flats. The dam at Bristol and Lincoln gave way.

— At New Haven, Vermont, a flood of water cause the Middlebury River to rise 10 to 12 feet [3.0-3.7 meters] higher than it was ever known to before. Dams burst. It carried off 20 buildings at West Mills. In the southeast part of town, two houses and a sawmill were swept away. A little further downstream at Wilson mills, the floodwaters washed away a bridge, a gristmill and a clothier works. Fourteen people were drowned at that location and twenty-one buildings were carried away. At East Mills, the bridge, dam, woolen factory, gristmill, sawmill and other mills were swept away by the floodwaters.

On 15-16 August 1830, a hurricane struck Florida in the *United States*. Several ships were lost off Cape Florida [Key Biscayne].<sup>141</sup>

In August 1830, a memorable gale passed close to the Windward Islands, visited *St. Thomas'* on the 12<sup>th</sup>; was near *Turks' Island* on the 13<sup>th</sup>; at *the Bahamas* on the 14<sup>th</sup>; on the gulf and coast of Florida in the *United States* on the 15<sup>th</sup>; along the coast of Georgia and the Carolinas on the 16<sup>th</sup>; off Virginia, Maryland, New Jersey, and New York on the 17<sup>th</sup>; off George's Bank and Cape Sable [Nova Scotia, *Canada*] on the 18<sup>th</sup>; and over the Porpoise and Newfoundland Banks [in *Canada*] on the 19<sup>th</sup>. It traveled 3,000 miles in 7 days.<sup>228</sup>

On 17 August 1830 in *England*, there was a hailstorm in Suffolk.<sup>93</sup>

A violent and extensive hurricane was first encountered to the north of *Turks' Island* on 22 August 1830. It moved north of *the Bahamas* on the 23<sup>rd</sup>, and off the coast of the *United States* on the 24<sup>th</sup>, 25<sup>th</sup>, and 26<sup>th</sup>. Much damage was done on the ocean by this storm but it scarcely reached the American shores.<sup>228</sup>

In 1830 in *France*, the losses from hailstorms during the year were estimated at £1,840,000. [In today's currency, that would be the equivalent of £139,000,000 or \$226,000,000 U.S. dollars using the retail price index.]<sup>93</sup>

In Paris, *France*, in the spring, summer and autumn of 1830, thunderstorms multiplied, mingled with storms and torrents of rain causing major disruptions. The first storms broke out in early April. Gusts and showers succeeded them in the months of May and June. The months of July and August produced thunderstorms followed by rain showers. On the night of August 4, nothing was missing from the endearing spectacle of this crisis. The storm feuded with greatest storms with the majesty for the title of the worst. Storms and showers returned in their turn, leaving just a few calm days in-between.<sup>79</sup>





December 1830. A similar storm traveled the same track on the 13<sup>th</sup> to 15<sup>th</sup> of January 1831.<sup>228</sup>

During the winter of 1830-31, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 82 days.<sup>202</sup>

In the *United States*, the earth was covered with snow in Philadelphia and the Delaware River was closed with thick ice from the first week in January until the last week in February. The streets of the city and roads in the country were banked up by the snow to a great height. The newspapers from Virginia, the far western U.S., the middle, northern and eastern States said that more snow had fallen during this month, than any corresponding month since 1780 A.D. A Salem, Massachusetts' newspaper said the snow drifted into banks in that town, and through that region of the country, to the depth of fifteen feet (4.6 meters). Other newspapers from the north and east published similar accounts.<sup>1</sup>

In the *United States*, the earth was covered with snow from the first week in January to the first week in March, from Maryland to Maine. In many places the snow was blown into banks from ten to twenty feet (3-6 meters) high. Snow fell in Maryland, Virginia, the Carolinas and in Alabama.<sup>1</sup>

In the *United States*, a great snowstorm began 14 January 1831 just south of the Mason-Dixon line and moved up the East Coast. It dumped 13 inches (0.3 meters) of snow at Washington D.C. and 18 inches (0.5 meters) in Baltimore, Maryland. It was a slow moving storm that lasted until the 16<sup>th</sup>. In Pennsylvania, the depth at West Chester averaged three feet (0.9 meters); at Lewiston the depth was 3 feet (0.9 meters) and 3 ½ feet (1.1 meters) in the countryside; in the lower Susquehanna Valley the snow was 3 feet (0.9 meters) with drifts up to 12 feet high (3.7 meters); at Harrisburg the snow was 2 feet (0.6 meters) deep; Pottsville reported 3 feet (0.9 meters) of snow; in Easton the depth was about 30 inches (0.8 meters); at Milford it was about 20 inches (0.5 meters); and in Pittsburg it was 22 inches (0.6 meters).<sup>27</sup>

In Central and Southeastern Illinois in the *United States*, the winter of 1830-31 produced deep snow. During this period, this part of Illinois was sparsely settled. The roads were merely trails or bypaths; and the houses of the settlers were log cabins of a crude style, and the larder [a small cool room or area for storing food] was not well supplied with sufficient provisions to carry the settler and his family through the winter. This being the case, much suffering occurred. The "deep snow" was one of the landmarks of the early settlers. It was one of the milestones that the early settlers used to count in dating events (birth, marriage, death). The snow began falling early in autumn and continued at intervals, throughout the entire winter. The snowfalls were succeeded by heavy sleet, forming crusts of ice between the layers of snow, strong enough in many places to bear up the deer and hunter. Frequently for weeks the sun was not visible, and the cold was so intense that not a particle of snow would melt on the sides of the cabins facing south. For weeks people were blockaded within their cabins and remained so until starvation compelled them to go forth in search of food. Great suffering, hunger and untold hardships were endured by the people. Game, such as deer, prairie chickens, quails, rabbits, etc., before this winter were very abundant, but for years afterwards were very scarce; having perished in the snow. As the snow would thaw, deer were often caught and killed without the aid of firearms because the deer were unable to get through the snow or walk on top it. Later in the winter when the mass of snow or ice had become compact, fences that were staked and rided [braced] buried in the snow were driven over with heavy loaded vehicles, and, in fact, the old settlers say in places these fences couldn't even be seen. The snow in many places where it was not drifted was between three and five feet deep. In the spring, when this immense snow melted, the rivers, streams and marshes became flooded.<sup>245</sup>

In March 1831, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 18<sup>th</sup> (32° F); 21<sup>st</sup> (32° F). There was frost on March 2<sup>nd</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 11<sup>th</sup>, and 22<sup>nd</sup>. There was snow on March 17<sup>th</sup>.<sup>116</sup>

A snowstorm began on 31 January 1831, continued for four days, and extended over the north of *England* and the whole of *Scotland*.<sup>43</sup>

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**1831 A.D.** In *Ireland* in February, there were great floods in the River Liffey; and waterspouts in various parts of the country.<sup>47, 92</sup>

In *Ireland* in 1831, there was a famine. Parliament granted 40,000*l.* for relief; 74,410*l.* subscriptions in England.<sup>57, 91</sup>

*Ireland* suffered the effects of famine in 1816, 1822 and 1831.<sup>188</sup>

In *India* during 1831-32, there was scarcity in Poona and the southern Mahratta country, producing considerable distress, but hardly a famine.<sup>57</sup> [Mahratta is a Maharashtra state in western *India*.]

In 1831, a powerful cyclone struck Barisal in southern *Bangladesh* causing 22,000 deaths.<sup>98</sup>

On 8 May 1831 on the terrace of Fort Bab-Azoun in *Algeria*, there was an instance of St. Elmo's Fire. After sunset some artillery officers were walking with uncovered heads during a storm. Each one, on looking at his neighbour, remarked with astonishment that the ends of their hair stood up, with little luminous plumes. When these officers raised their hands, plumes of light formed at the ends of their fingers.<sup>205, 271</sup>

On 28 May 1831 in *England*, there was a hailstorm in Hertfordshire.<sup>93</sup>

A hurricane struck the islands of *Trinidad, Tobago and Grenada* on 23 June 1831. It then passed into the Caribbean Sea. The hurricane encountered the H.M. Schooner *Minx*, and other vessels, and its swell was thrown with great force upon the southeastern shores of *Jamaica* on the 25<sup>th</sup>. It reached the coast of Yucatan [*Mexico*] on the night of 27 June. The hurricane traveled from Trinidad to the western shore of the Bay of Honduras in a little more than one hundred hours, a distance of about 1,700 nautical miles.<sup>228</sup>

On 16 July 1831, there was a dreadful storm at the Cape of Good Hope, *South Africa*, where immense property was lost.<sup>57, 90</sup>

An extraordinary dry fog occurred in August 1831 in part of *Europe*, the north coast of *Africa* and in the *United States*. It diminished the light of day and at nighttime produced a phosphorescent radiance. [Refer to a similar event in 1783] {This may have been related to an asteroid bolide impact event}<sup>205</sup>

On 10 August 1831, a hurricane struck the Island of *Barbados*, where it raged with great violence. On the 11<sup>th</sup>, it passed over the islands of *St. Vincent*, and *St. Lucia*, extending its influence to *Martinique* and the neighboring islands on the north, and to *Grenada* on the south, but exhibiting its chief violence between 12° 30' and 14° 30' of North latitude. On the 12<sup>th</sup>, it arrived on the southern coast of the Island of *Puerto Rico*. From the 12<sup>th</sup> to the 13<sup>th</sup>, it swept over the island of *Haiti* and the *Dominican Republic*, and was felt as far south as *Jamaica*. On the 13<sup>th</sup>, it raged on the eastern side of *Cuba*, and then swept over the entire island. On the 14<sup>th</sup>, it was at Havana, *Cuba*. On the 16<sup>th</sup> and 17<sup>th</sup>, it arrived on the northern shores of the Gulf of Mexico, raging simultaneously at Pensacola, Florida; Mobile, Alabama; and New Orleans, Louisiana in the *United States*, where it raged until the 18<sup>th</sup>. At 6 o'clock in the morning of 17 August while the storm was still raging, Mobile, Alabama reported that the water of the bay was on a level with most of the wharves. Commerce Street, from Barney's new building, north and from Conti Street, south, was underwater, as was the north end of Water Street. From the coasts it moved into the adjoining Southern States where it spent itself as heavy rains.<sup>206</sup>

On 10-11 August 1831, a great Atlantic hurricane struck the island of *Barbados* causing approximately 2,500 deaths.<sup>107</sup>

On 10-11 August 1831, a hurricane struck Barbados in the *Lesser Antilles*. Different accounts provide the following estimates of the number of casualties: 1477, >1500, 1525, and 2500.<sup>141</sup>

A hurricane desolated *Barbados* on the night of 10 August 1831. It passed Porto Rico [*Puerto Rico*] on the 12<sup>th</sup>, Aux Cayes [Les Cayes, *Haiti*] and St. Jago de Cuba [*Cuba*] on the 13<sup>th</sup>, Matanzas [*Cuba*] on the 14<sup>th</sup>, was encountered off the Tortugas [*Dry Tortugas* islands in the Florida Keys] on the 15<sup>th</sup>, in the Gulf of Mexico on the 16<sup>th</sup>, and was at Mobile, Alabama; Pensacola, Florida; and New Orleans, Louisiana in the *United States* on the 17<sup>th</sup>. The hurricane covered a distance of 2,000 nautical miles in about 150 hours.<sup>228</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Tunis, <i>Tunisia</i>	(104.5° F, 40.3° C) on 15 July
Izmir (Smyrna), <i>Turkey</i>	( 95.0° F, 35.0° C) on 16 July

Hailstone of a pound weight, fell at Constantinople [now Istanbul, *Turkey*] on 5 October 1831.<sup>43</sup>

In 1831, many regions of *China* experienced flooding including:<sup>153</sup>

— Kweichow (now Guizhou province) in southwestern *China* at Hsi-fêng.

— Hupeh (now Hubei province) in central *China* at Huang-an, Huang-kang, Ma-ch'êng, Ch'i-shui, I-tu, Kung-an and Shih-shou. At Shih-shou, the dikes were damaged.

— During the period between 9 July and 7 August, floods struck Hupeh province at Yün-mêng, Fang and An-lu. At Yün-mêng, The dikes and innumerable houses and fields were damaged by the floodwaters.

— During the period between 8 August and 5 September, floods struck Shantung (now Shandong province) on the east coast of *China* at Jih-chao, Hui-min, Shang-ho and Chan-hua; Hopei (now Hebei province) in northern *China* at Pao-ting; and Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-ch'un and Wu-chin.

— During the period between 6 September and 5 October, floods struck Hupeh province at Hanyang, Chung-hsiang and Huang-p'o. At Chung-hsiang, the dikes were damaged.

— During the period between 4 December 1831 and 2 January 1832, floods struck Hupeh province at Fang, Huang-kang, Ying-shan and Ao-ch'êng; Kiangsu province at Nan-ch'ang, Nan-k'ang, Lin-ch'uan, Kao-an, P'o-yang and I-ch'un; and Hopei province at Wên-an and Pao-ting.

**Winter of 1831 / 1832 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1831 occurred on 22 November. Considerable snow, not melted till January.<sup>116</sup>

During the winter of 1831-32, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 111 days.<sup>202</sup>

Miss Ellen D. Larned described the New England winter of 1831-32 at Thompson, Connecticut in the *United States* — On 22 November 1831 - heavy snow; good sleighing continues till January 15<sup>th</sup>. Coldest December ever known. On 5 February 1832 - snow; sleighing until March 1<sup>st</sup>. March 18<sup>th</sup> - snowed again. April very cold, with frequent snows to the 26<sup>th</sup>.<sup>116</sup>

In the *United States*, January brought intensely cold weather with several boisterous and severe snowstorms to Philadelphia. The Schuylkill and Delaware Rivers were closed with thick ice. The winter was long and severe all over the United States and very similar to January 1831. A hard frost occurred in Philadelphia during almost every night in March. There was floating ice in the Delaware River during the whole month.<sup>1</sup>

The winter of 1831-32 in Bradford County, Pennsylvania in the *United States* was very severe. It was the hardest experienced since the winter of 1779-80. Even as late as 5 June 1832, there was a snowfall of 4 inches [10 cm] all over Eastern Pennsylvania.<sup>178</sup>

In the *United States* during the winter of 1831-32, the temperature at Huntsville, Alabama fell to -9° F in January.<sup>113</sup>

In March 1832, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 15<sup>th</sup> (30° F); 16<sup>th</sup> (32° F); 18<sup>th</sup> (23°-24° F); 19<sup>th</sup> (26° F). There was frost on March 2<sup>nd</sup>, 16<sup>th</sup>, 28<sup>th</sup>, 29<sup>th</sup>, and 31<sup>st</sup>.<sup>116</sup>

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### 1832 A.D. – 1835 A.D. India. Famine

In *India* during the years 1832-1833, there was a severe drought in some of the northwest provinces.<sup>47</sup>

In *India* during 1832-34, there was a famine in some of the northwest provinces. “It is said that not a single shower of rain fell in Ajmir [Ajmer] in 1832. In the following year the drought was most severely felt in Bundelkhand, and in the southern pergunnahs of Cawnpore [Kanpur]; but in the pergunnahs bordering on the Ganges the rubbee [rupee] was good owing to the facilities for irrigation.”<sup>57</sup> [Ajmir is in northwestern *India*. Bundelkhand is in north-central *India*. Cawnpore is in northern *India*.]

In 1832, there was a famine in the Northwest Provinces and Madras in *India*.<sup>156</sup>

In Coringa, Hindustan (now in southeastern *India*), there was a great and most destructive inundation.<sup>47, 92</sup>

In 1832 in Madras [now Chennai] in southeastern *India*, there was a famine in the district of Guntoor; about 200,000 people perished.<sup>91</sup>

In 1832, there was a famine in the Bombay [now Mumbai] territories of *India*.<sup>182</sup>

In 1833, there was a famine in the Madras [now Chennai] territories of *India*. In the Guntoor [now Guntur] district, 200,000 out of 500,000 inhabitants perished.<sup>182</sup>

In southeastern *India* in 1833, a famine occurred in the Guntoor [Guntur] and other districts in the Madras Presidency. About 200,000 people perished. This famine became known as the “Guntoor famine”.<sup>57</sup>

In *India* during the period 1833-1835, there was a famine in the Madras Presidency. “In 1834 rain fell copiously in Kach [now part of *Pakistan*]; grain was sown and came up well; but locusts appeared and destroyed all the crops and grass as well as trees. In Ahmedabad, *India*, there was excessive rain the same year, which rendered cultivation impossible, and locusts also appeared in great quantities. In Broach, *India*, the famine of 1835 was also caused by excessive rain, which destroyed the spring crops, whilst the winter crops were also burnt up by intense cold. In the other districts named, the scarcity appears to have been caused by failure of crops owing to drought.”<sup>57</sup>

In 1833, a most serious famine struck Madras [now Chennai] Presidency in *India*. It was confined to the northern districts, and to the immediate neighborhood of the Presidency town. In consequence of the fearful loss of life, which took place in the Guntoor district [now Guntur in the state of Andhra Pradesh, *India*], this scarcity was generally known as “the Guntoor Famine”, although the districts of Nellore and Masulipatam [now Machilipatnam] also suffered very severely. Groups of people were seen dying in the streets from starvation every day. By August, serious grain riots occurred in Madras. The distress was reported to be dreadful, and the horrible spectacle of a mother devouring her dead infant was seen on the



streets of the town. In Nellore, the roads were strewn with dead bodies. The scarcity came to an end with the harvest of 1834. It was estimated that in Guntoor alone, 150,000 persons perished from famine out of a population of 500,000.<sup>188</sup>

In 1834, there was a famine in the Bombay Presidency in *India*.<sup>156</sup>

In 1834, there was a famine in Cutch [Kutch district in western *India*] caused by locusts. During the same year, there was a minor famine in Bundelkhand [now the states of Uttar Pradesh and Madhya Pradesh in central *India*], Ajmir [now Ajmer, a city in Rajasthan, *India*] and the North-Western Provinces of *India*.<sup>179</sup>

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**1832 A.D.** In January 1832, in Illawarra, *Australia*, the Tom Thumb Lagoon dried up because of the drought. This lagoon is usually 6 miles in circumference.<sup>103</sup>

In Sydney, *Australia*, on Saturday, 18 February 1832, "Saturday was one of the hottest days ever remembered. The recent rains having saturated the earth, the atmosphere was impregnated by an aqueous vapor not unlike steam issuing from a boiler, while the sun poured down all the fury of his heat. It was dreadful. Man and beast groaned beneath the oppression and numbers of working oxen dropped down dead on the public roads. In the evening we were relieved by a stiff southerly gale, wafting health and vigor on its blessed wings. On Sunday night we were visited by a tremendous storm of lightning, rain and hail. The lightning was magnificent beyond description, spreading over the whole canopy of heaven, and assuming a thousand various forms. The storm broke heaviest over Parramatta where the artillery of the skies roared and crashes in deafening peals, making the very houses totter."<sup>103</sup>

In 1832 cholera invaded *France*. Both January and February experienced strong moderating cold weather. The coldest day in Paris did not fall below 25.7° F (-3.5° C). The hottest day in the period was 54° F (12.2° C). The daily temperature varied often hour-by-hour between these two extremes. Under the influence of alternating clear sky and overcast, and winds sometimes violent and sometimes weak, produced almost constant humidity, controlled by thaws, frequent rain and thick mist. Atmospheric disturbances were interrupted on 13 or 14 February, which gave us several days of mild weather and very beautiful in the middle of the day, but cold and somewhat misty morning and evening. A rushing cold wind abruptly ended this pleasant period. However, alternating periods of cold and warm, calm and tempest, sun and rain resumed since February 29, interspersed with snow, hail and fog. These storms were intensified to the equinox and lasted until 26 or elsewhere to March 27. Then came another period of calm accompanied by clear skies, bright sunshine and warmth of June. An unusual drought replaced the dominant moisture of the prior month. The weather was disturbed again on 5 or 6 April. As the temperatures increased, they did not restore the balance. Storms made repeated charges during the summer. A deep calm with burning heat grew till it burst. Then gales with noisy rain showers bursting with explosions [lightning]. This was followed by penetrating cold with exuberant humidity. Despite these storms, summer rather bowed to heat and drought than to cold and moisture. There was a disorder of the elements to survive this hot season. In autumn, cold and heat, humidity and drought, storms and calm alternated and mingled still unabated. Only the bottom of the air was cold and there were many fog, some snow and a lot rain, which tipped the weather between wet and cold to drought and heat.<sup>79</sup>

On 16 June 1832 in *England*, there was a great hailstorm in Essex and Staffordshire.<sup>93</sup>

The summer of 1832 in Paris, *France* was characterized by:

Hot days	31 days
Very hot days	6 days
Extremely hot day	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]



The high temperatures observed during the summer were:<sup>62</sup>

Avignon, <i>France</i>	( 97.7° F, 36.5° C)	on 11 August
Geneva, <i>Switzerland</i>	( 95.4° F, 35.2° C)	on 22 August
Paris, <i>France</i>	( 95.0° F, 35.0° C)	on 13 August
Marseille, <i>France</i>	( 93.9° F, 34.4° C)	
Milan, <i>Italy</i>	( 93.9° F, 34.4° C)	
Maastricht, <i>the Netherlands</i>	( 90.1° F, 32.3° C)	on 14 July
Strasbourg, <i>France</i>	( 89.4° F, 31.9° C)	
Metz, <i>France</i>	( 88.7° F, 31.5° C)	on 13 August
Liège, <i>Belgium</i>	( 86.2° F, 30.1° C)	on 14 July
La Chapelle, <i>France</i>	( 81.9° F, 27.7° C)	on 9 August
London, <i>England</i>	( 81.9° F, 27.7° C)	on 10 August
Basel, <i>Switzerland</i>	( 80.8° F, 27.1° C)	on 12 July

The summer in Paris, *France* was dry. For two weeks at the end of September, the Seine River was below the zero point, the lowest water level of 1719. In Burgundy, there were significant changes in the state of the atmosphere. The grape harvest only began on 4 October. The harvest was poor and the wine of a low quality.<sup>62</sup>

On 7 August 1832, a hurricane struck *Jamaica*.<sup>124</sup>

In 1832, a hurricane struck off *Bermuda* causing 52 deaths.<sup>141</sup>

On 18 August 1832 in *Ireland*, there was heavy hail in County Londonderry that damaged crops and killed small birds.<sup>93</sup>

In 1832, a drought engulfed several regions of *China* including:<sup>153</sup>

- Hopei (now Hebei province) in northern *China* at Nei-ch'iu and Wang-tu.
- Chahar province (now eastern *Inner Mongolia*) at Huai-lai and Wan-ch'üan.
- During the period between 5 February and 26 July, a severe drought engulfed Hopei province at Ch'ang-p'ing.
- During the period between 6 May and 8 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing, Hu-chou and Ch'êng.
- During the period between 27 July and 25 August, a drought engulfed Hopei province at Tung-kuang and Ching-hai.
- During the period between 24 October and 21 November, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ling, Lin-i, Tsou-p'ing and Po-hsing; and Hopei province at Hsin-ch'êng [uncertain name]. [Lin-i is located at longitude 116.52° East and latitude 37.13° North.]

In 1832, several regions of *China* experienced flooding including:<sup>153</sup>

- During the period between 6 May and 8 August, floods struck Hopei (now Hebei province) in northern *China* at Yü-t'ien and Hupeh (now Hubei province) in central *China* at Sung-tzū, Wuchang, Ying-shan, Ma-ch'êng and Yün. At Sung-tzū, the dikes were damaged.
- During the period between 27 July and 25 August, floods struck Hupeh province at Chung-hsiang, Hsiang-yang, I-ch'êng and along the Tu River. At Chung-hsiang, the dikes and city walls were damaged by the floodwaters and innumerable people drowned. On the Tu River, more than 50% of the houses were damaged by the floodwaters.
- During the period between 26 August and 23 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ing-t'ien and Hupeh province at Chün and Ying-ch'êng. At Chün, innumerable houses were damaged by the floodwaters.

— During the period between 24 October and 21 November, floods struck Shantung (now Shandong province) on the east coast of *China* at Kuan-ch'êng, Chü-yeh and Wu-ch'êng.

*Also refer to the section 1832 A.D. – 1835 A.D. for information on the famine in India during that timeframe.*

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**Winter of 1832 / 1833 A.D.** Miss Ellen D. Larned described the New England winter of 1832-33 at Thompson, Connecticut in the *United States* — On 1 & 15 December 1832 - snow. In 1833, January was warm and pleasant. January 25<sup>th</sup> - snow and sleighing. January 31<sup>st</sup> - very hard snowstorm. February 6-7<sup>th</sup> - harder storm. March 1<sup>st</sup> - very severe snowstorm; could not see across the road; no such weather ever before seen in March; coldest of the season. March 16<sup>th</sup> - very muddy.<sup>116</sup>

During the winter of 1832-33, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 83 days.<sup>202</sup>

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**1833 A.D.** In 1833, the Brazos River in Texas in the *United States* flooded. In 1833, the creeks and lakes in this locality were dry prior to the flood; in fact there was no water in the county whatever, and all water from the floods were brought down by the rivers from up the country [from the north]. The flood of 1833 was highest in the vicinity of Duke, Texas on May 1, where the high water mark was three inches below that of the flood of 1899. This overflow commenced during the latter part of April and passed into the Gulf of Mexico early in May.<sup>123</sup>

The following extract from a letter, from Navasota, Texas, dated August 18, 1899, from Rufus Grimes, who has resided in the neighborhood of Grimes County for seventy years. The letter contains an interesting bit of flood history pertaining to the Brazos River:<sup>123</sup>

“In regard to the overflows of the Brazos River, my information comes from several men who had been repeatedly through portions of Texas previous to the introduction by S. F. Austin of his 300 families as colonists. These men told my father when I was a small boy (Mr. Grimes was born in 1819), and told me after I had attained the age of maturity, that the Brazos River had not been out of its banks for over thirty years until 1822, when there was a great overflow. The next overflow was in 1833, which came in May of that year; this overflow was considered by the early settlers the greatest overflow that had ever been known by white people in the streams west of the Mississippi River. It passed over the prairie where the present City of Navasota now stands in May 1833, and the back water was 2 to 4 feet deep all over the prairie. I cannot state positively the difference between the overflow of 1833 and that of the present year (1899), but I think the water was several feet higher at this place in 1833 than in 1899. The 1833 overflow did very little damage, as there was not exceeding 100 acres in cultivation in the present Grimes County portion of the Brazos bottom, and there was no [live] stock in the bottoms.”

In 1833 in *England*, there was a great hailstorm in Bedfordshire, Leicestershire and Lincolnshire.<sup>93</sup>

In 1833, there were tremendous gales of wind, which occasioned great loss of shipping on the coasts of *England* and *France*.<sup>43</sup>

On 2 June 1833, there was a violent hurricane in London and other parts of *England*.<sup>43</sup>

In Canton (Guangzhou) in southeastern *China* in October, there were incessant rains; about 10,000 houses were swept away and 1,000 persons drowned. The rains extended to other parts of *China*.<sup>47, 92</sup>

October 1833 at Canton, *China*, an inundation caused by incessant rains swept away 10,000 houses and about 1,000 persons perished. Equal or greater calamity was produced by the same cause in other parts of *China*.<sup>90</sup>

On 14 August 1833, there was a terrible thunderstorm at Strasburg [Strasbourg, *Austria*]. Within 15 minutes time, the tower of the cathedral was struck three times by lightning. The cathedral appeared to be in flames for several seconds [due to the electrical energy dissipated]. In many places the lead, copper and iron and even the mortar were found melted or vitrified. Fragments of metal had soldered themselves to the bells and were difficult to detach. Very large masses of stone fell in the neighboring streets.<sup>205</sup>

[In the Voyage of the Beagle, Charles] Darwin mentioned a tempest [in 1833] on the pampas of *South America*, where the icy fragments that fell were so heavy [the hailstones were as large as apples and extremely hard] as to kill large animals [including deer and ostriches].<sup>205</sup>

On 29 August 1833, ten thousand houses destroyed by flood at Canton (Guangzhou), *China*.<sup>43</sup>

In October 1833, eighteen thousand houses, carried away in the city of Chienchow (Chienchow), besides much other damage done throughout *China* by floods.<sup>43</sup> [Chienchow (Chienchow) is now Jian'ou (Jainning) in Fujian province in southeastern *China*.]

In Calcutta, *India*, a high tide in the Hooghly River committed great destruction.<sup>47, 92</sup>

In 1833, a powerful cyclone struck *India* causing 50,000 deaths.<sup>98</sup>

*Russia* suffered from a major famine in 1833.<sup>96</sup>

In 1833, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 5 February and 6 May, floods struck Hopei (now Hebei province) in northern *China* at P'ing-hsiang.

— During the period between 19 May and 17 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Kuei-ch'i; Hupeh (now Hubei province) in central *China* at Hsien-ning, Huang-p'o, Wuchang and Ao-ch'êng; and Chekiang (now Zhejiang province) on the east coast of *China* at Chiang-shan.

— During the period between 18 June and 16 July, floods struck Hupeh province at Tzū-kuei, I-tu and Kung-an.

— During the period between 17 July and 14 August, floods struck Hupeh province at Ch'i-ch'un, Huang-mei and Huang-kang.

In 1833 during the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Wu-ch'ing. During the period between 6 May and 8 August, a drought engulfed Kansu (now Gansu province) in northwest *China* at Lanchow and Lin-t'ao.<sup>153</sup>

*Also refer to the section 1832 A.D. – 1835 A.D. for information on the famine in India during that timeframe.*

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**Winter of 1833 / 1834 A.D.** During the winter of 1833-34, storms caused numerous shipwrecks on the coasts of *England*, *Scotland*, and *Ireland*, as well as on both sides of the *Channel* and on the shores of the *German Ocean*, to the extent of one hundred thousand tons.<sup>43</sup>

The winter of 1833-34 was very mild and very clear in northern *France*.<sup>79</sup>

On 15 January 1834, whole villages swept away in floods along with many thousands of inhabitants, in the country around Canton (Guangzhou), *China*.<sup>43</sup>

At Thompson, Connecticut in the *United States*, the first considerable snowstorm of the season in 1833 occurred on 25 & 26 November. It was snowy.<sup>116</sup>

During the winter of 1833-34, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 73 days.<sup>202</sup>

Miss Ellen D. Larned described the New England winter of 1833-34 at Thompson, Connecticut in the *United States* — On 30 October 1833 - coldest weather ever known in October. November 4-6<sup>th</sup> - winter like. November 25-26<sup>th</sup> - snowed considerable; some sleighing. December 17-18<sup>th</sup> - moderate snows and sleighing. On 1 January 1834 - great sleigh ride. January 18<sup>th</sup> - snow gone. February 7<sup>th</sup> - snowed all day. April 1<sup>st</sup> - snowed violently. April 11-17<sup>th</sup> - extremely warm.<sup>116</sup>

In the *United States* during the winter of 1833-34, the temperature at Fort Leavenworth, Kansas fell to -30° F in January.<sup>113</sup>

In the *United States*, the Chesapeake Bay was frozen over at the capes of Virginia in February.<sup>38</sup>

In March 1834, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 23<sup>rd</sup> (32° F). There was frost on the 14<sup>th</sup>, 17<sup>th</sup>, and 31<sup>st</sup>. There was ice on March 31<sup>st</sup>. It snowed on March 3<sup>rd</sup>.<sup>116</sup>

During the winter of 1833-34 in Bradford County, Pennsylvania in the *United States*, there was a late May snowfall. On May 14<sup>th</sup>, snow fell to a depth of 10 inches [25 cm] along with ice ½ inch [1 cm] thick.<sup>178</sup>

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**1834 A.D.** A tremendous fall of rain was experienced in Sydney, *Australia* on 30 March 1834. [During five hours some of the streets had the appearance of swollen rivers, and to such an extent did the waters accumulate, that youths were seen swimming about in the carriage ways. The foundations of many houses were injured, and the main guardhouse in Lower George-street gave way, the roof falling in with a crash. It was estimated that £10,000 would not cover the loss occasioned by the torrent of water, which saturated dwellings and ploughed up streets during the short period of a few hours.]<sup>103</sup>

In *Gibraltar*, there were waterspout and great damage from floods.<sup>47, 92</sup>

In 1834, a major storm struck the island of *Dominica*.<sup>43</sup>

On 31 May 1834 in *England*, there was a hailstorm in Lancashire.<sup>93</sup>

On 21 June 1834 in *England*, there was a hailstorm in Sussex.<sup>93</sup>

On 5 July 1834 in *England*, there was a hailstorm in Norfolk.<sup>93</sup>

On 31 July 1834 in *England*, there was a hailstorm in Suffolk.<sup>93</sup>

On 22 August 1834 in *England*, there was a hailstorm in Cambridgeshire.<sup>93</sup>

In August 1834, pieces of ice of three foot in diameter fell at Padua in *Italy*.<sup>43</sup>

On 4 September 1834, a hurricane struck South Carolina in the *United States* causing 37 deaths.<sup>141</sup>

On 20-23 September 1834, a hurricane struck Dominica in the *Lesser Antilles* and the Dominican Republic. Most accounts cite more than 200 deaths, but one account cites more than 100.<sup>141</sup>

On 18 October 1834, a storm struck the coast of *Great Britain* caused great destruction to the shipping.<sup>43</sup>

The winter of 1833-34 was very mild and very clear in northern *France*. The winter was followed by a warm very dry spring. The heat increased in May and during June, July and August. The temperature moderated significantly to September 10. However it was still very hot in September and even October. As a result of this heat, vegetation flourished. In September, most of the chestnut trees of the Luxembourg Gardens [in Paris], especially in the driveway of the South or the Observatory bloomed a second time. Some of the lilac garden produced new flowers. The sustained temperatures were 1.8° to 5.4° F (1° to 3° C) above the 21-year average.<sup>79</sup>

The average heat of 1834 rose considerably in Rouen, Strasbourg and Nantes, *France*.<sup>79</sup>

In 1834, there were dense dry fogs in *Europe* and *Russia*. They were the result of combustion of the peat beds and from the many fires that marked that year. Towards the end of May these dry fogs were observed in the Hartz Mountains in *Germany*. At the time there were fires in the peat beds in the neighborhood of Basle [Basel, *Switzerland*] and Orleans, *France*. The peat beds of Dachau, Bavaria [now Dachau, *Germany*] burned to a depth of more than nine feet [2.7 meters], and the fire propagated beneath ditches full of water. In the neighborhood of Münster and in Hanover in *Germany*, many peat beds were consumed. In July, there were terrible conflagrations in the forests and turf-pits near Berlin, *Germany*, in Silesia [a region of central Europe composed of primarily *Poland*, and smaller parts of the *Czech Republic* and *Germany*], in *Sweden* and in *Russia*. The drought during this time favored the propagation of these fires and the drifting of the smoke.<sup>205</sup>

The drought in 1834 was severe. In Paris, *France* the drought dominated the first three months of the year. The drought was maintained during the spring, despite some interruptions, and doubled in severity during the months of summer. Torrential downpours struck on the night of August 19/20 [providing some relief]. The drought resumed almost immediately and persevered, though with less intensity until the end of November. Rouen, Metz, Strasbourg, and Nantes felt the drought. The rains of spring, summer and fall were very far below average.<sup>79</sup>

This year produced high spring and summer temperatures. The summer of 1834 in Paris, *France* was characterized by:

Hot days	43 days
Very hot days	3 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The drought was very great in August. The Seine River sank to 3 centimeters (1.2 inches) above the low water level of 1719. The high temperatures observed during the summer were:

Avignon, <i>France</i>	( 95.0° F, 35.0° C) on 14 July
Geneva, <i>Switzerland</i>	( 94.1° F, 34.5° C) on 18 July
Liège, <i>Belgium</i>	( 92.3° F, 33.5° C)
Metz, <i>France</i>	( 91.4° F, 33.0° C) on 12 July
Strasbourg, <i>France</i>	( 91.0° F, 32.8° C)
Paris, <i>France</i>	( 90.7° F, 32.6° C) on 12 and 18 July
Marseille, <i>France</i>	( 88.5° F, 31.4° C)
Lyon, <i>France</i>	( 88.3° F, 31.3° C) in July
Brussels, <i>Belgium</i>	( 88.0° F, 31.1° C) on 19 July
La Chapelle, <i>France</i>	( 87.1° F, 30.6° C) on 21 June
London, <i>England</i>	( 86.7° F, 30.4° C) on 17 July
Basel, <i>Switzerland</i>	( 80.8° F, 27.1° C) on 18 July

In *Southern Europe*, the summer produced moderate temperature and heavy rains. In Burgundy, the year was famous for the excellent quality of the wine. The grape harvest began on 15 September. In the area of Bordeaux the weather behaved well. Throughout most of *France* rich grain harvest was good.<sup>62</sup>

The heavy rains of 1834 fell in the spring, summer and autumn in southern *France*. These rains caused almost all the rivers in the south to overflow their banks, notably the Rhône and the Gironde rivers.<sup>79</sup>

In 1834 during the period between 5 February and 6 May, a drought engulfed Shensi (now Shaanxi province) in central *China* at Tso-shui. During the period between 8 August and 8 November, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ting-hai.<sup>153</sup>

[The original record does not have this year, but both the text and a check with the annals (Ch'ing Shih Kao, Chapter 18) suggest that this date is missing.] In 1834, several regions of *China* experienced flooding including:<sup>153</sup>

- Hopei (now Hebei province) in northern *China* at Ta-hsing, Wan-p'ing, Wang-tu and Fu-ning.
- Hupeh (now Hubei province) in central *China* at Shih-shou, Kung-an and Sung-tzū.
- During the period between 7 June and 6 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui and Shensi (now Shaanxi province) in central *China* at Tso-shui.
- During the period between 7 July and 4 August, floods struck Chekiang province at Chin-yün and Shensi province at Yü-lin. At Yü-lin, the crops were damaged by the floodwaters.

*Also refer to the section 1832 A.D. – 1835 A.D. for information on the famine in India during that timeframe.*

**Winter of 1834 / 1835 A.D.** A great snowstorm reached Dartmouth at Hanover, New Hampshire in the *United States* on 30 December 1834, having commenced 24 hours earlier at Washington D.C. The depth of the snow was 20 inches [51 centimeters] at Baltimore, Maryland; 15 inches [38 centimeters] at Boston, Massachusetts; and 10 inches [25 centimeters] at Dartmouth.<sup>207</sup>

As a very strong cold wave passed through the northeastern region of the *United States* on 4 and 5 January, the following low temperatures were recorded:<sup>38,207</sup>

Anson, Maine	(-42° F, -41° C)
Franconia, New Hampshire	(-40° F, -40° C)
Montpelier, Vermont	(-40° F, -40° C)
Bangor, Maine	(-39° F, -39° C)
Milburn, Maine	(-39° F, -39° C)
New Lebanon, New York	(-39° F, -39° C)
Dunstable, Massachusetts	(-38° F, -39° C)
Norridgewick, Maine	(-38° F, -39° C)
Greenfield, Connecticut	(-36° F, -38° C)
Kennebeck, Maine	(-35° F, -37° C)
Lancaster, Massachusetts	(-35° F, -37° C)
Montreal, Canada	(-35° F, -37° C)
Greenwich, Massachusetts	(-34° F, -37° C)
Utica, New York	(-34° F, -37° C)
Schenectady, New York	(-33° F, -36° C)
Poughkeepsie, New York	(-33° F, -36° C)
Newbury, Vermont	(-33° F, -36° C)
Goshen, New Jersey	(-32° F, -36° C)
Hyde Park, New York	(-32° F, -36° C)
Albany, New York	(-32° F, -36° C)
Northampton, Massachusetts	(-32° F, -36° C)
Alfred, Maine	(-32° F, -36° C)
Pine Grove, Pennsylvania	(-32° F, -36° C)



Pittsfield, Massachusetts	( -32° F, -36° C)
Hanover, New Hampshire	( -32° F, -36° C)
Norfolk, Virginia	( -30° F, -34° C)
Kinderhook, New York	( -29° F, -34° C)
Dover, New Hampshire	( -28° F, -33° C)
Catskill, New York	( -28° F, -33° C)
Saco, Maine	( -28° F, -33° C)
Concord, Massachusetts	( -27° F, -33° C)
Smithfield, Rhode Island	( -26° F, -32° C)
Hartford, Connecticut	( -25° F, -32° C)
Norwich, Connecticut	( -24° F, -31° C)
Woonsocket Falls, Rhode Island	( -24° F, -31° C)
Pottsville, Pennsylvania	( -24° F, -31° C)
New Haven, Connecticut	( -23° F, -31° C)
Lancaster, Pennsylvania	( -22° F, -30° C)
Dorchester, Massachusetts	( -22° F, -30° C)
Fitchburg, Massachusetts	( -22° F, -30° C)
Bellville, New Jersey	( -20° F, -29° C)
North Lebanon, Pennsylvania	( -20° F, -29° C)
Portsmouth, New Hampshire	( -20° F, -29° C)
Worcester, Massachusetts	( -19° F, -28° C)
Columbia, Pennsylvania	( -18° F, -28° C)
Elizabethtown, New Jersey	( -18° F, -28° C)
Salem, Massachusetts	( -17° F, -27° C)
Washington D.C.	( -16° F, -27° C)
Branford, Connecticut	( -16° F, -27° C)
Boston, Massachusetts	( -15° F, -26° C)
Charlestown, Virginia	( -14° F, -26° C)
Hagerstown, Maryland	( -12° F, -24° C)
Alexandria, Virginia	( -10° F, -23° C)
Baltimore, Maryland	( -10° F, -23° C)
Bradford, Pennsylvania	( -6° F, -21° C)
New Bedford, Massachusetts	( -6° F, -21° C)
Philadelphia, Pennsylvania	( -4° F, -20° C)
Pittsburgh, Pennsylvania	( -4° F, -20° C)

In the *United States* during the winter of 1834-35, the temperature at Gouverneur, New York fell to -38° F in January. The temperature at Saint Louis, Missouri fell to -25° F in February. The temperature at Cincinnati, Ohio fell to -17° F in February.<sup>113</sup>

In the *United States*, a New York newspaper said the temperature was -23° F (-31° C) in Albany, New York; -15° F (-26° C) in Boston, Massachusetts; -13° F (-25° C) in Newark, New Jersey at sunrise on 6 January; and -18° F (-28° C) in New York City on the morning of 7 January.<sup>1</sup>

During the winter of 1834-35, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 100 days.<sup>202</sup>

In the *United States*, a man and a boy exposed to the outdoor weather on the night of 8 January, near Four Mile Point, in the vicinity of Savannah, Georgia, were frozen to death. The thermometer at Charleston, South Carolina at daybreak on 8 February was at (0° F, -18° C)<sup>38</sup>

In the *United States*, the mercury in several thermometers in Bangor, Maine and the towns adjacent, froze on the morning of 4 January. [The mercury in mercury thermometers solidifies (freezes) at -37.89 °F (-38.83 °C).] Penobscot river and bay as low down as eight miles (12.9 kilometers) below Belfast and

across to Castine and the Fox islands in Maine, were frozen over – an event not within the recollection of the oldest inhabitants.<sup>38</sup>

In the *United States*, nearly a mile from Boston, Massachusetts and in line with the fort, there were a number of tents erected on the ice where “whisky and long nines” were dispersed in great profusion.<sup>38</sup>

In Northampton, Massachusetts in the *United States* many wells were frozen at the depth of fourteen feet (4.3 meters) from the surface.<sup>38</sup>

In the *United States*, the mercury became congealed at New Lebanon, New York on the morning of the 5 January. [The mercury in mercury thermometers solidifies (freezes) at  $-37.89^{\circ}\text{F}$  ( $-38.83^{\circ}\text{C}$ ).] It is related that professor Cleveland of Bowdoin college, Massachusetts about a quarter of a century ago, in making experiments in several glasses suspended from the boughs of trees in exposed situations, ascertained that the mercury, after sinking to  $-38^{\circ}\text{F}$ , became stationary. It is mentioned, that in Parry’s second voyage to the *North Pole*, when the alcoholic thermometers stood at  $-58^{\circ}\text{F}$  ( $-50^{\circ}\text{C}$ ), his officers amused themselves by casting quicksilver into bullet moulds and freezing it, and enjoyed great sport in firing the balls at the polar bears.<sup>38</sup>

In the *United States*, the extreme cold weather caused the Nantucket beach in Maine to produce a series of three ice walls along its entire length of 4 miles (6.4 kilometers). The one next to the sea was 8 feet (2.4 meters) high and 20 feet (6.1 meters) thick of solid ice. The next wall was set back 20 feet (6.1 meters) from the first wall and was 3 feet (0.9 meters) high. The third ice wall was set back another 20 feet (6.1 meters) further up the beach and was 2 feet (0.6 meters) high.<sup>38</sup>

In the *United States*, foot passengers passed on the ice from Staten to Long Island, New York. The N.Y. Commercial states that on 9 January, Mr. R. Hazard, in company with three other gentlemen, started in a sleigh, crossed the hills on the ice near Elizabethtown, New Jersey and drove up to Jersey city, having made the track all the way.<sup>38</sup>

In the *United States*, a couple gentlemen from New York traveled by ice skates from Jersey City, New Jersey down to Bergen point, through the kills across the bay to Newark, New Jersey in four hours time.<sup>38</sup>

In the *United States*, Joshua H. Valliant and George W. Hynson, during the month of January, skated from Baltimore to Annapolis in Maryland, a distance of thirty miles in three and a half hours. They returned to Baltimore on the same day.<sup>38</sup>

Miss Ellen D. Larned described the New England winter of 1834-35 at Thompson, Connecticut in the *United States* — On 7 October 1834 - brilliant rainbow in the northwest just after sunrise. October 26<sup>th</sup> - p.m., heavy shower. October 31<sup>st</sup> - snowed several hours. December 13<sup>th</sup> - snowed. December 14<sup>th</sup> - more violent snowing. December 15<sup>th</sup> - the thermometer said to be  $-18.5^{\circ}\text{F}$  ( $-28.1^{\circ}\text{C}$ ). December 24<sup>th</sup> and 25<sup>th</sup> - more snow and sleighing. December 29<sup>th</sup> and 30<sup>th</sup> - another violent snowstorm. On 4 January 1835 - most remarkably cold; said to be  $-20^{\circ}\text{F}$  ( $-28.9^{\circ}\text{C}$ ). January 14<sup>th</sup> - sleighing gone. February 6<sup>th</sup> - snowed. February 15-16<sup>th</sup> - tedious snowstorm; sleighing again. March 2<sup>nd</sup> - very cold. March 7-10<sup>th</sup> - violent snowstorms; sleighing. March 19<sup>th</sup> - snowed. March 22<sup>nd</sup> - snow, rain, hail, thunder, and lightning. March 23<sup>rd</sup> - sleighing continuous. March 30<sup>th</sup> - snow. April 13-15<sup>th</sup> - snowstorm. April 25<sup>th</sup> - snow.<sup>116</sup>

The great freeze occurred in Florida in the *United States* on 7 February 1835, when the temperature went as low as  $7^{\circ}\text{F}$  above zero. John Lee Williams, writing in 1837, gives the following account of the great freeze of February 1835: "A severe northwest wind blew ten days in succession, but more violently for about three days. During this period the mercury was  $7^{\circ}$  below zero." [This is undoubtedly an error, and

should read above zero instead of below zero] "The St. Johns River was frozen several rods from the shore, and afforded a spectacle as new as it was distressing. All kinds of fruit were killed to the ground. Many of them never started again, even from the roots. The wild groves suffered equally with those cultivated as far south as 28° [North latitude]." He further remarks that a couple years later in 1837, the wild orange groves south of Volusia and at New Smyrna were in full bearing, which shows that they were not as injured as he originally wrote. In 1844, the writer saw very large sweet orange trees on Drayton Island bearing fruit, which could not have been killed down in 1835. There has been some question as to the exact date of the freeze of 1835. George R. Fairbanks thinks there is no doubt that it occurred on the night of the 7<sup>th</sup> and morning of the 8<sup>th</sup> of February 1835. Paragraphs in Nile's Register, February 1835, state that the mercury was 1° F below zero at Baltimore, and 1° F above zero at Raleigh, North Carolina, on the morning of 8 February 1835. That month was excessively cold, the Chesapeake having been frozen so as to close navigation three times during that month. The mercury was reported to have been at 11° F above zero at the same period at Fort King, Florida, then an army post near the present Ocala. Dr. Baldwin of Jacksonville, an excellent authority, indicated the freeze occurred on 8 February 1835 and the mercury stood at 8° F above zero.<sup>115</sup>

The frost at Jacksonville, Florida in the *United States* covering 125 years.<sup>115</sup>

February, 3, 1766	~ 20° F ( - 6.7° C)
February 8, 1835	8° F ( - 13.3° C)
January 16, 1857	16° F ( - 8.9° C)
December 28, 1872	27° F ( - 2.8° C)
January, 19, 1873	24° F ( - 4.4° C)
December 28, 1875	28° F ( - 2.2° C)
December 3, 1876	24° F ( - 4.4° C)
December 28, 1878	27° F ( - 2.8° C)
January 7, 1879	25° F ( - 3.9° C)
December 30, 1880	19° F ( - 7.2° C)
January 6, 1884	21° F ( - 6.1° C)
January 12, 1886	15° F ( - 9.4° C)
January 12, 1886	15° F ( - 9.4° C)
December 20, 1894	14° F ( - 10.0° C)
February 8, 1895	14° F ( - 10.0° C)

According to Schott's early records, the lowest temperature observed in the *United States* were:<sup>115</sup>

Fort Barancas, Florida	10° F ( - 12.2° C)	on January 1852
Fort Brooke, Florida	26° F ( - 3.3° C)	on January 1827 & 1857
Fort Dallas, Florida	30° F ( - 1.1° C)	on January 1857
Fort Jefferson, Florida	42° F ( + 5.6° C)	on December 1868
Fort King, Florida	11° F ( - 11.7° C)	on February 1835
Fort Marion, Florida	21° F ( - 6.1° C)	on January 1831
Fort Meade, Florida	24° F ( - 4.4° C)	on January 1852
Fort Myers, Florida	31° F ( - 0.6° C)	on January 1852
Fort Pierce, Florida	29° F ( - 1.7° C)	on January & December 1851, 1857
Indian Key, Florida	47° F ( + 8.3° C)	on February 1836
Key West, Florida	44° F ( + 6.7° C)	on January 1857
Charleston, South Carolina	16° F ( - 8.9° C)	on January 1852
Fort Moultrie, South Carolina	6° F ( - 14.4° C)	on February 1835

In the *United States*, the ice in the Mississippi River, at Bowling Green, Missouri, on 8 February, was strong enough for foot passengers to cross on, and the following day horses and teams crossed in safety.<sup>38</sup>

In the *United States*, the thermometer at Charleston, South Carolina at daybreak on 8 February was at 0° F (-17.8° C).<sup>38</sup>

The winter of 1834-35 was remarkable for the extreme cold in *North America*. A severe cold wave arrived on the Atlantic coast on 5 & 6 January. The ports of Boston, Portland, Newbury, New Haven, Philadelphia, Baltimore and Washington D.C. were frozen completely. On 3 & 4 January, wagons drove across the ice on the Potomac River. In contrast, the winter in *Europe* was very mild. Paris, *France* had no more than 24 frost days. The lowest temperatures observed were:<sup>62</sup>

Geneva, <i>Switzerland</i>	( 14.9° F, -9.5° C) on 21 December
Basel, <i>Switzerland</i>	( 16.9° F, -8.4° C) on 25 December
Paris, <i>France</i>	( 19.8° F, -6.8° C) on 6 January
Brussels, <i>Belgium</i>	( 25.0° F, -3.9° C) on 15 November
Constantinople, <i>Turkey</i>	( 32.4° F, 0.2° C) on 8 January
Hyères, <i>France</i>	( 33.1° F, 0.6° C) on 26 December
Cairo, <i>Egypt</i>	( 43.2° F, 6.2° C) on 17 January

In the *United States*, a severe winter of extraordinary harshness struck the South in 1835. Snow fell in South Carolina in April 1835.<sup>123</sup>

During the winter of 1834-35 in Bradford County, Pennsylvania in the *United States*, there was a late May snowfall. On 20 & 21 May, snow fell to a depth varying between 15 and 24 inches [0.4 – 0.6 m]. Apple, peach and plum trees were in bloom at the time.<sup>178</sup>

**1835 A.D.** In January 1835, the thermometer was 109° F (42.8° C) in the shade [in Sydney, *Australia*]. In February, there was a drought in Illawarra, Argyle and Maitland, *Australia*.<sup>103</sup>

A violent storm broke out first on 6 February 1835 at Toulon, *France*. Thunderstorms and rainstorms then became widespread in the southern regions of *France*. These storms even reached central regions. Rains from these storms caused rivers in both regions to overflow their banks at the end of spring.<sup>79</sup>

On 10 June 1835 in *England*, there was a great hailstorm in Cambridgeshire and Leicestershire.<sup>93</sup>

On 10 July 1835 in *England*, there was a great hailstorm in Derbyshire.<sup>93</sup>

On 11 July 1835 in *England*, there was a great hailstorm in Essex.<sup>93</sup>

The summer of 1835 in Paris, *France* was characterized by:

Hot days	41 days
Very hot days	10 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:

Avignon, <i>France</i>	( 95.0° F, 35.0° C) on 31 July
Alost (Aaist), <i>Belgium</i>	( 95.0° F, 35.0° C) on 9 June
Paris, <i>France</i>	( 93.2° F, 34.0° C) on 23 July
Rouen, <i>France</i>	( 93.2° F, 34.0° C) on 23 & 24 July
Metz, <i>France</i>	( 91.4° F, 33.0° C) on 18 July
Geneva, <i>Switzerland</i>	( 90.5° F, 32.5° C) on 16 July
Marseille, <i>France</i>	( 89.4° F, 31.9° C)
Lyon, <i>France</i>	( 87.4° F, 30.8° C) in August
Brussels, <i>Belgium</i>	( 85.6° F, 29.8° C) on 11 June and 12 August
London, <i>England</i>	( 84.0° F, 28.9° C) on 28 August
La Chapelle, <i>France</i>	( 83.8° F, 28.8° C) on 11 August

Basel, *Switzerland* ( 78.8° F, 26.0° C) on 17 June  
Normandy experienced heat and dryness. The grape harvest began in Burgundy, *France* on 5 October. The yield was abundant but the wine was of poor quality. The cereal harvest was satisfactory.<sup>62</sup>

On 12 August 1835, a hurricane struck St. Kitts in the *West Indies*.<sup>144</sup>

On 12 August 1835, a hurricane ravaged the islands of *Antigua*, *Nevis*, and *St. Kitt's*. It then struck *St. Thomas*, *St. Croix*, and Porto Rico [*Puerto Rico*] on the 13<sup>th</sup>; Hayti [*Haiti*] and *Turks' Island* on the 14<sup>th</sup>; the vicinity of Matanzas and Havana [in *Cuba*] on the 15<sup>th</sup>. It was encountered off the *Tortugas*, in the Gulf of Mexico, on the 16<sup>th</sup>. It was at Metamora, on the coast of *Mexico* on the 18<sup>th</sup>, where it was most violent. The hurricane traveled more than 2,200 miles in six days.<sup>228</sup>

On 3 September 1835, a hurricane struck Barbados in the *Lesser Antilles* and the *Dominican Republic*. The mail boat, *Lady Lunn*, was capsized and sunk; one man saved. Two boats were driven to sea from Barbados and not heard from after 11 days. Three deaths on the ship *Matilda* near the Dominican Republic.<sup>141</sup>

In 1835, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Yüan-shih; Shantung (now Shandong province) on the east coast of *China* at Lin-ch'ü; and Hupeh (now Hubei province) in central *China* at I-tu, Chih-chiang and I-ch'ang.

— During the period between 6 May and 8 August, a drought engulfed Hupeh province at I-ch'êng and Ku-ch'êng; and Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou, Wên-chou, Ch'êng and Li-shui.

— During the period between 27 May and 21 September, a drought engulfed Chekiang province at Huang-yen.

— During the period between 27 May and 21 October, a drought engulfed Chekiang province at Chin-yün.

— During the period between 24 August and 21 September, a drought engulfed Hupeh province at Fang, Huang-kang and An-lu.

— During the period between 8 November 1835 and 5 February 1836, a drought engulfed Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing; Kiangsi (now Jiangxi province) in southern *China* at Yü-shan; and Hupeh province at Ao-ch'êng.

In 1835 during the period between 27 May and 25 June, floods struck Shensi (now Shaanxi province) in central *China* at Mien and Hupeh (now Hubei province) in central *China* at Chung-hsiang. At Mien, houses and fields were damaged by the floodwaters. During the period between 24 August and 21 September, floods struck Hopei (now Hebei province) in northern *China* at Hsing-t'ai and Shantung (now Shandong province) on the east coast of *China* at Chan-hua and P'u-t'ai.<sup>153</sup>

*Also refer to the section 1832 A.D. – 1835 A.D. for information on the famine in India during that timeframe.*

**Winter of 1835 / 1836 A.D.** The winter of 1835-36 in *Belgium* and northern *France* was rather strict, but not exceptionally. Certain parts of *Provence* experienced very strong frosts. The nature of the cold and rainy winter and half of the spring harmed the fruit trees and a large number of them died out. The following are the lowest temperatures recorded in different cities this winter:<sup>62</sup>

Moscow, <i>Russia</i>	(-46.7° F, -43.7° C)
St. Petersburg, <i>Russia</i>	(-28.8° F, -33.8° C)
Orange, <i>France</i>	( -0.4° F, -18.0° C) on 28 December
Basel, <i>Switzerland</i>	( 8.1° F, -13.3° C) on 23 December
<i>Ibid.</i>	( 2.3° F, -16.5° C) on 2 January

Metz, <i>France</i>	( 9.5° F, -12.5° C) on 15 December
<i>Ibid.</i>	( 8.6° F, -13.0° C) on 2 January
Geneva, <i>Switzerland</i>	( 10.4° F, -12.0° C) on 11 & 12 December
Löwen, <i>Germany</i>	( 10.8° F, -11.8° C) on 2 & 3 January
Brussels, <i>Belgium</i>	( 13.3° F, -10.4° C) on 22 December
<i>Ibid.</i>	( 11.7° F, -11.3° C) on 2 January
Paris, <i>France</i>	( 14.7° F, -9.6° C) on 22 December
<i>Ibid.</i>	( 14.0° F, -10.0° C) on 2 January
Avignon, <i>France</i>	( 14.9° F, -9.5° C) on 29 December and 3 January
Alost (Aaist), <i>Belgium</i>	( 17.4° F, -8.1° C) on 22 December
<i>Ibid.</i>	( 15.4° F, -9.2° C) on 2 January
Nantes, <i>France</i>	( 17.4° F, -8.1° C) in December
London, <i>England</i>	( 20.8° F, -6.2° C) on 24 December
<i>Ibid.</i>	( 17.6° F, -8.0° C) on 2 January
Fort Vancouver, <i>Canada</i>	( 21.2° F, -6.0° C) on 7 December
Constantinople, <i>Turkey</i>	( 23.2° F, -4.9° C) on 27 December
Hyères, <i>France</i>	( 29.7° F, -1.3° C) on 2 January
Cairo, <i>Egypt</i>	( 40.5° F, 4.7° C) on 31 December
<i>Ibid.</i>	( 36.5° F, 2.5° C) on 26 January

In Paris, *France* there was 54 days of frost, but only nine in succession. But in *European Russia* and *Turkey*, there was severe cold. On 27 December a low temperature of 23.2° F (-4.9° C) was observed in Constantinople (Istanbul), *Turkey*. In Constantinople, during the first days of January, an extraordinary cold struck, and the number of people that perished from the cold exceeded the number from the year 1812. On the night of 5/6 January in St. Petersburg, *Russia*, the low temperature of -25.6° F (-32° C) was observed. This was followed by five days in succession a cold between -13° F (-25° C) and -28.8° F (-33.8° C). Then on January 9, within 24 hours the temperature suddenly rose to 42.8° F (6° C). During those cold days there was a terrible wind. “You could hear the sound of wheels on the frozen ground, and sharp cries, expression of the general public suffering. A sledge arrived at the gates of the city, but when officials approached the sledge, they found the people inside frozen to death.” The birds fell down dead in large numbers. In Petersburg, the rapid temperature change caused by heat and cold produced many diseases. In Moscow, *Russia*, the severe cold was measured as -46.7° F (-43.7° C). As a result of these freezing temperatures, nobody could make anything, and the shops closed up for three days in a row. During the snowstorms, the wind was particularly unbearable because anyone exposed to it, were essentially wrapped in a sheet of ice, which robs them of any ability to fight the effects of the cold.<sup>62</sup>

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1835 occurred on 23 November. It snowed all day; very cold.<sup>116</sup>

The winter of 1835-36 was one of the severest winters ever known in New England in the *United States*. The summer of 1835 was dry and remarkably pleasant. But the winter had many extremely cold days. All the harbors from New York to Nova Scotia were thickly frozen with ice. Massachusetts Bay was covered by ice for a long distance from the shore. The first snow fell on 23 November and from then until the end of March the area was pounded by frequent snowstorms. The ground was covered to a great depth with snow. There was excellent sleighing continuous for twenty weeks.<sup>199</sup>

— On 16 December 1835, the harbor of Salem, Massachusetts was frozen over as far as Naugus Head. A small craft with a crew of 5 capsized and all the men were drowned. It was -18° F [-28° C] at Salem, Massachusetts. At Greenfield, it was -15° F [-26° C]. Many people suffered frozen fingers, ears and noses. During that night, there were many buildings burned, probably on account of the great fires that were made to enable people to keep warm.

— During November and December, there was a winter drought. The streams were so low that the [water powered] manufacturing companies had to suspend operations. Many wells were very low or



completely dry. Water had to be hauled a distance by teams for domestic use.

— January 1836 was severely cold. There were many disasters to vessels on the coast and a number of lives were lost. The brig *Regulator* ran aground on an island in Boston harbor.

— On 21 February, the three month run of cold weather in eastern Massachusetts was finally broken. The snow was deep everywhere, in the woods and fields and highways. In most of the streets of Boston, the snow and ice had accumulated to from 3 to 4 feet [0.9-1.2 meters] in depth, and in many narrow streets even deeper.

— On 1 April, the snow was four feet [1.2 meters] deep in the New Hampshire woods and not a speck of bare ground was visible on hill or dale.

Miss Ellen D. Larned described the New England winter of 1835-36 at Thompson, Connecticut in the *United States* — On 23 November 1835 - snow and tolerable sleighing. November 30<sup>th</sup> - snowed all day; very cold month. December 12<sup>th</sup> - snowed; very cold. December 17<sup>th</sup> - more so; very, very cold; temperature -14° F (-25.6° C). December 22<sup>nd</sup> - good sleighing. On 17-18 January 1836 - snowstorm. January 25<sup>th</sup> and 31<sup>st</sup> - snowed. February 8<sup>th</sup> - tremendous storm; roads all banked up. February 17<sup>th</sup> - more snow. February 26<sup>th</sup> - snow. March 10<sup>th</sup> - hard rain; hard traveling; bridges carried off. March 22<sup>nd</sup> - snow; good sleighing until the 28<sup>th</sup>, in all about four months sleighing; many snow banks left. April 6-13<sup>th</sup> - tedious snowstorms.<sup>116</sup>

In the *United States* during the winter of 1835-36, the temperature at Huntsville, Alabama fell to -9° F in January. The temperature at Williamstown, Massachusetts fell to -30° F in January. The temperature at Saint Louis, Missouri fell to -19° F in January.<sup>113</sup>

In Illinois in the *United States*, an early settler described her recollections of a “sudden freeze” that occurred a little after noon one day in January 1836. She and her family had finished their noon day meal, and were sitting around and in front of the old fashioned large open fireplace, enjoying the generous warmth, chatting and discussing the state of the weather, as during the morning it had been snowing and raining a little. Presently the lady looked from the window of her cabin and noticed a heavy black cloud lying off to the west, which seemed to be rapidly approaching. Needing some water, she took a bucket and went to the well, at a distance of about 100 yards, lowering the bucket with a long “sweep” then used in drawing water, filled it, and started for the house. Before reaching the house, the wind and the rain struck her clothing. The cold air seemed to cut like a knife, and before she reached the house, her dress and apron were frozen stiff in a solid sheet of ice. Ponds, which a moment before was free of ice, were frozen in a few minutes. Many persons were frozen to death that happened to be caught away from home; and many others, before they could get to a place of shelter, had their faces, ears, hands and feet frozen. Immediately preceding the storm, the ground had been slightly covered with snow, which from the morning rains had become slushy. Cattle in the field were held fast by the slush, which froze about their feet, and it became necessary to cut away the ice to free them. Ducks and geese were imprisoned in the same manner. It was scarcely 10 minutes after the cold wave swept over the place, that the water and melting snow was hard enough to bear the weight of a man on horseback.<sup>245</sup>

Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>

During the winter of 1835-36, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 125 days.<sup>202</sup>

Seven snowstorms struck the Northeast *United States* in January. Eight to ten feet (2.4-3.0 meters) of snow fell in many places near Philadelphia. The newspapers said that the interior of Pennsylvania and New York and various parts of New England received ten to fourteen feet (3.0-4.3 meters) of snow in January.<sup>1</sup>

In the *United States*, the storm of 8-10 January 1836 dumped 15 inches (0.4 meters) of wet snow in Philadelphia; around 15 inches (0.4 meters) in New York City; 18 inches (0.5 meters) in Brooklyn; 3 to 4 feet (0.9-1.2 meters) over the highlands of northern Pennsylvania into Central New York State; 42 inches (1.1 meters) in Montrose and 5 feet (1.5 meters) at Ithaca and Rome, New York.<sup>27</sup>

An extract from a letter received from Mr. Thomas J. Beans who lived in Pennsylvania in the United States: "I was nine years old when the snow of 1836 fell. From that time throughout my residence in Pennsylvania it was always spoken of as 'the big snow.' Enquiring of many of the old people in New Jersey, they say it was called here, 'the great snow.' At my father's home I remember the sheep were covered [with snow] out of sight, and after a long search were found by holes in the snow made by their breath. The young timber was bent over in the woods so that many trees kept their bent form after they had attained size years after. A rain and freeze covered the snow with ice, so that skating over its surface was the usual way for going to school. My father hauled his hay to Philadelphia, 18 miles, on a hay body with sled runners."<sup>123</sup>

The winter of 1835-36 in Bradford County, Pennsylvania in the *United States* was remarkable for a great fall of snow and intense cold weather. On 8, 9 and 10 January 1836, snow fell without cessation and was followed by a heavy wind, which in many places, piled the snow in drifts from 15 to 20 feet [4.6 – 6.1 m] deep. Again on 24 and 25 January, more than a foot [30 cm] of snow fell, making with the previous fall a snow depth of about four feet [1.2 m] on the level. The weather continued extremely cold for five weeks and as a result, many cattle and other animals perished. There was still good sleighing on the 23<sup>rd</sup> of March. Teams crossed the Susquehanna River on the ice at Towanda on the 28<sup>th</sup>. Then there was a sudden change and the ice in the river went out on March 30, doing little damage.<sup>178</sup>

Eight snowstorms struck the Northeast *United States* in February. It is estimated that if the snow had fallen on the level and remained to the end of the last snow, the snow depth would have been 8 to 10 feet (2.4-3.0 meters). But the snow blew into banks that were in some places 20 to 25 feet (6.1-7.6 meters) high. Snow covered much of the United States. It was good sleighing during February from Virginia to the Rocky Mountains, to Upper Canada, to Eastport, Maine. This was the coldest February since 1815.<sup>1</sup>

In the *United States*, every night in March produced ice in Philadelphia except the last three days of the month.<sup>1</sup>

In March 1836, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 3<sup>rd</sup> (29°-30° F); 12<sup>th</sup> (30°-31° F); 13<sup>th</sup> (28°-29° F); 16<sup>th</sup> (32° F); 26<sup>th</sup> (32° F). There was frost on March 4<sup>th</sup>, 9<sup>th</sup>, 13<sup>th</sup>, 16<sup>th</sup>, 25<sup>th</sup>, and 27<sup>th</sup>. It snowed on March 22<sup>nd</sup>.<sup>116</sup>

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**1836 A.D.** The River Thames went dry in London, *England* and people were able to cross the river on foot.<sup>1</sup>

Major storms reigned in *France* in 1836. The winter storms shook the Mediterranean Sea and the English Channel. Spring brought thunderstorms of hail and heavy rain. In late summer and in the fall the rainstorms and lightning storms increased in intensity.<sup>79</sup>

In France there was a flood. On 8 May 1836, the Seine River in Paris, *France*, at the bridge "Pont de la Tournelle" reached a height of 6.4 meters (21 feet) above the zero mark [the low water mark of the year 1719].<sup>71</sup>

On 28 June 1836, there was a heavy fall of snow in Sydney, *Australia* that lasted for a half hour.<sup>103</sup>

On 4 July 1836 in *England*, there was a hailstorm in Hertfordshire and Wiltshire.<sup>93</sup>

On 6 July 1836 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>

The summer of 1836 was memorable because of the thunderstorms of June and the beginning of July and because of the heat in the south of *France*. In *Denmark*, *Prussia* and *Spain*, the temperature was abnormally high. The summer of 1836 in Paris, *France* was characterized by:

Hot days 30 days

Very hot days 7 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

La Rochelle, <i>France</i>	(102.2° F, 39.0° C) on 4 & 5 July
Flacq, <i>Mauritius</i>	(101.3° F, 38.5° C) in March and April
Avignon, <i>France</i>	( 97.9° F, 36.6° C) on 5 July
Toulouse, <i>France</i>	( 97.0° F, 36.1° C) on 3 July
Paris, <i>France</i>	( 93.7° F, 34.3° C) on 1 July
Rodez, <i>France</i>	( 92.8° F, 33.8° C) in July
Geneva, <i>Switzerland</i>	( 92.1° F, 33.4° C) on 12 July
Marseille, <i>France</i>	( 91.0° F, 32.8° C)
Alost (Aaist), <i>Belgium</i>	( 89.8° F, 32.1° C) on 6 July
Bordeaux, <i>France</i>	( 87.8° F, 31.0° C) on 4 July
Brussels, <i>Belgium</i>	( 86.2° F, 30.1° C) on 6 July
Metz, <i>France</i>	( 85.6° F, 29.8° C) on 24 June
London, <i>England</i>	( 84.9° F, 29.4° C) on 4 August
La Chapelle, <i>France</i>	( 84.6° F, 29.2° C) on 5 July
Löwen, <i>Germany</i>	( 83.8° F, 28.8° C) on 6 July
Basel, <i>Switzerland</i>	( 78.8° F, 26.0° C) on 12 July

Between 15 June and 3 July, the thermometer remained consistently above 86° F (30° C) in Toulouse, *France*. On the roads many horses dropped dead from the heat. In La Rochelle, *France* the heat killed many people and domestic animals. In the neighborhood of Perpignan, *France* reapers in the field choked to death from the heat, and in *Spain*, soldiers on the march dropped dead from the heat.<sup>62</sup>

The drought was very great in Paris, *France* in August. The Seine River was 30 centimeters (1 foot) below the low water level of 1719. In the south, the grape harvest provided an average quantity and the wine produced was of fairly good quality. In Burgundy, the grape harvest only began on 6 October. The grain harvest was poor.<sup>62</sup>

On 14 August 1836, a violent thunderstorm with heavy rains struck *England*. The storm did much damage to the shipping in the harbor at Liverpool. On the same day, a violent thunderstorm struck *Austria*, destroying houses, barns and causing fatalities.<sup>228</sup>

On 1836, a hurricane struck the Cayman Islands in the *Caribbean Sea*. The women of east end left widowed when their husbands were lost at sea.<sup>141</sup>

On 3 & 4 October 1836, there were violent gales on Lake Michigan in the *United States*. Several vessels and much property were destroyed.<sup>203</sup>

On 5 October 1836, a great snowstorm struck the *United States*. At Auburn, New York, 24 to 26 inches [61 to 66 centimeters] of snow fell. In Pennsylvania between Hollidaysburg and Johnstown, the snow was 20 inches [51 centimeters] deep. This storm was remarkable for the early arrival in the winter.<sup>203</sup>

On 29 November 1836, a very violent gale struck London and throughout *England*. Much damage was done to London and many vessels were wrecked along the coast.<sup>203</sup>

On 29 November 1836, a storm struck throughout *England* and on the coast of *France*, which did great damage, when the ball and cross on St. Paul's cathedral vibrated fearfully.<sup>43</sup>

On 29 November 1836, a terrible hurricane struck *England*. This storm first appeared on the 23<sup>rd</sup> on the eastern shores of North America, off St. Lawrence. A ship from Poole fell in with this storm on the 26<sup>th</sup> at latitude 47° North, longitude 32° 20' West, and was thrown on her beam-ends. The storm continued across the Atlantic Ocean, and reached Land's End, *England* about 7:45 a.m.; Plymouth 8:30 a.m.; Exeter 9:30 a.m.; Weymouth 10 a.m.; Poole 10:30 a.m.; Farnham 12 noon; London 1:30 p.m.; Suffolk coast 2:30 p.m.; and Hamburg, *Germany* at 6 p.m. This storm traveled at 50 miles per hour but had a circular motion of from 120 to 150 miles per hour. The fury of the gale was most felt on the coasts of *France* and *Belgium*. At Ostend, *Belgium* there was scarcely a house, which was not unroofed; and so great was the demand for [roof] tiles that they rose from 16 to 30 florins per 1000.<sup>228</sup>

In 1836, there was a famine in the Bombay Presidency and Madras in *India*.<sup>156</sup>

In 1836, there was a famine in Orissa [now Odisha on the east coast of *India*].<sup>182</sup>

In 1836 during the period between 5 February and 6 May, floods struck Shantung (now Shandong province) on the east coast of *China* at Mou-p'ing. The fields were damaged by the floodwaters. During the period between 12 August and 10 September, floods struck Hupeh (now Hubei province) in central *China* at Chung-hsiang. The dikes were damaged.<sup>153</sup>

In 1836 during the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at P'êng-lai. During the period between 6 May and 8 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Ying-ch'êng; Kansu (now Gansu province) in northwest *China* at Lanchow and Lin-t'ao; and Shensi (now Shaanxi province) in central *China* at Tso-shui.<sup>153</sup>

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**Winter of 1836 / 1837 A.D.** A snowfall began on 24 December 1836, which continued for some days, and blocked up the roads in most parts of the kingdom so completely, that on the 27<sup>th</sup> at 8 p.m., all the mail with the exception of two, were due [late]. Such a violent snowstorm had not occurred in *England* since 1814. At Lewes, Sussex in southern *England*, an avalanche of snow, falling from a cliff, destroyed a number of houses, and buried the inhabitants in the ruins. The storm was equally severe in Paris and in the north of *France*, but the cold was not intense. The thermometer scarcely descending more than a few degrees below freezing.<sup>43</sup>

On 24 December 1836, there was a great fall of snow in *Great Britain* and northern *France*. It blocked up the roads in most parts of *England* so that on the 27<sup>th</sup>, the mail could not be delivered at London. The storm caused great damage and loss of life. At Lewes, an avalanche from a cliff destroyed several houses and buried the inhabitants in the ruins. At Chatham Lines [railroad line in England], the snow was from 30 to 40 feet [9.1 to 12.2 meters] deep. "Never before," says a London paper, "within our recollection, was the London mail stopped for a whole night at a few miles from London; and never before have we seen the intercourse between the southern shires of England and the metropolis interrupted for two whole days".<sup>203</sup>

On Christmas day 1836, a powerful snowstorm struck London, *England*. Communications with the metropolis for one whole week was greatly retarded by land, the effects of which were seriously felt by the commercial houses. The drifted snow, in many places, measured from 12 feet to 16 feet in depth, but

the average depth as nearly as could be calculated was about 4 feet. In London, the principal streets during the whole of Christmas week, resembled ploughed lands. The snow, having become mingled with the dirt in the streets, had lost its whiteness, and had very much the appearance of black mould [mold]; so that carriages passed along the streets as silently as they would have done along a ploughed field. The gale on Christmas day did much damage to the shipping on the east coast. It is believed that this storm struck across all of *England*. There was a considerable fall of snow in *Spain*, with an unusual decrease in temperature.<sup>228</sup>

In *England*, there were floods caused by winter's thaw.<sup>47, 92</sup>

The winter of 1836-37 in Bradford County, Pennsylvania in the *United States* began early. The people of Bradford county back on the hills were very surprised upon awakening on 5 October 1836 to find the ground covered with a great body of snow which had fallen to the depth of nearly two feet [0.6 m] during the night. Fruit had not been gathered nor buckwheat, some not yet cut. Fruit trees were broken down and roads through the forests blockaded with limbs. On the 6<sup>th</sup>, the sun shone brightly and the snow soon disappeared. Of this storm the Northern Banner wrote: "This was one of the most unusual storms we have ever witnessed, and being accompanied by the keen, cutting blasts from the North, it had every appearance of real winter. The jingling of sleigh bells was heard through our streets (Towanda) on the 5<sup>th</sup> of October as merrily as in the middle of winter, and overcoats, cloaks and good fires were as indispensable as in January. . . Palmer Thompson of Smithfield township perished in the snow-storm on the night of the 5<sup>th</sup>. He had been a few miles from home to a [barn?] raising. Returning home through the woods, night coming on and it being very dark, he lost his way and lay in the woods all night where he was found dead the next morning."<sup>178</sup>

During the winter of 1836-37, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 111 days.<sup>202</sup>

At Thompson, Connecticut in the *United States*, the first significant snowstorm of the season in 1836 occurred on 17 November. Considerable snow.<sup>116</sup>

Miss Ellen D. Larned described the New England winter of 1836-37 at Thompson, Connecticut in the *United States* — On 3 November 1836 it snowed. November 17<sup>th</sup> - snowstorm. November 25<sup>th</sup> - squally and cold. On 1 January 1837 - snow and sleighing. January 18<sup>th</sup> - snow. January 21<sup>st</sup>-22<sup>nd</sup> - hard snowstorm. January 25<sup>th</sup> - very remarkable red auroras. Quiet snows and sleighing through February. March 2<sup>nd</sup> - great sleighing party. March 19<sup>th</sup> - very cold. March 22<sup>nd</sup> - cold and tedious storm; trees loaded with ice. April 1<sup>st</sup> - cold, frozen rain. April 2<sup>nd</sup> - cold. April 8<sup>th</sup> - rain and thunder all day. April 9-10<sup>th</sup> - hail. April 16<sup>th</sup> - cold rain. May 1<sup>st</sup> - ground frozen hard. May 5<sup>th</sup> - rain and thunder showers all day and evening.<sup>116</sup>

In March 1837, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 1<sup>st</sup> (31° F); 4<sup>th</sup> (22° F); 5<sup>th</sup> (27°-28° F); 6<sup>th</sup> (31° F). There was frost on March 12<sup>th</sup>, 17<sup>th</sup>, and 21<sup>st</sup>. It snowed on March 3<sup>rd</sup> and 24<sup>th</sup>.<sup>116</sup>

On 3 April 1837, a great late season snowstorm struck St. Louis, Missouri in the *United States* with snow falling to a depth of 17 inches [43 centimeters].<sup>203</sup>

On 7 April 1837, it snowed all day in St. Charles and Warren Counties, Missouri in the *United States*. On the morning of the 8<sup>th</sup>, the snow was 2½ feet deep on the level.<sup>123</sup>

On 8 April 1837, snow fell at Havre, Rouen and many other places in *France*.<sup>203</sup>



On 11 April 1837, there was a considerable snowfall in London, *England*. The newspaper *The Morning Herald* wrote, "Considering the quantity [of snow] that fell in October, we may now be said to have had seven months of winter. In fact there has not been any genial weather since the middle of August."<sup>203</sup>

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### **1837 A.D. – 1838 A.D. India. Famine**

In *India* during the years 1837-1838, there was a severe drought in some of the northwest provinces.<sup>47</sup>

In 1837, there was a famine in the Northwest Provinces in *India*.<sup>156</sup>

In 1837, there was a famine in Agra and the North-Western Provinces of *India*. A half million people perished most miserably.<sup>182</sup>

In 1837-38, there was a famine in Marwar in western *India* in which 50,000 people perished.<sup>182</sup>

In 1837-38, there was a great famine in *India*. It affected the whole country between Allahabad and Delhi, but was most severe in the central Daub [river region], in the neighborhood of Agra and Cawnpur. Including Rajputana, the affected population included 28 million. In 1836 the rains failed, and the distress was intensified by poor harvests in the preceding years. Grain merchants closed their shops. The peasantry took to plunder. Cattle starved and died. In the part of the Mathura district west of the Jumna [river], the village thatches were torn down to feed the starving beasts. In Farrukhabad, "Brahmans, who had before rejected their cooked food if the defiled Christian came to near, were now seen by us stealing the scraps from our dogs. Mothers sold their infants to the despised foreigners, or left them a prey to the wolves; society was entirely disorganized, and horrors of every kind pervaded the land."<sup>181</sup>

In *India* during 1837-38, there was a famine in northwest provinces, resulting from a general failure of rain. This was also felt in the lower provinces: for in Calcutta it is said the [water] tanks were empty. Lord Auckland wrote in January 1838: "The fall in the usual season of the rains last year was unusually late and scanty; and an absolute drought has followed up to the present time."<sup>57</sup>

In 1837-38 in northwest *India*, there was a famine. Above 800,000 people perished.<sup>90</sup>

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### **1837 A.D. – 1839 A.D. Australia. Drought**

From 1837-39, there was a severe drought in New South Wales, *Australia*. This was reported to be the worst drought since the region was settled. Many rivers were dry.<sup>101</sup>

In 1837 in the Hunter Region of New South Wales, *Australia*, wheat sown in May had not germinated in September.<sup>103</sup>

In 1838, there was a drought in *Western Australia*. Crops suffered in Northam and York.<sup>101</sup>

On 2 November 1838 was declared a Day of Humiliation in New South Wales, *Australia* on account of the drought.<sup>103</sup>

In 1839, there was a drought in *South Australia*. There was no permanent water anywhere. The drought was severe from Port Lincoln to the head of Spencers Gulf.<sup>101</sup>

In New South Wales, *Australia*, there was a great drought in 1839.<sup>103</sup>

In February 1839 in New South Wales, *Australia*, the Cowpasture River ceased to flow. This was the first time this ever happened since it was first discovered 48 years earlier. In March, dead cattle along the roads; no food for man or beast.<sup>103</sup>



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**1837 A.D.** During May through September of 1837 in *South Australia*, there was intermittent flooding in Adelaide.<sup>101</sup>

On 3 June 1837, a tornado cut a path from the Hudson [River] through Dutchess County, New York into the State of Connecticut in the *United States*, causing great damage.<sup>203</sup>

On 15 June 1837, there was a great rainstorm in Baltimore, Maryland in the *United States*. The waters of Jones's Fall rose suddenly in 3 to 4 hours time, 20 feet [6.1 meters] above its usual level. About 50 dwelling houses and 200 stores were destroyed or damaged; a great amount of goods and property ruined; and between 20 and 30 lives were lost.<sup>203</sup>

On 28 June 1837, there was a great fall of snow near Sydney, *Australia*.<sup>103</sup>

On 26 July to 3 August 1837, a hurricane struck the *Caribbean* island of Martinique and the southwest *Atlantic Ocean* causing 57 deaths. [Reid (1841) reprints report that two hurricanes occurred in Santo Domingo in 1837, in some combination causing 3 drownings, plus "three Haytian vessels were also on the coast, and only one man saved."] <sup>141</sup>

On 30 July 1837 in Dublin, *Ireland*, there was a violent shower of hail, accompanied by loud thunder.<sup>93</sup>

On 2-3 August 1837, a hurricane struck near the *Caribbean island* of St. Thomas, *Puerto Rico* and the southwest *Atlantic Ocean*. This hurricane caused more than 141 deaths.<sup>141</sup>

On 2-4 August 1837, hurricanes cause great damage at *St. Thomas*, *St. Bartholomew's* and other West India Islands [West Indies Islands].<sup>203</sup>

On 18 August 1837, a hurricane struck North Carolina in the *United States*. Several vessels were lost, one of them, with the entire crew. The ship *Palambam* foundered.<sup>141</sup>

The high temperatures observed during the summer were: <sup>62</sup>

Basse-Terre, <i>Guadeloupe Island</i>	( 95.0° F, 35.0° C) on 21 August
Reykjavik, <i>Iceland</i>	( 68.9° F, 20.5° C) on 25 and 31 July

On 26-27 September 1837, a hurricane struck *Jamaica*.<sup>124</sup>

On 3-10 October 1837, a hurricane struck the coast of the *Gulf of Mexico* and North Carolina in the *United States* causing 105 deaths.<sup>141</sup>

On 20 December 1837, the brig *Schah* was blown ashore about two nautical miles east of Rame Head (east coast of Gippsland) in *Australia*. The *Schah*, a 91-ton vessel, was on its way from Hobart to Sydney, carried ten passengers and a crew of nine. The *Schah* was struck by heavy gales from the southwest, losing some of its sail. When off Rame Head the weather became foggy and a change in wind forced the vessel towards the shore. Four female passengers and a child disappeared in the raging waters, while two male passengers were trapped on the vessel as it sunk. The survivors, near naked and exhausted, managed to reach the rocks and clamber ashore. The vessel disintegrated almost immediately.<sup>99</sup>

In 1837 during the period between 5 February and 2 July, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Lin-ch'ü. During the period 3-31 July, a drought engulfed Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at

Hai-k'ang. During the period 1-30 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Yüan-shih, Fou-ch'êng and Hsing-t'ai.<sup>153</sup>

*Also refer to the section 1837 A.D. – 1838 A.D. for information on the drought in India during that timeframe.*

*Also refer to the section 1837 A.D. – 1839 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1837 / 1838 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1837 occurred on 14 November. Severe snowstorm.<sup>116</sup>

The winter of 1837-38 in Bradford County, Pennsylvania in the *United States* was remarkably mild until the end of January when winter began in earnest and the weather continued intensely cold, the greater part of the time, until the 5<sup>th</sup> of March. April was also very cold.<sup>178</sup>

During the winter of 1837-38, the Hudson River at Albany, New York in the *United States* was closed to river traffic because it was frozen or obstructed by ice for 94 days.<sup>202</sup>

Miss Ellen D. Larned described the New England winter of 1837-38 at Thompson, Connecticut in the *United States* — On 14 November 1837 - cold, blowing snowstorm all day. November 22<sup>nd</sup> - snowed all day. December 10<sup>th</sup> - snowed. December 14<sup>th</sup> - severe storm. December 25<sup>th</sup> - snowed all day. On 9 January 1838 - snowed; warm month; snows turned to rain. Sleighing in February. March 8<sup>th</sup> - heavy snowstorm. March 15<sup>th</sup> - snowstorm. March 27-29<sup>th</sup> - snowed and melted. April 14<sup>th</sup> - snowstorm; cold and snowy to 24<sup>th</sup>.<sup>116</sup>

In the *United States* during the winter of 1837-38, the temperature at Hillsborough (now Hillsboro, Ohio) fell to -22° F in February.<sup>113</sup>

In March 1838, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 1<sup>st</sup> (26° F); 3<sup>rd</sup> (30° F); 4<sup>th</sup> (31° F). There was frost on March 13<sup>th</sup> and 24<sup>th</sup>. It snowed on March 2<sup>nd</sup>.<sup>116</sup>

In the *United States* it was the coldest April in Philadelphia since 1816. There was ice on five mornings and frost on eleven other mornings. Snow fell on April 14 and 24.<sup>1</sup>

In *England* on the 7<sup>th</sup> of January, a severe frost commenced this day – one of the most severe in modern times – and continued for a month.<sup>47, 93</sup>

[In *England*] from 7 January to February 1838, there was a severe frost. The River Thames was blocked by the ice.<sup>90</sup>

The winter of 1837-38 in *England* was remarkable for the long frost of January and February 1838. It lasted eight weeks. The thermometer recorded the lowest temperature at Moseley, near Birmingham on 20 January at -5.0° F (-20.6° C). Colder temperatures were recorded in more exposed areas with readings of -8.0° to -10.0° F (-22.2 to -23.3° C). On the 13<sup>th</sup> of January, the old Royal Exchange in London was destroyed by fire. The frost was so great that when the fire brigades ceased working on one portion of the burning pile, the water in short order became icicles of such large dimensions, that the effect has been described as grand in the extreme.<sup>70</sup>

In *France*, the Seine River was frozen on 17th of January 1838 at the bridge “Pont de Bercy”, and on the 18th at the bridge “Pont d’Austerlitz” in Paris. The river was crossed on the ice until the 8<sup>th</sup> of February. The Saône and Rhône Rivers in *France* were also frozen.<sup>62</sup>

The winter of 1838 was harsh in southern *France*. The thermometer at Ain [in eastern *France*] sank down to -13° F (-25° C). The intensity of the cold killed all the mulberries bushes in the surrounding area. In areas where the cold was less rigorous, many young grapevines were lost.<sup>79</sup>

During the winter of 1837-38 the frost began early, and the Dvina (Daugava) River was by 7 November covered with ice. On 30 December severe cold struck St. Petersburg, *Russia*. During this time, spring weather prevailed in Paris, *France*. In Champagne, *France*, the honeysuckle bloomed, and the apple trees were still laden with fruit, and the thermometer showed 50.0° to 52.3° F (10° to 11.3° C). Nevertheless, there was in Paris this winter, 65 days of frost, of which 26 were consecutive. From 7 January, the temperature dropped quickly. On 11 January, ice formed on the Seine River. On 13 January, the river was frozen at Rouen, *France*. On 15 January, the small arm of the river was frozen at the hospital Hotel-Dieu in Paris. On 18 January, the river was frozen at the bridge Pont d'Austerlitz. On 19 January, the ice was thick enough to support individuals crossing the river on foot. On 16 January, the Saône River was frozen above Serin and Neuville in the harbor in eastern *France*. From 13 to 19 January, the Rhône River was frozen at Avignon above St. Clair. In *Germany*, in the middle of January, the Rhine River, as well as the Neckar River were frozen above Heidelberg. In *England*, the River Thames was so obstructed with ice, that ordinary shipping was stopped almost entirely. In Châlons-sur-Marne, *France*, three travelers were found frozen to death. The following are lowest temperatures observed during the winter:<sup>62</sup>

Geneva, <i>Switzerland</i>	(-13.5° F, -25.3° C) on 11 and 15 January
Lons-le-Saunier, <i>France</i>	(-12.1° F, -24.5° C) on 16 January
Great St. Bernard Hospice, <i>Switzerland</i>	( -7.2° F, -21.8° C) on 20 January
<i>Ibid.</i>	(-10.5° F, -23.6° C) on 13 February
Löwen, <i>Germany</i>	( -5.6° F, -20.9° C) on 2 January
Lyon, <i>France</i>	( -4.0° F, -20.0° C) on 16 January
Paris, <i>France</i>	( -2.2° F, -19.0° C) on 20 January
Reims, <i>France</i>	( -2.2° F, -19.0° C) on 20 January
Brussels, <i>Belgium</i>	( -1.8° F, -18.8° C) on 16 January
Metz, <i>France</i>	( -1.3° F, -18.5° C) on 21 January
Bernay (Eure), <i>France</i>	( -0.4° F, -18.0° C)
Alost (Aaist), <i>Belgium</i>	( 0.7° F, -17.4° C) on 20 January
Orange, <i>France</i>	( 7.3° F, -13.7° C) on 20 January
Rouen, <i>France</i>	( 8.6° F, -13.0° C)
London, <i>England</i>	( 10.6° F, -11.9° C) on 16 January
Cherbourg, <i>France</i>	( 16.7° F, -8.5° C) on 18 January
Avignon, <i>France</i>	( 18.3° F, -7.6° C) on 20 January
Hyères, <i>France</i>	( 29.7° F, -1.3° C) on 12 January
Cairo, <i>Egypt</i>	( 46.2° F, 7.9° C) on 27 December
<i>Ibid.</i>	( 45.1° F, 7.3° C) on 9 January

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**1838 A.D.** On 18 April 1838 in *Ireland*, there was a great hurricane on the north coast, with much hail and snow.<sup>93</sup>

On 4 July 1838 in *England*, there was a hailstorm in Lancashire and Yorkshire.<sup>93</sup>

During the autumn of 1838, there were terrible storms and gales in *Europe* and great damage was sustained both on the sea and land. The chain bridge at Montrose was carried away [the South Esk chain bridge in Montrose, *Scotland*]. Immense damage to shipping was done. Another storm occurred on the night of 28 October, sweeping the whole northern and eastern coast of *England* with terrific violence, unroofing houses, blowing down chimneys, trees, etc. and doing immense damage to vessels.<sup>1</sup>

The maximum temperature during the summer in Pau in southwestern *France* was 101.8° F (38.8° C) on 4 August.<sup>62</sup>

In 1838, there was a major drought in New England area of the *United States*.<sup>113</sup>

In the *United States*, on August 11, a terrific thunderstorm passed from Virginia to the New England states. Lightning killed many people; houses and barns were burnt; vessels struck and set on fire, the wind blew a perfect hurricane. In Maryland, several houses and other buildings were demolished and many buildings lost their roofs. Several barns were struck by lightning and burnt in Pennsylvania, New Jersey and New York. The newspapers cited the names of 26 individuals who lost their lives during this storm.<sup>1</sup>

On 7 September 1838, a hurricane struck near Cape Florida [Key Biscayne] in the *United States* causing 38 deaths.<sup>141</sup>

On 28 October 1838, a hurricane visited London, *England*, and its neighborhood. The storm did great damage to the buildings, but there was no destruction of human life, though many serious accidents occurred.<sup>90</sup>

In *England* on the 28<sup>th</sup> of October, a great hurricane visited London and neighborhood; considerable destruction of property; but very little loss of life.<sup>57</sup>

On 28 October 1838; 11 July 1874; 11 April 1878, and 12 December 1883, storms struck London, *England*, which destroyed from twenty to thirty lives in each case, and from \$1 to \$3 million (U.S.) dollars in property damage. [In present currency, that would be equivalent to \$27-\$81 million dollars in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>197</sup>

On 1 November 1838, a hurricane struck the east coast of *Mexico*. Three United States vessels were lost, and the crews of two of these perished.<sup>141</sup>

In *India* during 1838-39, there was a great scarcity and considerable distress, caused by failure of rains in Surat and other districts in the Bombay Presidency. Large numbers of people left these provinces in search of food elsewhere.<sup>57</sup>

In 1838 during the period between 6 May and 8 August, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin; Hupeh (now Hubei province) in central *China* at Ying-shan; and Kansu (now Gansu province) in northwest *China* at Ching-yüan. During the period between 19 September and 17 October, a drought engulfed Anhwei (now Anhui province) in eastern *China* at Fou-yang. Twenty-one districts were affected by the drought.<sup>153</sup>

[Although the source gives the year as 1836, it appears to be a mistake. The actual year being 1838.] During the period between 21 July and 19 August, floods struck Hupeh (now Hubei province) in central *China* at I-tu. Many houses were damaged by the floodwaters. During the period between 20 August and 18 September, floods struck Hupeh province at Ên-shih.<sup>153</sup>

*Also refer to the section 1837 A.D. – 1838 A.D. for information on the drought in India during that timeframe. Also refer to the section 1837 A.D. – 1839 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1838 / 1839 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1838 occurred on 28 & 29 October.<sup>116</sup>

Miss Ellen D. Larned described the New England winter of 1838-39 at Thompson, Connecticut in the *United States* — On 28-29 October 1838 it snowed moderately. November 8<sup>th</sup> - hard storm; very cold. November 18<sup>th</sup> - cold snowstorm. November 24-25<sup>th</sup> - extreme cold. December milder, with slight

snows. On 4 January 1839 it snowed, but soon melted; very fine and spring like, then snow and very cold; temperature -11° F (-23.9° C). January 26<sup>th</sup> - violent southeast rainstorm; variable season. February 9<sup>th</sup> - snow. April was dry and warm early in month. April 12-18<sup>th</sup> - cold storm, rain and snow.<sup>116</sup>

During the winter of 1838-39 in Bradford County, Pennsylvania in the *United States*, there was a late May snowfall. On 25 May 1839, snow began falling, continuing during the night until it was more than a foot [30 cm] deep. The spring had been early and much farming done. The corn was up. The snow soon melted and passed away.<sup>178</sup>

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**1839 A.D.** In *Europe* during January and February the weather was very tempestuous, both on sea and land and many distressing shipwrecks occurred. There was a great amount of damage done in Liverpool and Manchester.<sup>1</sup>

On January 6 & 7, an awful hurricane struck the West Coast of *England* and in *Ireland*. Through Cheshire, Staffordshire and Warwickshire the damage was immense. Many vessels wrecked, some of great value. In Limerick, Galway, Athlone, and other places, many houses destroyed and fires extended the destruction. Dublin suffered much.<sup>47, 57</sup>

On 6-7 January 1839, an awful hurricane struck on west coast of *England* and in *Ireland*. The storm raged through Cheshire, Staffordshire, and Warwickshire; 20 persons were killed in Liverpool, by the falling of buildings, and 100 were drowned in the neighborhood; the coasts and harbors were covered with wrecks, the value of two of the vessels lost being nearly half-a-million Sterling. In Limerick, Galway, Athlone, and other places, more than 200 houses were blown down, and as many more were burnt, the winds spreading the fires. Dublin suffered dreadfully; London and its neighborhood scarcely sustained any damage.<sup>90</sup>

On 6 & 7 January 1839, a hurricane struck Dublin, *Ireland*. The loss of life in Dublin was estimated at 100, and the city sustained \$3,000,000 in property damage. [In present currency, that would be equivalent to \$81.5 million in damages based on the Consumer Price Index (CPI) inflation rates.] This storm was felt throughout the greater part of *Ireland* and on the west coast of *England*. Several other large towns in Ireland besides Dublin were struck, including Limerick, Galway and Athlone. In Liverpool, *England*, the destruction was also great. Thirty persons were killed by falling buildings or flying debris, and 100 were drowned in the storms.<sup>197</sup>

On 18 June 1839 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>

On 18 June 1839, a tornado ravaged the parish of Châtenay in the department of Seine and Oise in *France*. It tore down walls, chimneys and removed the roofs from the chateau and the farm. It carried trees hundreds of metres [meters] distant and took boards, rafters and [roof] tiles away 500 yards [457 meters] and more. The tornado was approximately 160 yards [146 meters] wide and traveled a distance on the ground of 4 kilometres [kilometers] (2½ miles). Fifteen hundred tree-roots had served as conductors for the incessant electrical flashes that accompanied this storm.<sup>271</sup>

On 20 June 1839 in *England*, there was a hailstorm in Lincolnshire, Northamptonshire, and Worcestershire.<sup>93</sup>

On 7 July 1839 in *England*, there was a great hailstorm in Berkshire, Surrey, and Sussex.<sup>93</sup>

In July and August 1839 in consequence of a great drought in New South Wales, *Australia*, the necessaries of life became scarce and accordingly dear. The 2 pound loaf of bread was raised to 2s. 6d. Vessels were sent to Valparaiso and China for grain provisions. A public subscription was raised, from

which funds, flour, etc. was purchased, and distributed gratuitously to the sufferers.<sup>103</sup>

In 1839 in *Germany*, there was a succession of hailstorms that nearly ruined the Hail Insurance Association Mutual and Proprietary companies. The damage from hailstorms was so great in *Germany* that but few of the mutual associations could pay their losses in full; and the loss to the Berlin Company amounted to £30,502 beyond the premiums.<sup>93</sup>

The summer of 1839 was extremely dry in the south of *France* and also distinguished by its great heat. In the north it was rainy with moderate temperatures. The summer in Paris was characterized by:

Hot days	34 days
Very hot days	5 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Toulouse, <i>France</i>	(101.3° F, 38.5° C) in June
Avignon, <i>France</i>	(100.4° F, 38.0° C) on 3 August
Pesaro, <i>Italy</i>	( 96.1° F, 35.6° C) on 28 June
Dijon, <i>France</i>	( 93.0° F, 33.9° C) in July
Geneva, <i>Switzerland</i>	( 93.0° F, 33.9° C) on 15 July
Alost (Aaist), <i>Belgium</i>	( 92.5° F, 33.6° C) on 18 June
Metz, <i>France</i>	( 92.1° F, 33.4° C) on 18 June
Gent (Ghent), <i>Belgium</i>	( 92.1° F, 33.4° C) on 18 June
Paris, <i>France</i>	( 91.9° F, 33.3° C) on 17 June
Brussels, <i>Belgium</i>	( 91.2° F, 32.9° C) on 18 June
Marseille, <i>France</i>	( 88.7° F, 31.5° C)
Löwen, <i>Germany</i>	( 88.5° F, 31.4° C) on 18 June
London, <i>England</i>	( 84.9° F, 29.4° C) on 8 and 20 June
La Chapelle, <i>France</i>	( 82.4° F, 28.0° C) on 17 June
Angers, <i>France</i>	( 81.7° F, 27.6° C) on 7 July

In Burgundy, *France*, the grape harvest only began on 30 September. Due to the frost that occurred in May, the yield of grapes was very mediocre, and the yield of wheat was not enough to meet demand.<sup>62</sup>

The year 1839 was one of the driest in the southern *France*.<sup>79</sup>

In 1839 northern *France* received frequent rains. In Paris, a very soft winter preceded a cold and rainy spring, full of thunderstorms followed by showers. Thunderstorms and rains continued during the summer and fall. During the month of June, the most rain fell. There was 4.2 inches (107 millimeters) of rainfall. But overall the annual rainfall in Paris in 1839 was only 19 inches (483 millimeters); which was less than normal.<sup>79</sup>

In 1839, a powerful cyclone struck Coringa, *India* causing 300,000 deaths.<sup>98</sup>

On 28 August 1839, ball lightning struck Paris, *France*. “In the midst of a violent storm, the black and low clouds of which almost touched the tops of the buildings, the stroke [of lightning] fell in the middle of the court of the unfinished central office of the custom-house in the city of Paris, in the course of building. This thunderbolt was in the form of a great globe of fire, and was accompanied by a train of vapour; it struck the soil, formed of fresh rubbish, and dug a hollow eighteen centimeters in diameter; here it moved furiously about, turning round, and threw up the loose earth; then it rebounded, to fall again at three metres [meters] distance, where it made another excavation nine centimeters in diameter, being continually in violent agitation. Very soon the globe of fire rebounded again from this cavity on to the wall of the enclosure, along which it followed the coping for about thirty metres. Arrived at the corner of the wall opposite the Hospital of Saint Louis, this globe, already very much diminished in volume, dashed



along the street, over the pavement wet with the rain; here it dragged itself along a long serpentine furrow, passed the entrance gate of the hospital, and disappeared in the middle of the court opposite the church. As the time went on and its contact was prolonged, you could very clearly see its mass diminish; when it arrived in the middle of the court of the Hospital of Saint Louis, it was nothing but a thin strip, with but little light, which disappeared suddenly. At the moment of the fall of this globe in the court of the custom-house, all the workmen and clerks who were at shelter under the sheds felt a smart electric shock; and they were all impressed by the strong sulphurous smell which it left behind.”<sup>271</sup>

In the *United States*, the drought was so severe in Alabama from August to November as to render good drinking water so scarce, that it was sold for one dollar per gallon.<sup>1</sup> [In present currency, that would be equivalent to \$21 per gallon based on the Consumer Price Index (CPI) inflation rates.]

On 11 & 12 September 1839, a great gale struck the *Bahamas Islands*.<sup>123</sup>

On 25 November 1839, a cyclone struck Port Essington in the Northern Territory of *Australia*. A ship, *H.M. Pelorus*, was driven aground near Port Essington and eight people drowned. The settlement at Port Essington was demolished by winds. The winds from the cyclone toppled trees on Cobourg Peninsula, which caused another four deaths. A 10.5-foot (3.2 meter) storm surge added to the damage.<sup>99</sup>

In December 1839 in Victoria, *Australia*, there was a flood on the Yarra and Saltwater Rivers.<sup>101</sup>

In 1839, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 14 February and 14 March, floods struck Shantung (now Shandong province) on the east coast of *China* at Hui-min, Chan-hua and Chi-ning.

— During the period between 14 April and 12 May, floods struck Hupeh (now Hubei province) in central *China* at Chih-chiang, Kung-an, Sung-tzū and Yün-hsi.

— During the period between 13 May and 10 June, floods struck Hupeh province at Chung-hsiang. The dikes were damaged.

— During the period between 11 July and 8 August, floods struck Hupeh province at I-tu, Kung-an, Sung-tzū, Ao-ch'êng, I-ch'ang and Chih-chiang; Shantung province at Lin-i and Ling; and Hopei (now Hebei province) in northern *China* at Yü-t'ien. At Yü-t'ien, it flooded for 5 consecutive years. [Lin-i is located at longitude 116.52° East and latitude 37.13° North.]

— During the period between 8 August and 8 November, floods struck Hopei province at Ching-hai; Shantung province at Chan-hua; and Shensi (now Shaanxi province) in central *China* at Mien. At Ching-hai, all the crops were damaged by the floodwaters.

In 1839 during the period between 5 February and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Wang-tu. During the period between 14 April and 12 May, a drought engulfed Hopei province at Wu-ch'iang and Chahar province (now eastern *Inner Mongolia*) at Huai-lai. During the period between 8 August and 8 November, a severe drought engulfed Kansu (now Gansu province) in northwest *China* at Chuang-lang.<sup>153</sup>

*Also refer to the section 1837 A.D. – 1839 A.D. for information on the drought in Australia during that timeframe.*

**Winter of 1839 / 1840 A.D.** Charles Pierce describes the winter of 1839-40 in Philadelphia, Pennsylvania in the *United States*:<sup>1</sup>

— In November 1839, the weather was very variable, from mild to cool, until the 20<sup>th</sup>, when the wind changed to northwest, after which the cold increased so rapidly, that on the morning of the 21<sup>st</sup>, the mercury was 20° F; on the 22<sup>nd</sup> it was 18° F; on the 23<sup>rd</sup> it was 20° F. The 24<sup>th</sup> and 25<sup>th</sup> were mild; but the 26<sup>th</sup> was severely cold; at sunrise, the mercury rested at 15° F and it did not rise higher than 24° F at mid-day. The 27<sup>th</sup> and 28<sup>th</sup> were also cold; but the 29<sup>th</sup> and 30<sup>th</sup> were milder. Some rain fell on five days, making three and a half inches; and some snow fell on two

days, about half an inch in all. During the night of the 25<sup>th</sup>, the cold was so severe as to freeze over the Delaware River from Kensington to Trenton, which stopped the steamboats from running for a few days. This was also the case in November 1838, but they resumed their trips, and continued to run until the middle of December. On the 7<sup>th</sup>, snow fell in the interior of New York and through the New England States, and Canada, to the depth of several inches. In some places there was good sleighing.

— December 1839 was a weeping month. Some rain fell on fifteen days, making in all six and a quarter inches, and some snow fell on seven days, making in all about twelve inches, in this city; but in the country it fell to a much greater depth. There were only seven entirely clear days during the month. The newspapers from various parts of the country said, that more snow had fallen in this month, than in any December for thirty years. The snow, from Philadelphia to Baltimore, and Washington D.C., was from 18 to 20 inches (46-51 centimeters) deep, and the roads were impassable for two days, after the violent snowstorm of the 22<sup>nd</sup> and 23<sup>rd</sup>. The roads between Philadelphia and Lancaster were so blocked up, that cars and stages were stopped for three days, and no mail was received from Pittsburgh, Erie, etc., for nearly two weeks. The snow was also very deep in the interior of New York State, and in all the western, northern and eastern States. The gale and storm of the 22<sup>nd</sup> and 23<sup>rd</sup>, was awfully severe and destructive from the Chesapeake to the extreme part of the State of Maine, and many vessels and valuable lives were lost. The shipping suffered very much in the harbors of New York, Rhode Island, Boston, and to the extreme part of Maine. Out of sixty vessels which put into Gloucester, (Cape-Ann,) for a harbor, twenty-two were totally lost, with almost every one of their crews; and the remainder were all dismantled and otherwise crippled. About fifty poor sailors thus perished. Twenty of their dead bodies were found washed ashore the next morning, and several more afterwards. On the 20<sup>th</sup> and 21<sup>st</sup>, the Delaware River closed from Kensington to Trenton.

— January 1840 was a month without a thaw. Some snow fell on eight days, about eight inches in all. On eight mornings the mercury was from two to ten above zero degrees Fahrenheit. On eight more days, from ten to twenty above zero. On one morning, only, it was above the freezing point. The Schuylkill River closed on the 1<sup>st</sup>, and the Delaware River would have followed suit, but for the iceboats. But Jack Frost obtained a victory over them on the night of the 16<sup>th</sup>, and placed his broad white seal upon the Delaware River, which remained unbroken for several days. At Baltimore, Maryland and Washington D.C. the mercury sunk down to zero degrees Fahrenheit. At Gettysburg and several other towns in the interior of Pennsylvania, the mercury was -13° F (-25° C). At Albany, Saratoga, Buffalo, New York, the temperature fell to -30° F (-34° C). At Hartford and New Haven, Connecticut the temperature fell to -15° F (-26° C). At Springfield, Massachusetts the temperature fell to -30° F (-34° C). At Boston, Massachusetts the temperature fell to -14° F (-26° C), and Portsmouth, New Hampshire to -14° F (-26° C). At Portland, Augusta, Eastport, etc., in Maine, the temperature fell to -20° F to -30° F (-29° to -34° C). In Montreal and Quebec, Canada the temperature fell to -37° F to -39° F (-38° to -39° C), and the roads well blocked up with snow. There were great disasters amongst the shipping on the coast and in harbors. Two inches of rain fell in Philadelphia during January.

— In February 1840, from the 1<sup>st</sup> to the 6<sup>th</sup> it was intensely cold; the mercury ranged from 0° F to 15° F, which closed the Delaware River below Pine Street, and would have kept it closed but for the vigilance of the iceboat. On the 6<sup>th</sup>, the wind came from the south and the weather suddenly became very mild, the rain poured down, and his icy majesty soon took his flight from this vicinity, and six inches of snow, which fell on the 1<sup>st</sup>, soon ran into the Schuylkill and Delaware rivers. The remainder of the month was mild and accompanied by occasional fog and rain. Three inches of rain fell during February.

— March 1840 commenced uncommonly warm; the mercury ranged at sunrise, (during the first seven days,) from 38° F to 53° F; and during mid-day, from 56° F to 70° F. But on the night of the 7<sup>th</sup>, the wind changed from south to northwest, and the cold increased so rapidly during the night, that on the morning of the 8<sup>th</sup>, it had sunk to 22° F. It continued cold until the 15<sup>th</sup>, when a little snow and rain fell—after which it became mild, and (with the exception of a few days,) it continued so until the month closed. About three inches of snow fell during March; and two and a half inches of rain. There were many frosty nights.

— During April 1840, there was the temperature of winter, spring and summer. There was thin ice on four mornings, and frost on six. On nine days the mercury ranged from noon to three o'clock from 50° F to 60° F; on ten days from 63° F to 70° F; on five days from 70° F to 76° F; on four days from 82° F to 84° F. Seven inches of rain fell, which is the greatest quantity in April for twenty years.

Three major snowstorms struck Northeast *United States* in December 1839. The snowstorm of 14-15 December dumped 20 inches (51 centimeters) of snow at New Haven, Connecticut; and 24 inches (61 centimeters) in Westchester County, New York. The second storm struck on 22-23 December dumping 10 inches (25 centimeters) of snow on Washington D.C.; and 16 inches (41 centimeters) at Baltimore,

Maryland; 2 feet (61 centimeters) of snow at Gettysburg, Chambersburg and Easton, Pennsylvania. The third storm struck on 27-28 December caused 2 feet (61 centimeters) of snow to fall in a band from Hartford, Connecticut to Worcester, Massachusetts.<sup>27</sup>

On 15 December 1839, a strong gale swept through New England in the *United States*. Many vessels turned over and sunk with the complete loss of their crew. Some vessels dashed against the rocks and were destroyed. The whole shore of Massachusetts were strewn with wrecks and dead bodies, and the harbors of Newburyport, Salem, Marblehead, Boston, Cohasset, Plymouth and Cape Cod were filled with disabled vessels. The exact number of dead was never known, but it must have been great. On the shores of Maine and Connecticut, the storm was less severe. On land, many buildings were blown down and hundreds of chimneys were overturned. The tide rose higher than many of the highest watermarks then known. Inland as far as northwestern Massachusetts, the snow fell in great quantities, and its depth rendered travelling almost impossible. The deep embankments in many places extended to the second story of buildings and houses.<sup>199</sup>

— At Boston, Massachusetts, the tide rose higher than the old watermarks, and swept completely across the Neck. The roof of the Maverick house and the car house at East Boston were blown away. A ship and brig were sunk at their wharves. The schooner *Hesperus* broke her anchor chain and crashed into the docks and smashing her jib boom through the upper window of a four story building.

— At Nahant, the schooner *Catherine Nichols* dashed to pieces on the rocky shore.

— In the harbor at Marblehead, several vessels were damaged by the gale. The schooner *Paul Jones* was driven high upon the rocks. The schooner *Sea Flower* was driven on the beach and wholly lost.

— There were vessels in the harbor at Gloucester when the gale struck. Twenty-one vessels were driven ashore, three schooners sank and seventeen were so thoroughly dashed to pieces that in some cases no fragment larger than a plank was left. Twenty vessels still rode in the harbor, all but one with masts, they having been cut away. The pieces of twenty-two wrecks were scattered along the shore. Many of these crews perished in the storm. It was estimated that 40 perished at Gloucester.

— At Ipswich the schooner *Deposit* smashed into the sandy beach near the lighthouse. Many of the crew drowned or died from exposure. The funeral was held at the South Church. Sixteen sea captains acted as pallbearers.

— At Newburyport, the tide overflowed the wharves and many ships were damaged.

— On 22 December, a second severe snowstorm struck the region. The snowfall was so great that the railroads in Massachusetts were blocked. Great damage was done on both land and sea. Many vessels were driven ashore. The storm reached as far south as Baltimore. The brig *Pocahontas*, 271 tons, was wrecked at Plum Island. All the officers and nine hands of the mast perished. At Nantasket beach, the bark *Lloyd* went ashore. The vessel was finally dashed to pieces and all on board perished.

— On 27 December, another violent gale struck. At Portland, Maine, the tide rose so high that the sea swept over Tukey's Bridge. At Newburyport, Massachusetts, 41 vessels were damaged. At Gloucester, the brig *Richard Packet* was driven ashore and dashed to pieces. Several other vessels were lost. At Salem, a few ships and schooners were driven ashore. In Boston, the wharves were overflowed and lumber, wood, coal, etc. were swept away. The Front Street Dike broke and water covered nearly all the lowlands between Front and Washington Streets, from the Neck to Northampton Street. Water also came into Water Street and damaged dry goods in cellars. The causeway leading to Dorchester, and the lower streets of the city were submerged. The ship *Columbiana* was driven by the winds and tides into Charlestown Bridge and then the Warren Bridge and then destroyed a house. The storm was very severe at Provincetown on Cape Cod. The loss to shipping and the property on the wharves amounted to \$50,000. [In present currency, that would be equivalent to \$800,000 in damages based on the Consumer Price Index (CPI) inflation rates.] Ten or eleven stores were knocked down by vessels. Two salt mills were blown down and many salt works were carried away.

— The snows during the winter of 1839-40 were deep and severe. In the valleys in the western part of Massachusetts, snow was 2 feet [0.6 meters] deep throughout the winter and on the Berkshire hills it was 4 feet [1.2 meters] deep. Most roads were impassable and people traveled about on snowshoes. In many

places, the snow was 15 feet [4.6 meters] deep. In Chesterfield [Massachusetts], a man died and the snow was so deep that it took four days for the family to get to a neighbor's house for assistance. The disasters at sea during December 1839 included upwards of 300 vessels wrecked and more than 150 lives lost in these three storms.

In the *United States* during the winter of 1839-40, the temperature at Salem, New York fell to -40° F in January.<sup>113</sup>

During the winter of 1839-40 in Bradford County, Pennsylvania in the *United States*, temperatures dropped to the range of -15° F to -20° F [-26° C to -29° C] on January 4<sup>th</sup> and 5<sup>th</sup>.<sup>178</sup>

Miss Ellen D. Larned described the New England winter of 1839-40 at Thompson, Connecticut in the *United States* — Autumn was mild. On 15 December 1839 - tremendous snowstorm. December 16<sup>th</sup> - wind increased all day; snow very deep; fine day followed, but roads impassable. December 23<sup>rd</sup> - another violent snowstorm. December 27<sup>th</sup> - snowed again. The amount of snow falling in these incessant storms exceeded anything reported by the oldest inhabitant; business and social intercourse were virtually suspended, and the roads were so heavily packed that it seemed impossible to force a passage. A pamphlet published in Boston tells of the "awful calamities" occurring during the "dreadful hurricanes" on December 15, 21, and 27, with great loss of life and destruction of property. The year 1840 began very cold. January 11<sup>th</sup> - snowed all day. January 13<sup>th</sup> - snowed; the day made memorable by the burning of the steamer Lexington on its passage from Stonington to New York. February 4 & 5 - extremely cold. February 16<sup>th</sup> - family resumed church going; sunny and mild days followed; the snow passed off without damage. February 20<sup>th</sup> - snow nearly gone. March 4<sup>th</sup> - very warm, with thunder. March 6-16<sup>th</sup> - cold, strong winds. March 15<sup>th</sup> - snowed. March 22<sup>nd</sup> - very cold. March 24-25<sup>th</sup> - snowstorm. April 1<sup>st</sup> - snowed.<sup>116</sup>

In March 1840, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 11<sup>th</sup> (32° F); 12<sup>th</sup> (31° F); 26<sup>th</sup> (32° F). There was frost on March 6<sup>th</sup> and 26<sup>th</sup>. There was ice on March 6<sup>th</sup> and 22<sup>nd</sup>.<sup>116</sup>

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**1840 A.D.** On 9 & 10 April 1840, a hurricane struck the island of *Mauritius* in the Indian Ocean. Trees of gigantic stature were torn up by the roots, and strewn about on the ground like mere straws. Buildings were thrown down, and all the wooden palings [fence pickets] were swept away. A group of tall filao trees (*casuarina equisetifolia*), from 60 to 100 feet [18 – 30 meters] high, very tough and not easily broken; but due to the irresistible force of the hurricane were bent down to an almost horizontal direction. After the storm passed, the rich green luxuriant vegetation of the tropics, had completely disappeared as if an arctic winter had suddenly took hold. Many vessels were thrown ashore.<sup>198</sup>

The summer in Paris, *France* was characterized by:

Hot days	44 days
Very hot days	3 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Cairo, <i>Egypt</i>	(111.0° F, 43.9° C) on 23 May
Tours, <i>France</i>	(100.4° F, 38.0° C)
Toulouse, <i>France</i>	( 96.8° F, 36.0° C) in June
Paris, <i>France</i>	( 91.4° F, 33.0° C) on 6 August
Dijon, <i>France</i>	( 90.5° F, 32.5° C) in July
Alost (Aaist), <i>Belgium</i>	( 88.3° F, 31.3° C) on 9 June
Geneva, <i>Switzerland</i>	( 88.2° F, 31.2° C) on 22 June
Gent (Ghent), <i>Belgium</i>	( 86.0° F, 30.0° C) on 2 June

Marseille, <i>France</i>	( 85.8° F, 29.9° C)
Metz, <i>France</i>	( 85.1° F, 29.5° C) on 2 June
Angers, <i>France</i>	( 84.2° F, 29.0° C) on 15 June and 30 August
London, <i>England</i>	( 82.9° F, 28.3° C) on 1 June
Brussels, <i>Belgium</i>	( 81.5° F, 27.5° C) on 2 June
Löwen, <i>Germany</i>	( 81.1° F, 27.3° C) on 2 September
La Chapelle, <i>France</i>	( 81.0° F, 27.2° C) on 6 August

In part of the south [of *France*], the summer produced many strong thunderstorms. Several cows used for fieldwork collapsed from the heat. The grain harvest was good. The grape harvest was moderate in quantity, and the wine was quite good in quality. In Burgundy, the grape harvest began on 25 September.<sup>62</sup>

The last six months of 1840 produced an abundance of rainstorms in *France*. In Paris, this unusual rainfall began on the stormy night of May 6 and continued until November 27. Both before and after this time period, there was a persistent drought. The rain was mixed with westerly winds and sunny spells interspersed very short intervals in between, for five consecutive months. The monthly rainfall measured were: 1.3 inches (32.2 millimeters) in May; 1.0 inch (25.7 millimeters) in June; 1.3 inches (32.4 millimeters) in July; 1.1 inches (27.2 millimeters) in August; 4.5 inches (114.0 millimeters) in September; 2.0 inches (51.3 millimeters) in October; and 2.4 inches (59.9 millimeters) in November. Annual rainfall in Paris measured on the terrace of the Observatory exceeds by 1.4 inches (35.4 millimeters) the average rainfall derived from 54 years of measurements. The Seine overflowed the first days of November, and on November 20<sup>th</sup> the waters still covered half of the ports of the city.<sup>79</sup>

These storms and rains did not spare the province. They did, on the contrary, greater havoc especially in the basins of the Rhône and Saône rivers than in Paris, *France*. Eastern and southern *France* will long remember the floods of 1840. In Avignon, the Rhône River was 2.6 feet (80 centimeters) higher than the flood of 1775. In Lyon, the flood was so prodigious that the water was higher than all known levels for over a hundred years. The flooding broke out in October and was repeated in November. Many other rivers like the Seine, the Doubs, the Loire, and the Moselle hardly overflowed their banks until after the Rhône and the Saône. We know of a few regions, including the Roussillon and Lauragais [in southern *France*] where the floods didn't come owing to late rains, until the end of November or in December.<sup>79</sup>

In *France* from October 31 through November 4, the Saône River poured its waters into the Rhône River, broke through its banks, and covered 60,000 acres (24,281 hectares). Lyons was inundated. In Avignon 100 houses were swept away, still a greater number (218 houses were carried away) at La Guillotiere; and upwards of 300 (houses) at Vaise, Marseilles, and Nismes [La Guillotiere and Vaise are now part of Lyons]. Many villages almost swept away. The Saône River had not attained such a height for 238 years.<sup>47, 90, 92</sup>

*Germany, France* and *Russia* suffered famines in 1840.<sup>96</sup>

There was a famine in the Jalaun district of the Uttar Pradesh state of *India* in 1840, which caused a great loss of human life and also that of cattle.<sup>185</sup>

In 1840, a drought engulfed Kansu (now Gansu province) in northwest *China* at Lanchow, Lin-t'ao and Yü-chung.<sup>153</sup>

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**Winter of 1840 / 1841 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1840 occurred on 25 October. A tedious snowstorm; snow fell a foot deep in some places and lay for several days.<sup>116</sup>



In the *United States*, a snowstorm over the period of 4-6 December 1840, dropped fifteen inches (38 centimeters) of snow on Philadelphia, Pennsylvania. The storm was very violent from Virginia to Maine and considerable damage was sustained by the shipping, in ports and on the coast. The storm was very violent on the Great Lakes and in *Canada*. Further south, the storm produced heavy rainfall. Norfolk and Richmond saw several inches of hail. Another storm hit the East Coast on December 22 and 26. Snow blew into banks six to eight feet (1.8-2.4 meters) high.<sup>1</sup>

Miss Ellen D. Larned described the New England winter of 1840-41 at Thompson, Connecticut in the *United States* — November 15<sup>th</sup>, 18<sup>th</sup> and 26<sup>th</sup> in 1840 report snowfalls. December 17, 18<sup>th</sup> - snowed; very cold; cold weather; snows and sleighing continued through the month. [Account ends at the end of December.]<sup>116</sup>

In March 1841, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 15<sup>th</sup> (30° F); 17<sup>th</sup> (28° F); 18<sup>th</sup> (28° F). There was frost on March 4<sup>th</sup> and 24<sup>th</sup>. It snowed on March 5<sup>th</sup>, 17<sup>th</sup>, and 18<sup>th</sup>.<sup>116</sup>

In the *United States*, a snowstorm struck the Philadelphia area on April 10 dumping 6 inches (15 centimeters) of snow. Another struck on the 12<sup>th</sup> dumping ten to twelve inches (25-30 centimeters) of snow. Snow extended south to Virginia, west to Ohio, north to Vermont, and east through all the New England states to the extreme part of Maine.<sup>1</sup>

The winter of 1840-41 in Bradford County, Pennsylvania in the *United States* produced an unusual March snowstorm [thundersnow]. On January 4<sup>th</sup>, temperatures fell to -21° F [-29° C]. A severe snowstorm struck Towanda on 12 March 1841, accompanied in the evening by heavy thunder and most vivid flashes of lightning. As of March 17<sup>th</sup>, the weather continued cold and stormy ever since, and snow was still falling. On 1 May 1841, a severe snowstorm struck, which continued throughout the day. At evening the snow ceased but the temperature was cold and blustery. On the morning of May 2<sup>nd</sup>, ice was found in open vessels nearly an inch [2.5 cm] in thickness and the mud was frozen sufficiently to bear the weight of a horse. On the morning of the May 14<sup>th</sup>, ice was found in open vessels, ¼ of an inch [0.6 cm] thick.<sup>178</sup>

In the *United States*, on the morning of May 3, the ice was as thick as window glass in Philadelphia. The repeated frost of April and May destroyed a great part of the fruit-buds.<sup>1</sup>

The Seine River in *France* froze from 18 December 1840 to 5 January 1841 at the bridge “Pont Notre-Dame” in Paris.<sup>62</sup>

The weather in December 1840 was so severe in *Sweden*, that it was computed that three thousand people perished.<sup>1</sup>

During the winter of 1840-41, there were 59 days of frost in Paris, *France*; of these, 27 days were in succession. The cold began on 5 December, and lasted until 10 January with a break between 1 to 3 January. A second frost began on 30 January and lasted till 10 February. The temperature in Paris on 3 February was 15.4° F (-9.2° C). On 16 December, large masses of ice on the Seine River blocked the arch of the bridge Pont-Royal. The same evening, the river froze at the bridge Pont d'Austerlitz. It froze from the bridge Pont Marie up to Charenton. On other days it was frozen at the Pont Notre-Dame. On 18 December one could cross the river on the ice between Bercy and la Gare. At several places, the ice on the river had accumulated to 2 meters (6.6 feet) thick. The cold temperature during the first phase of the frost in Paris was as follows: 12 December (30.2° F, -1.0° C); 13 December (27.5° F, -2.5° C); 14 December (19.2° F, -7.1° C); 15 December (14.7° F, -9.6° C); 16 December (11.5° F, -11.4° C); 17 December (8.2° F, -13.2° C); 18 December (10.6° F, -11.9° C); 19 December (14.0° F, -10.0° C);



20 December (27.3° F, -2.6° C). The ice on the Seine River partially thawed in January. The thaw lasted nine days and then the river froze again on January 14. The river froze at Rouen beginning on 16 December. On 20 December, nearly 40 boats in Charenton sunk in a few minutes. On 19 December, the Loire and the Maine rivers froze. On 17 December, the Saône at Lyon froze. The thaw and melting of the snow brought about major flooding in *France*.<sup>62</sup>

On 15 December 1840 in Paris, *France*, a major procession was held taking the mortal remains of Emperor Napoleon from St. Helena, by way of the Arc de Triomphe de l'Étoile [to his final resting place at the Invalides]. The thermometer the night before read 6.8° F (-14° C). A countless number of men, the legions of the National Guard of Paris and its neighboring communities, many regiments lined the Elysian Fields from morning to 2 o'clock in the afternoon. Everyone suffered terribly from the cold. National Guards and workers believed they could warm themselves by drinking brandy. But after they drank, they died almost immediately from congestion. Other people became victims of their own curiosity, in order to watch the procession; they climbed trees along the avenues. But the tree limbs were frozen by the cold; the branches broke and they fell to the ground and died.<sup>62, 70</sup>

In Alsace, *France* [near the Swiss and German borders], the thermometer fell to 5.0° F (-15° C). After 15 December, three trains were stranded on the railway line from Mulhouse near Thann in eastern *France*. This is despite the fact that on that day, six heated machines were available. However, once the locomotive left the shed and was placed on the turntable. It was so hampered by the ice; it could not turn. Once this obstacle was fixed, and the machine set in motion; all it took was one moment for the water inside the feed pumps to freeze. A train had to spend the night in the forest of Lutterbach, because it was impossible to bring any machines from the station because it was frozen completely. An auxiliary locomotive was sent to fetch them. The flasks were frozen solid in the cylinders and the tubes were cracked and let the water through, so the wheels of the locomotive froze fast to the brakes preventing it from moving on the tracks. After the auxiliary locomotive's futile efforts of freeing the train; they took the stranded passengers and brought them back to Mulhouse. The cold was so bad that one of the machinists froze their feet.<sup>62</sup>

The following are the lowest observed temperatures at different locations:<sup>62</sup>

Great St. Bernard Hospice, <i>Switzerland</i>	( -9.9° F, -23.3° C) on 22 January
Geneva, <i>Switzerland</i>	( 10.4° F, -12.0° C) on 16 and 17 December
<i>Ibid.</i>	( 6.1° F, -14.4° C) on 9 January
<i>Ibid.</i>	( 0.0° F, -17.8° C) on 10 January
Metz, <i>France</i>	( 4.5° F, -15.3° C) on 17 December
<i>Ibid.</i>	( 9.5° F, -12.5° C) on 10 January
Avignon, <i>France</i>	( 4.5° F, -15.3° C) on 17 December
<i>Ibid.</i>	( 9.5° F, -12.5° C) on 10 January
Alost (Aaist), <i>Belgium</i>	( 6.3° F, -14.3° C) on 14 December
Paris, <i>France</i>	( 8.2° F, -13.2° C) on 17 December
<i>Ibid.</i>	( 8.4° F, -13.1° C) on 8 January
Orange, <i>France</i>	( 8.4° F, -13.1° C) on 16 December
<i>Ibid.</i>	( 10.4° F, -12.0° C) on 10 January
Brussels, <i>Belgium</i>	( 8.8° F, -12.9° C) on 16 December
<i>Ibid.</i>	( 11.7° F, -11.3° C) on 9 February
Gent (Ghent), <i>Belgium</i>	( 9.5° F, -12.5° C) on 16 December
Löwen, <i>Germany</i>	( 11.3° F, -11.5° C) on 3 and 4 February
London, <i>England</i>	( 21.0° F, -6.1° C) on 17 December
<i>Ibid.</i>	( 15.1° F, -9.4° C) on 9 January
Toulouse, <i>France</i>	( 17.6° F, -8.0° C) on 17 December
Marseille, <i>France</i>	( 23.9° F, -4.5° C) on 9 January
Cairo, <i>Egypt</i>	( 43.5° F, 6.4° C) on 3 December
<i>Ibid.</i>	( 41.4° F, 5.2° C) on 1 January

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**1841 A.D.** In Middlesex, *England*, on January 16, there were great floods at Brentford and surrounding districts; many lives lost, and considerable destruction of property.<sup>47, 90, 92</sup>

In January 1841 in Queensland, *Australia*, there was a flood on the Brisbane River.<sup>101</sup>

The London, *England* newspaper of 3 February 1841 said, “The weather is awfully severe and boisterous, and numerous disasters have occurred to the shipping. The Thames steamboat from *Ireland*, was wrecked and out of sixty-five passengers, only four were saved.”<sup>1</sup>

On 28 March 1841, a great flood of the Susquehanna River struck Towanda, Pennsylvania in the *United States*. The immense body of snow, which lay in the woods combined with heavy rains that began on 23 March caused an extraordinary freshet. That portion of Towanda below the State Road bordering the river was completely inundated. The water was from two to three feet [0.6 – 0.9 m] deep on Water Street, the whole distances from the State Road to the Bridge. Every cellar was filled with water and in several instances, it rose to the first floor of buildings and the occupants were obliged to abandon their homes. Below the bridge, it was still worse. Nearly all the low ground in that vicinity was overflowed. In some instances the water was three feet [0.9 m] deep in the dwellings.<sup>178</sup>

On 28 May 1841 in *England*, there was a great hailstorm in Berkshire and in Suffolk.<sup>93</sup>

On 15 July 1841 in *England*, there was a great hailstorm in Derbyshire, Middlesex, Sussex, Surrey, and Yorkshire.<sup>93</sup>

Major storms reigned in *France* in 1841. Thunderstorms and very severe storms succeeded in quick succession in 1841. These storms struck Paris and the province on April 23<sup>rd</sup> & 30<sup>th</sup>, May 3<sup>rd</sup>, 25<sup>th</sup>, 26<sup>th</sup>, 27<sup>th</sup>, 28<sup>th</sup> & 30<sup>th</sup>, June 23<sup>rd</sup>, July 4<sup>th</sup> & 18<sup>th</sup>, August 8<sup>th</sup> & 11<sup>th</sup>. The most intense storms occurred on 30 May and 4 July. The storm of May 30 specifically ruled in southern *France*. The city of Pau, Languedoc, the Gard and Ardèche experienced massive damage. A terrible hail struck. Some hailstones were twice the size of a walnut. The hail destroyed the vines and forage. During this storm furious tornadoes ravaged the two banks of the Rhône River, in the Vaucluse region in southeastern *France*. There was the sound of an awful turnover, and the storm cast waves of hail as big as chickpeas, and some even reached the size of a hen's egg. This column storm trampled seedlings, uprooted trees, and toppled houses. It removed large branches, swirling and twisting them in a vortex. It pulled up trees by the roots and carried them over thirty paces. Some of these trees were one meter (3.3 feet) in diameter. It lifted a boat from off the Rhône River that was two and a half meters wide and seven meters long (8.2 feet wide and 23 feet long), to a height of 20 meters (66 feet) in the air. At Orange in the Vaucluse region, the tornado ripped apart a section of wall about twelve meters (39 feet) long by eight meters (26 feet) tall and thick. It discarded this construction material eight meters (26 feet) away. It demolished, and scattered new stone buildings. It broke the tiles off roofs and carried them away with such violent force that the fragments were encrusted into a tree trunk. It seized an old man, a resident of the suburb, rolled and broke his head against the wall. The violent storm of July 4 was preceded by a searing heat and thick fumes all day. In Paris, the storm began at half past seven in the evening with a strong gust of wind from the southwest. This was followed for a quarter hour with a dazzling lightning display, great thunder strikes, whirlwinds, torrents of rain and hail. Lightning, thunder, wind, rain and hail mingled well for three quarters of an hour, giving us in this horrible turmoil; a sublime and frightening image of a sort of desperate struggle between all the powers of nature. The storm abated somewhat near the end of the day. But it revived during the night with a return of winds, strong ground shaking and huge showers. Paris did not suffer alone. The storm devastated the surrounding country and spread far and wide from north to south in the departments of Seine-et-Oise, Seine-et-Marne, Loiret, Indre, in Côte-d'Or, Indre-et-Loire, Nièvre, Allier and Cher. The earth shaking was felt in the provinces after midnight, at the same time in

Paris and it was all over several oscillations in different directions, sometimes with a roll underground, sometimes without any noise.<sup>79</sup> [Seine-et-Oise is in the metropolitan area of Paris. Seine-et-Marne is east of Paris. Loiret, Indre, in Côte-d'Or are south of Paris. Indre-et-Loire and Cher are southwest of Paris. Nièvre and Allier are southeast of Paris.]

Longer and deeper weather variations upset the seasons of 1841 in *France*. The winter was very early and consisted, mainly in the north, of alternating periods of frosts and thaws. Heat broke early March, the thermometer in Paris went to 55.4° F, 64.4° F, 68° F, and 71.6° F (13° C, 18° C, 20° C, and 22° C). A brilliant sun shone almost without interruption producing this high temperature. Vegetation was excited and awoke with a burst of activity. Trees flourished in the first half of the month, and most were already covered with leaves by March 30. This heat, sun and the greenery were like the best days of May. There were gusts and some rains in April. But the cold tarnished the brightness of the sky. But on April the 26<sup>th</sup>, good weather continued and the temperature rose to 46.4° F, 50° F, 59° F, and 66.2° F (8° C, 10° C, 15° C, and 19° C). The month of May and the first seven or eight days of June were generally very fine, very dry and very hot. The thermometer in the middle of the day, almost always exceeded 68° F (20° C), it reached 78.8° F (26° C) and often 80.6° F (27° C) and this period went well. On May 25<sup>th</sup> the temperature went to 88° F (31.1° C), May 26<sup>th</sup> to 92.8° F (33.8° C), and May 27<sup>th</sup> to 92.7° F (33.7° C). Then in July, in Paris and the provinces, the extreme heat settled in. A pattern of stormy weather struck during the summer. The air cooled, the wind blew in gusts, pushing before her big dark clouds from which arose several times during the day torrents of cold rain. The storms began on June 7, and continued obstinately until 18 August. Few days passed without rain. It was from morning to evening as alternations waves of heat and cold, calm storms, rain and cloudy. If the sun shone all day, which rarely happened, her sultry and oppressive atmosphere foretold of an impending sudden storm or hurricane. Cold, gales and rain this summer assimilated to the saddest days of autumn. Things were heating up several times in the month of June, July and August. The products of the earth, which so advanced in March and May, found themselves floundering in the first days of July. Most products including grains, fruits and grapes, even then withered away or could not ripen due to a lack of heat, drought and sun.<sup>79</sup>

In *France*, the summer of 1841 was the coldest since the beginning of this century, after the year 1817. The harvest was poor. In Burgundy the grape harvest began on 27 September.<sup>62</sup>

*Italy*, however, experienced very unusual heat during the summer. Leopold Pilla described the weather in *Italy* in a letter addressed to Elie de Beaumont as follows: Last week we suffered from such stifling heat in Naples, *Italy*, since anyone can remember. It was an African heat, a Sirocco, which filled our skies with dark beautiful hazy air. This Sirocco produced very high temperatures for 2 ½ days, from 16 July to noon on 18 July. On 17 July, the thermometer located on the north side of the building in the shade at 2:30 p.m. showed a temperature of 101.8° F (38.8° C); and the same instrument set up in the sun rose to 122° F (50° C). You may think that we were suffering from the heat of Libya. Generally the air compared to the reflection of a blast furnace. There were moments when the hot air blew and we believed we were suffocating. The best means of protecting against the heat was to remain inside the house with the windows sealed tight. On the morning of the 18th of July, I went with Melloni and other friends to the sea at Cape Paustlippo to refresh a little. The sky was overcast, but Mount Vesuvius was surrounded by a misty and murky air that felt like it was especially made in the volcanic crater of Atrio del Cavallo. The effect of these winds on the vineyards located at the foot of Mount Vesuvius cause the grapes to completely dry up – so the harvest was lost. . . . The stifling temperatures lasted until noon on 18 July, then the air changed direction to a northeast wind and the weather became a little fresher. It was said that in Sicily the heat was even greater. In Palermo, Italy, the temperature reached 110.8° F (43.75° C).<sup>62</sup>

On 2 October 1841, a strong gale struck New England in the *United States*. The precipitation was primarily in the form of rain in Massachusetts and snow in New Hampshire. Six inches [15 centimeters] of snow fell in Amherst, New Hampshire and twelve inches [30 centimeters] on the hills in Hampden

County. On land, a great deal of fruit was destroyed, and chimneys and buildings were blown down. “On sea, the gale was so terrific that it tore the newest and strongest canvas into shreds and masts and spars of vessels were carried away. The ocean roared as though with unbridled madness, and its waves ran mountain high, throwing their spray far into the sky, and forming a majestic yet fearful sight. Many vessels were wrecked on the water and on the shores.” In the harbors, vessels were wrenched from their moorings and dashed against the shore or driven out to sea. The tide covered the wharves and submerged the marshes.<sup>199</sup>

— In the harbor of Portland, Maine, several vessels went ashore and were wrecked. At Portsmouth, New Hampshire, the vessel *Maine* parted her cables and was driven into Massachusetts Bay and went ashore at Scituate Beach. Eight men and women perished in the wreck.

— At Cape Ann, Massachusetts, many vessels were dashed against the rocks. At Pigeon Cove the fishing fleet of sixteen vessels lost fourteen of their ships. The fisherman not only lost their vessels but many fish houses, fish flakes, 60 barrels of mackerel, 200 hogsheads [around 13,000 gallons or 48,000 liters] of salt, and 300 empty barrels were destroyed.

— At Nantucket Island, Massachusetts, several vessels were damaged. The tide rose 2 to 3 feet [0.6-0.9 meters] above the wharves and flowed into the lower streets of the town. At Siasconset, a high bluff collapsed into the sea, taking with it a house and two barns.

— On Cape Cod, Massachusetts, the beach from Chatham to the highlands was strewn with wrecks. Around 40 to 50 vessels were driven ashore and 50 dead bodies were found along the shore after the storm. The schooner *Franklin* capsized and then was cast ashore at Hyannis Port losing two of its crewmen. The schooner *Tangent* had one of its crew fall overboard and drown. The schooner *Bride* was driven ashore and lost 8 members of its crew. The town of Dennis lost 26 of its seamen. The schooner *Forest* was lost at sea with 8 crewmembers. The schooner *Ellis* went ashore on the east side of Truro; nine were drowned. The schooner *Industry* went ashore and lost 3 of its crew. The schooner *Spitfire* was wrecked a half-mile [0.8 kilometers] below Race point; four were drowned.

— Most of the vessels from Truro, Massachusetts were disabled by the gale and driven upon the Nantucket shoals, which extend 50 to 60 miles [80 to 97 kilometers] into the ocean. These included the vessels: *Altair*, *Arrival*, *Cincinnatus*, *Dalmation*, *Garnet*, *General Harrison*, *Pomona*, and the *Prince Albert*. Truro lost 57 mariners to this gale.

On 3-4 October 1841, a hurricane struck New England in the *United States* causing between 58 and 81 deaths.<sup>141</sup>

In the *United States*, a large storm struck on 3 October 1841. More than 100 vessels were lost and damage estimates were \$2 million (\$50 million in today’s currency). Many poor mariners perished. The storm unleashed not only wind and rain but also hail and snow. It struck hard in Brunswick, New Jersey; New York City; New Haven, Cape Cod and Halifax and Quebec in *Canada*. Hail and snow storms also struck Utica, Geneva and Buffalo in New York and in the interior of Pennsylvania during October.<sup>1</sup>

On 18 October 1841 in *England*, there was a great hailstorm in Essex.<sup>93</sup>

In central *France* in November, there were great floods at Mâcon and neighborhood; immense damage done.<sup>47,92</sup>

In 1841 during the period between 6 May and 8 August, floods struck Hupeh (now Hubei province) in central *China* at Ao-ch’êng, Huang-p’o, Hanyang, Sung-tzū, Huang-kang and Chung-hsiang. Then during the period between 15 October and 12 November, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ning-yang.<sup>153</sup>

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**Winter of 1841 / 1842 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1841 occurred on 3 October. First snowfall; at some places people went to town meeting in

sleighs. November 8, a hard snowstorm. Between October 3 and November 22, ground covered with snow four or five times.<sup>116</sup>

In the *United States* in November 1841, ten inches (25 centimeters) of snow fell during 4 days in Philadelphia. Great quantities of snow fell during the month in Indiana, Michigan, Ohio, and the interior of Pennsylvania, New York and several New England states.<sup>1</sup>

In March 1842, the temperature at Princess Anne, Maryland in the *United States* did not fall below freezing. There were frost on March 15<sup>th</sup> and 16<sup>th</sup>.<sup>116</sup>

During the winter of 1841, the cold and snow filled the southern and central *France*. Northern *France* suffered greatly. There was a severe cold outbreak around Christmas. This was accompanied everywhere with abundant snow. At Marseille, the thermometer sank sharply to 23° F (-5° C) until the end of December. Frosts continued afterwards, and lasted almost without interruption during the first fortnight of January. Temperatures reached 17.6° to 21.2° F (-6° to -8° C). The cold also broke out suddenly, after the winter solstice, in Lunel and Toulon, and the rest of Languedoc and Provence, with torrents of snow. The cold gripped the Saône River at Lyon and the Garonne River at Bordeaux.<sup>79</sup>

But the main feature of the winter of 1841 was the great mass of snow, which fell especially in central and southern *France*. Snow fell in Paris on November 15<sup>th</sup>, 17<sup>th</sup> and 19<sup>th</sup>. Snow fell later in the central and southern provinces, where it did not seem much by the end of the year. Afterwards however, the effects of winter became much more prominent. Roads became blocked. The quantity of snow was such that letters from Paris to Marseilles wandered for forty-eight hours. The news from Paris to Alby [Albi] failed for three consecutive days to get through. In some valleys of Dauphine and Roussillon, the depth of the snow was estimated as more than 1.6 to 2.0 feet (50 to 60 centimeters). Avalanches occurred repeatedly in many places, for example in the village of Servières, Auvergne, and Barège-les-Bains, which brought ruin and desolation. The snows piled up from a series of successive snowfalls during the first three months of the year.<sup>79</sup> [Alby, Servières, Auvergne, and Barège-les-Bains are located in southern *France*. Dauphine and Roussillon are located in southeastern *France*.]

The winter of 1841-42 in *Europe* was remarkable for the severe frosts in the south of *France* and by unusually cold weather in *Spain* and *Algiers*. The weather in *France* was very mild until the end of December. But in the beginning of January, south of the Loire, there was a snow accompanied by falling temperatures. From 8 to 16 January, there was very strong frost in southern *France*. On 10 January the Saône River was frozen between the St. Vincent Bridge in Lyons and the island bar. The Garonne River at Agen [southwestern *France*] as in Bordeaux was covered with ice and on 8 January at Toulouse, individuals were skating on the Canal. In Paris, there were 52 frost days, 23 of which were successive. On 10 January, the Seine River drove strong ice. Some of the lowest temperatures recorded during the winter are as follows:<sup>62</sup>

Brussels, <i>Belgium</i>	( 9.3° F, -12.6° C) on 8 January
Pau, <i>France</i>	( 9.9° F, -12.3° C) on 8 January
Agen, <i>France</i>	( 10.4° F, -12.0° C) on 16 January
Toulouse, <i>France</i>	( 11.3° F, -11.5° C) on 8 January
Gent (Ghent), <i>Belgium</i>	( 12.4° F, -10.9° C) on 8 January
Paris, <i>France</i>	( 14.0° F, -10.0° C) on 10 January
Metz, <i>France</i>	( 14.4° F, -9.8° C) on 26 January
Orange, <i>France</i>	( 16.3° F, -8.7° C) on 13 January
Bayonne, <i>France</i>	( 21.2° F, -6.0° C) on 8 January
London, <i>England</i>	( 27.1° F, -2.7° C) on 24 January

On 15 April 1842, the ground was so frozen in Warren County, Missouri in the *United States*, that individuals were unable to set stakes in the woods as guides for a worm fence.<sup>123</sup>



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**1842 A.D.** In *Ireland*, there were great floods at Limerick; waterspouts elsewhere.<sup>47, 92</sup>

On 3 & 4 February 1842, a great flood of the Susquehanna River struck Bradford County, Pennsylvania in the *United States*. The unusual warm weather, which prevailed during the previous two weeks, melted the existing snow in the woods and a subsequent heavy snowfall, swelling the small streams and causing the river to rise to an unusual height. Immense damage was done along the river and some of the larger creeks by the sweeping away of bridges, lumber, fences, etc. In Towanda, the water overflowed River Street and the lower part of the town nearly as much as it did in March 1841. The tollhouse of the bridge and large quantities of lumber on the bank at Towanda and at the mouths of Towanda and Sugar Creek were washed away. The new bridge across the Wysox was carried from its foundation. Several mills were carried away or destroyed.<sup>178</sup>

On 28 April 1842 in *England*, there was a great hailstorm in Hampshire.<sup>93</sup>

On 27 May 1842 in *England*, there was a hailstorm in Nottinghamshire.<sup>93</sup>

On 1 June 1842 in *England*, there was a hailstorm in Yorkshire.<sup>93</sup>

On 2 June 1842 in *England*, there was a hailstorm in Nottinghamshire.<sup>93</sup>

In June 1842, a tornado passed over the southeastern portion of Bradford County, Pennsylvania in the *United States*, which was described by an eyewitness at Wyalusing as follows: "On Sunday, June 26 about one o'clock, a dark cloud began to rise in the northeast, accompanied with low distant thunder until 25 minutes past one, when the most violent clap of thunder I ever heard, burst upon us and instantly it began to rain and the wind to blow, until the rain fell, not by drops, but by vast unbroken sheets, and the wind increased until it became terrific. The forest trees, orchards, fences and buildings gave way to the giant strength of an imperceptible power. Forests that had withstood the tempest for ages had to yield to this last and more mighty than all its predecessors. Cattle were seen running to and fro for some place of shelter, and seemingly the wind would fairly raise them clear from the ground. After raining about 15 minutes the rain came like shot from a gun, breaking windows, cutting corn, potatoes and all crops to the ground, beating down meadows, riddling the forest leaves and fairly driving the cattle mad with pain and fear. The tornado was more than three miles [4.8 km] wide and went from northwest to southeast. Two barns of Justus Gaylord were blown flat. In Browntown, houses were unroofed, barns torn down, shops upset, carriages carried some distance and dashed to pieces. People were obliged to lie down to keep from being, blown away. On the west side of the river in the Bend, the wind was still harder, hurling barns and houses from their foundations with the velocity of lightning, leveling fences, orchards, grain and everything that came in its way. Farther down the river the hail was terrible. Long after the storm had passed you could gather pailfuls anywhere on the ground. Nearly all of the glass in the northwest side of all houses was broken and dents remained in the weatherboards as if a stone had been thrown against them. It was the hardest and most violent blow ever felt in this section, and the loss is 20 times more than ever occasioned from any storm before."<sup>178</sup>

On 25 June 1842 in *Wales*, there was a great hailstorm in Glamorganshire.<sup>93</sup>

The year 1842 produced a great hot summers in *France*. The heat was more intense in the North and the South. In Paris, the heat began on June 5 and lasted through a few intermissions until September. The temperature reached its peak on August 18 when 99° F (37.2° C) was observed on the thermometer. This is one of the highest readings seen during this century. The hot weather was usually stormy and dry. Many public gardens chestnut trees that lost their leaves in July bloomed again in late August.<sup>79</sup>



The drought of 1842 in *France* began during the first days of June with the onset of heat. The drought continued, with a few temporary interruptions, until the last days of September. The drought was particularly severe in northern *France*. There were regions in the region of Meuse where a barrel of water sold in the month of August, up to three francs. In Paris, *France*, transportation on the Seine River was interrupted for four consecutive months [due to the low water level]. The water level of the Seine River was lower by several inches than the zero water mark on the bridge Pont Royal. In Paris, the rainfall measurements from the terrace in June were 1.5 inches (38.7 millimeters); in July 0.5 inches (13.3 millimeters); and in August 0.5 inches (13.3 millimeters). As a result the monthly average rainfall during these three months was 0.9 inches (21.8 millimeters) instead of the typical summer monthly average of 5.6 inches (141 millimeters).<sup>79</sup>

The summer of 1842 was the hottest since the beginning of this century, particularly in the area of Paris and northern *France*. The weather was also very dry. At the observatory, only 65 millimeters (2.6 inches) of rain fell which is 107 millimeters (4.2 inches) less than average. During several days in July, August, September and October, the water level on the Seine River at the bridge “Pont de la Tournelle” fell below zero [the low water mark of the year 1719]. The summer in Paris, *France* was characterized by:

Hot days	51 days
Very hot days	11 days
Extremely hot day	4 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Paris, <i>France</i>	( 98.0° F, 37.2° C )	on 18 August
Agen, <i>France</i>	( 98.6° F, 37.0° C )	on 4 July
Bordeaux, <i>France</i>	( 94.6° F, 34.8° C )	on 16 July
Toulouse, <i>France</i>	( 93.9° F, 34.4° C )	on 17 July
Löwen, <i>Germany</i>	( 91.0° F, 32.8° C )	on 11 June
Angers, <i>France</i>	( 91.0° F, 32.8° C )	on 17 August
Brussels, <i>Belgium</i>	( 90.7° F, 32.6° C )	on 18 August
Metz, <i>France</i>	( 90.5° F, 32.5° C )	on 19 August
La Chapelle, <i>France</i>	( 90.1° F, 32.3° C )	on 18 August
Gent (Ghent), <i>Belgium</i>	( 90.0° F, 32.2° C )	on 19 August
Geneva, <i>Switzerland</i>	( 87.6° F, 30.9° C )	on 4 July
London, <i>England</i>	( 86.0° F, 30.0° C )	on 19 August
La Havre, <i>France</i>	( 86.0° F, 30.0° C )	
Marseille, <i>France</i>	( 85.6° F, 29.8° C )	
Calais, <i>France</i>	( 80.6° F, 27.0° C )	on 19 August

Several incidents caused by the heat were recorded. The wheels of several mail wagons were inflamed. On 28 June in Badajoz in southwestern *Spain*, 3 workers perished. A lady died from suffocation in an eilwagen [stagecoach]. In Cordova (Córdoba) in southern *Spain*, several persons died from heat stroke, and several cases of insanity were also attributed to the high temperature.<sup>62</sup>

In the afternoon of 1 July a great thunderstorm struck Philadelphia, Pennsylvania in the *United States*. The peals of thunder were astonishing, and the lightning the most terrific to behold, and the rain poured down in such torrents for two and a half hours, that several streets in the eastern part of the city were under two feet (0.6 meters) of water. A total of six inches (15 centimeters) fell on that day. The lightning struck and consumed several barns in the vicinity of the city along with houses and libraries and several people were stunned. Some rain fell on twelve other days of that month making a total of twelve inches (30 centimeters) for that month.<sup>1</sup>

On 12-15 July 1842, a hurricane struck the coast of North Carolina in the *United States*. Many ships were lost and many persons drowned. Two vessels were capsized and their entire crews were lost. Seven men who went out later [for rescue?] were also drowned. The hurricane of 12 July 1842 was one of the worst in the history of coastal Carolina.<sup>141</sup>

On 14 July 1842, the lower part of the city of Baltimore, Maryland in the *United States* was completely deluged by repeated and powerful rains; and particularly by tremendous thunderstorms, during which several people were struck down by lightning. On the same day there was a most destructive storm in Virginia and North Carolina, by which the whole South was partially deluged. The newspapers from those States gave the most distressing accounts of the violent gale of wind; which accompanied the torrents of rain. The Norfolk newspaper said “the rain was followed by a three days’ hurricane, by which great damage was done, to the shipping in Hampton Roads, to railroads, canals, bridges and mills. On the east side of Oronoke, fourteen vessels were cast away, and completely wrecked. And a number of dead bodies were washed ashore. Two other vessels were stranded, and their whole crews perished.” It was indeed, a month of more violent thunderstorms all over the United States, than any month for half a century. One record of the number of buildings burnt by lightning was sixty-one and of deaths due to lightning strikes was forty-six.<sup>1</sup>

On 20 July 1842 in *England*, there was a great hailstorm in Essex.<sup>93</sup>

On 10 August 1842 in *England*, there was a hailstorm in Yorkshire.<sup>93</sup>

On 24 August 1842, a hurricane struck the coast of North Carolina in the *United States*. At least eight mariners were dead (seven from the *Congress* and 1 from the *Pioneer*) from a storm “hardly less severe” than 15 July 1842 hurricane.<sup>141</sup>

On 29 August 1842 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>

On 31 August 1842 in *England*, there was a great hailstorm in Cornwall and Norfolk.<sup>93</sup>

In Burgundy, *France*, the grape harvest began on 21 September. The yield was plentiful and of very good quality. But more in the East, for example, in Doubs, the amount was lower. In Bordeaux, the quality of the wine was poor. The cereal harvest compared to an average year.<sup>62</sup>

In 1842 during the period between 9 June and 7 July, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling and Sung-tzū.<sup>153</sup>

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**Winter of 1842 / 1843 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1842 occurred on 30 November.<sup>116</sup>

On 30 November 1842, a storm struck New England in the *United States*. At Dover, New Hampshire, 15 inches [38 centimeters] of snow fell. Travel on railroads was greatly disrupted. The storm began in Washington D.C. and Baltimore, Maryland, where significant snow fell.<sup>199</sup>

— Many vessels in Boston Harbor in Massachusetts were driven from their mooring and smashed against each other or the wharves during the storm. Above the noise of the storm, the sound of falling masts and the vessels crashing together could be heard in the city. Several ships were sunk and several sailors drowned.

— The bark *Isadore*, a 400-ton burden, was driven on the rocks near Cape Neddock, Maine. The entire crew of fifteen perished.

— The schooner *Napoleon* lost both masts and capsized and then righted itself, but was filled with water. Only the mate survived, the rest of the crew of six were drowned or froze to death.

— The schooner *James Clark*, of 60-ton burden, was driven ashore at Rye Beach and wrecked. Two adults and three children perished.

January 1843 was unseasonably warm from New Jersey to Maine in the United States but colder in the South.<sup>140</sup>

Charles Pierce describes the winter of 1842-43 in Philadelphia, Pennsylvania in the *United States*:<sup>1</sup>

— In September 1842, there were the extremes of autumnal heat and cold. From the 1<sup>st</sup> to the 14<sup>th</sup> the mercury varied from +76° F to +88° F. On the 14<sup>th</sup> the wind changed from south to northeast, and the 17<sup>th</sup> to northwest, and the cold increased daily until the 23<sup>rd</sup>, when the mercury at sunrise had sunk to +36° F in this city, and in the country to +32° F, and ice was an eighth of an inch thick in many places. On the 28<sup>th</sup>, it moderated and the mercury ran up to +76° F at midday, on the last three days in the month. A very little rain fell on ten days, making in all only one inch and a quarter. The wind was northwest either the whole or a part of fifteen days.

— In October 1842 with a very few exceptions, the weather was mild and pleasant during the whole month, in this vicinity. On five days the mercury rose to +70° F and above, at midday. On two days it rose to +74° F. On fourteen days it varied from +60° F to +68° F. There were only six frosty mornings during the month. A little rain fell on five days, making in all one and three quarter inches. While we were so highly favored in this latitude with mild and pleasant weather, violent gales and storms were experienced at South Carolina, Georgia, Florida, in the Gulf of Mexico, in the Mississippi river, at Pensacola, Galveston, etc.; great damage was done to vessels on the coast and in ports. The brig *Cuba*, from Galveston for New York, with a number of male and female passengers, was lost in a violent gale, and all on board perished, and several other vessels were lost in the same gale, as nothing was heard of them afterwards.

— In November 1842 from the 1<sup>st</sup> to the 18<sup>th</sup>, the weather was as mild and pleasant as September. But in the afternoon of the 18<sup>th</sup>, the wind changed to northwest, and the mercury sank from +50° F to +31° F by ten o'clock in the evening; and to +24° F by the next morning. The weather during the remainder of the month was more like midwinter than autumn. Some snow fell on the 24<sup>th</sup>, 27<sup>th</sup>, and 30<sup>th</sup>, making about four inches; and two inches of rain fell during the month. At the close of this month, we received accounts of the severity of the weather, from the east, west, north and south, commencing about the time it did in this city. At Baltimore, Washington D.C., and farther south, it was very severe. The Kentucky, Ohio, Michigan, Indiana, and other newspapers, stated the cold to be as great there, as any ever experienced in November. The papers from the interior of New York, Vermont, and through Canada, made similar statements, and that much snow had fallen, and sleighing was excellent. Most terrific gales were experienced on the western and northern Lakes, and many vessels wrecked, and lives lost. Accounts from Detroit, Buffalo, Erie, Chicago, Dunkirk, etc., stated, that in consequence of the wrecks of so many vessels, the shores were lined with barrels of flour, pork, corn, wheat, etc., and many dead bodies were washed ashore; and in several of those places the mercury was below zero degrees Fahrenheit.

— December 1842 commenced with the mercury at +27° F at sunrise, and continued about this temperature, (with the exception of four mornings,) until the 23<sup>rd</sup>, when the wind changed from west to northwest, and the mercury sunk from +36° F to +18° F, and on the morning of the 24<sup>th</sup> to +14° F, and it continued cold until the month closed. There was but little falling weather during the month, in this city. On the 8<sup>th</sup> there was a moderate northeast rain storm, and on the 21<sup>st</sup> another; and a very little rain fell on a few other days, making three and a half inches; and about four inches of snow fell. The cold during a part of the month was very severe in many parts of the country, and a great quantity of snow fell in the west, the north and the east. But in this vicinity, there was but very little stormy weather. By the following we see how very different the weather is in different latitudes, and sometimes even in the same latitude. For instance, in Philadelphia and vicinity we had but very little severely cold or stormy weather during the two previous months, while in many parts of the western, northern and eastern states there was excessively cold, stormy and tempestuous weather. In several places beyond the Ohio River, snow fell to the depth of two feet, and there were several weeks of excellent sleighing in November. It was precisely the same in the interior of Pennsylvania, New York, Connecticut, Massachusetts and all the New England States. In Illinois, as early as the 29<sup>th</sup> of November, the mercury sunk to -14° F (-26° C), and in Belfast, Maine to -20° F (-29° C), while in Philadelphia on the same morning at sunrise, the mercury was +18° F; being a difference of 32° F between Illinois and this city, and between Belfast and Philadelphia a difference of 38° F; i.e. it was 38 degrees colder at Belfast than in Philadelphia. And as it respects a snowstorm which commenced in this city at ten o'clock on the morning of the 30<sup>th</sup> of November, (and which was comparatively mild and moderate here) it did not commence in New York until past twelve o'clock, and in Boston not until three p.m., where it was so violent, from New York to the extreme part of Maine, that the whole coast from Boston to the Bay of Funda, was lined with wrecks of vessels.

It was during this storm that the beautiful barque *Isadore*, (which left Boston before the storm commenced) was wrecked and stove entirely to pieces on the ledge of rocks running out from the harbor of York, Maine, and every person on board perished, consisting of fifteen young men, all under thirty years of age, and belonging to Kennebec, Maine, where the vessel was owned. Part of the time the wind blew a complete hurricane. The number of lives lost on the coast and in harbors by shipwrecks from the 10<sup>th</sup> to the close of November were 578. The whole month of December 1842 was one of awful and destructive storms in different latitudes.

— In January 1843, 1½ inches of rain fell, and about the same quantity of snow, in the vicinity of Philadelphia. It was a remarkably mild and pleasant winter month. But the newspapers informed us that, while Philadelphia was so highly favored, various other places were experiencing very different weather. On the 26<sup>th</sup>, Pottsville, Pennsylvania was visited by a tremendous hurricane, which swept away almost everything before it. On the 7<sup>th</sup> and 8<sup>th</sup> of January, Danville, Pennsylvania, was visited by a very destructive storm of wind and rain, which swept away bridges, and did a great amount of other damage. On the 7<sup>th</sup>, there was a great fall of snow in Tennessee, and it was intensely cold, and the papers stated that the cold extended to Louisiana and Mississippi. It was also intensely cold at the north, and down through Canada to the bay of Funda. The Montreal and Quebec papers said the weather was so cold, that the mercury sunk to -36° F (-38°).

— In February 1843, a little snow fell on five days, making about seven inches in all. There was sleighing for three days. Two and a half inches of rain fell during the month. On the mornings of the 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 16<sup>th</sup>, 17<sup>th</sup>, and 18<sup>th</sup>, the mercury ranged from +10° F to +12° F, and considerable ice made in the Delaware River, but the ice boat kept the river open, so that vessels had free ingress and egress. The weather was not severely cold in this vicinity, but in the papers, we saw it stated that in New York, and in the northern and eastern States, it was intensely cold and boisterous, and that a great deal of snow had fallen. The weather was also very cold at the south. Snow fell in South Carolina to the depth of two inches (5 centimeters); and there was both snow and ice in Alabama, Florida and Louisiana.

— In March 1843, snow fell on five days, measuring in the whole about fifteen inches, and four inches of rain fell. The snowstorm of the 16<sup>th</sup> was the most severe and violent that had occurred for many long years, in the month of March; during this storm, twelve inches (30 centimeters) of snow fell in Philadelphia, and blew into banks from four to five feet (1.2-1.5 meters) high in many of the streets. It was the coldest March month we have, or can find on record. On fourteen mornings the mercury ranged from +13° F to +20° F; and there were only three mornings during the month that the mercury was above the freezing point. From the 1<sup>st</sup> of February to the 8<sup>th</sup> of April, the weather was steady cold. The New York papers said, that during the violent storm of the 16<sup>th</sup>, snow fell in that city to the depth of two feet (0.6 meters), and blew into banks six feet (1.8 meters) high; that the country roads were so banked up, that no mails arrived from the north and east for two or three days. We received similar accounts from Baltimore and Washington D.C. Also, from the west, the north, and the east as far as Massachusetts, New Hampshire, and Maine. Vessels on the coast and in harbors, received great damage, and there were several shipwrecks, and great loss of property and lives.

— In April 1843, the quantity of rain that fell was four and three quarter inches. A little snow fell on the 4<sup>th</sup>, 5<sup>th</sup> and 9<sup>th</sup>, about two inches in all. The month commenced with a wintry atmosphere; the mercury at +31° F, and ice a quarter of an inch thick, and it continued cold and frosty until the 12<sup>th</sup>, when the wind changed from north to southwest, and the weather became mild and spring-like, and so continued during the remainder of the month. On four days during the last week, the mercury ranged from +70° F to +75° F at midday.

In the *United States* at the close of the winter in 1842, a New York newspaper said, “The past winter has been the coldest since the settlement of the country, and perhaps, more snow has fallen!”<sup>1</sup>

The winter of 1842-43 in Bradford County, Pennsylvania in the *United States* was severe and bitterly cold with snow three feet [0.9 m] deep. The supply of hay and straw became exhausted and many livestock perished. This winter began in the early fall and lasted until the 6<sup>th</sup> of April. In the fall of 1842, myriads of black squirrels migrated through the wilderness. The Bradford Porter of 12 April 1843 wrote: "The past winter has been one of unusual severity and is still lingering in the lap of spring as if determined to reign over the entire season of sunshine and flowers. The month of March was one unbroken period of cold weather, deep snows and good sleighing. April thus far is but little better. The snow is still lying in our fields more than a foot [30 cm] in depth and the weather is cold and freezing. The ice went out of the Susquehanna River without any unusual rise on April 6<sup>th</sup>. April 8<sup>th</sup> was pleasant and melted the snow considerably, causing a moderate freshet at this time. From every quarter we hear great complaints of the

scarcity of fodder and the consequent suffering and loss of cattle, sheep, etc. It is said that some farmers have lost their entire stock of cattle for want of food."<sup>178</sup>

In March 1843, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 2<sup>nd</sup> (28° F); 3<sup>rd</sup> (22° F); 4<sup>th</sup> (24° F); 5<sup>th</sup> (29° F); 6<sup>th</sup> (26° F); 7<sup>th</sup> (28° F); 8<sup>th</sup> (28° F); 14<sup>th</sup> (29° F); 18<sup>th</sup> (30° F); 19<sup>th</sup> (28° F); 20<sup>th</sup> (29° F); 21<sup>st</sup> (31° F); 23<sup>rd</sup> (31° F); 24<sup>th</sup> (21° F); 25<sup>th</sup> (28° F); 26<sup>th</sup> (32° F); 27<sup>th</sup> (32° F). There was frost on March 22<sup>nd</sup> and 30<sup>th</sup>. It snowed on March 17<sup>th</sup>.<sup>116</sup>

In the *United States* in the interior of Pennsylvania, New Jersey, New York, and in all the New England states, on the morning of 1 & 2 June 1843, there was a hard killer frost. In some places the ice was as thick as window glass, which destroyed tender plants and did great damage. A snow squall struck Philadelphia on the afternoon of June 1.<sup>1</sup>

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### 1843 A.D. – 1845 A.D. Australia. Drought

According to rainfall records 1843-45 were dry years in *South Australia*. By the year 1846, the interior and north were converted to an arid desert.<sup>101</sup>

In New South Wales, *Australia*, there was a drought from August 1842 to February 1843. The Patterson River ceased running in November.<sup>103</sup>

In 1843, there was a severe drought in Hobart, Tasmania, *Australia*.<sup>101</sup>

In Central *Australia*, the high temperature on 21 January 1845 was 131° F (55° C) in the shade. On 11 November 1845, the temperature was measured at 127° F (52.8° C) in the shade.<sup>103</sup>

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**1843 A.D.** In the beginning of April 1843, the tail of a great hurricane passed the island of *Mauritius*. From the 12<sup>th</sup> to the 15<sup>th</sup>, the telegraph was saturated with messages of a number of disabled, almost unmanageable, and leaky vessels, covered with emblems of distress, or firing guns for help, finding it almost impossible, even in the sight of a port, to make their way in. Such a fleet of wrecks from one storm had never perhaps put into Port Louis, Mauritius before. A visit to the anchorage showed groups of shattered vessels, some without their mast, others heeling over to one side, from the shifting of their cargoes in the gale. All the ships having their upper works, boats, bulwarks, and everything, which was on the deck swept away. The hurricane struck the island of *Rodrigues* in the Indian Ocean on 4 April. Some of the ships affected by this hurricane were the *Margaret*, *Robin Gray*, *Argo*, *Rambler*, *Blanche*, *Broxbournebury*, *Sea Queen*, *Velore*, *Katherine Stewart Forbes*, *Waverley*, *Parland*, *Wellington*, *Framjee Cowajee*, *Surat Merchant* and *Gazelle*. The *Victoria* was shipwrecked on the reefs of *Rodrigues*.<sup>198</sup>

On 21 April 1843, a hurricane struck the Island of Rotty [Rote Island] in *Indonesia*. Vast numbers of trees were blown down. Great damage was caused by the blowing down of large lofty trees, where the bees breed, so that no wax could be collected for two years. A great number of houses were destroyed. Seventy-five persons lost their lives.<sup>198</sup>

On 28 May 1843 in *England*, there was a hailstorm in Middlesex.<sup>93</sup>

In 1843, the Brazos River in Texas in the *United States* flooded. In 1843, the creeks and lakes in this locality were dry prior to the flood; in fact there was no water in the county whatever, and all the water from the floods were brought down by the rivers from up the country [from the north]. The overflow occurred during the month of May. The stage of the river during its overflow was about twenty inches higher than in 1852, but was not as high as that of the flood of 1899 by about five feet in the vicinity of Duke, Texas. Perhaps the greatest damage done by this overflow was the destruction of a grist and flour mill on Beason's Creek near the present town of Courtney, constructed to run by water power.<sup>123</sup>



On 10 June 1843 in *England*, there was a hailstorm in Derbyshire.<sup>93</sup>

On 5 July 1843 in *England*, there was a hailstorm in Derbyshire and Yorkshire.<sup>93</sup>

On 6 July 1843 in *England*, there was a hailstorm in Gloucestershire.<sup>93</sup>

In the *United States* on 5 August an immense storm struck Philadelphia. The streets were flooded in every direction. Towards the end of the storm a tornado swept down the Schuylkill River damaging 40 vessels loading or waiting to be loaded with coal. One man was killed instantly and several others injured. But this disaster was minimal in comparison to the damage the storm did elsewhere. In Delaware, the storm killed 30 people and destroyed public and private property to the amount of half a million dollars (\$15 million in today's currency), consisting of mills, factories, and stock. Fifty bridges were swept away by the flood. The storm did immense damage in Norristown, Upper Merion, Wilmington, Brandywine, Newark, and Elizabethtown. During August, destructive floods struck Maryland, Virginia, North Carolina, Washington D.C., New York and Connecticut. Philadelphia received 9.25 inches (23 centimeters) of rain in that month.<sup>1</sup>

On 7 August 1843 in *England*, there was a hailstorm in Cambridgeshire.<sup>93</sup>

On 9 August 1843 in *England*, there was a great hailstorm in Bedfordshire, which extended into: Berkshire, Essex, Gloucestershire, Hertfordshire, Kent, Oxfordshire, Suffolk, and Norfolk. In Norfolk, the devastation of crops was so great that a voluntary county-rate was made in favor of the sufferers. Out of these events sprang the General Hailstorm Insurance Company. In Oxfordshire, the damage to the crops resulting from this storm was estimated at "considerably over " £30,000; and a Hailstorm Relief Fund was founded, by means of which some substantial aid was afforded to the sufferers. The only previously existing Hailstorm Insurance Company, the Farmers and Gardeners, increased its rates considerably after this storm. This is one of the most widely extended storms on record. It commenced at Cheltenham, and extended its ravages across the island. The stones were not as large as in many previous cases, 8 inches in circumference being the largest spoken of; the average being 6 inches.<sup>93</sup>

A powerful hailstorm struck the county of Oxford in south-central *England* on 9 August 1843. As the storm approached an awful extraordinary sound resembling the roar of the ocean was heard for 5-10 minutes before the storm struck. At first the hail was only of an ordinary size, but soon some stones as large as pigeons' eggs began to fall, to strike the ground with great force, and to bound up again to the height of four or five feet. Some of the hailstones measure 8 inches in circumference. Many of the hailstones weighed 2 ounces. The hailstones had the appearance of misshapen morsels of ice.<sup>196</sup>

— This hailstorm destroyed crops over 50 square miles. Some of the areas affected included the parishes of Churchhill, Chipping-Norton, Over-Norton, Heythrop, Enstone, the Tews, Sandford, the Bartons, Middle Aston, and North Aston. Two men were killed at Clanfield. The hailstones did great damage to buildings by destroying glass windows and roofs. They broke to pieces the slate roof tiles; even the strongest slates such as the Stonesfield slates. The lead roof of the church was so dented from the impact of the hailstones that it took on the appearance of a person strongly marked by small pox.

— When the hailstones descended the chimneys, as in many cases they did, their size and the force of their descent were so great as in two instances to cut through kettles boiling on the fire. The hole they made in the kettle was 1½ inches across.

— In a valley at Great Tew the flood of rain carrying with it the immense hailstones was so great that it swept down a strong wall, and the hailstones accumulated in so large a quantity, that they had not melted 14 days later. Some people used the hailstones to replenish their icehouses.

— As the storm approached, cattle displayed great fear. A man who had gone into the field to look at some young colts, found them so distressed and alarmed that they came round him, as if expecting



protection from him against the impending danger, and very plainly manifesting great fear. A gentleman, who was caught on the high road riding, in the very middle of the storm, dismounted, and crept for shelter under a hedge; his horse, a mare of much courage and blood, was so cowed, that she crept down on her knees into the ditch beside him, quaking in every limb with fear.

— The smaller animals and birds were killed in great abundance. A man saw around a dozen hares running about during the storm. One after another were struck by hailstones, leaped up as if shot, tumbled over and fell dead. A leveret [a young hare in its first year] was found completely cut in two. A great number of crows, pheasants, and partridges were killed.

The maximum temperature during the summer in Calais, *France* was 86.0° F (30.0° C) on 10 August.<sup>62</sup>

In *England*, there was a terrific hailstorm in Norfolk, causing great devastation of the crops through the county.<sup>57</sup>

In 1843, the missionary M. Hue saw a hailstorm in *Mongolia* where the hailstones weighed 6 kilograms (13 pounds). During this great storm, there fell in a field a piece of ice bigger than a millstone, which was broken with hatchets, and though it was in the hottest weather, it was three days before it was entirely melted.<sup>271</sup>

In 1843 during the period between 27 July and 24 August, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Hu-chou.<sup>153</sup>

*Also refer to the section 1843 A.D. – 1845 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1843 / 1844 A.D.** In the *United States*, on 1 November, there was ice in Georgia as thick as a window-glass. On the 10<sup>th</sup> of November, the weather was so cold in Upper *Canada*, that there was good skating on the St. Charles river. At the same time, snow fell two feet (0.6 meters) deep in Vermont and the winds drove this into 4-foot (1.2 meters) deep snow banks.<sup>1</sup>

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1843 occurred on 29 November.<sup>116</sup>

During the winter of 1843-44 in Bradford County, Pennsylvania in the *United States*, there was no snow or sleighing until the beginning of February. Spring began uncommonly early.<sup>178</sup>

In March 1844, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 5<sup>th</sup> (32° F); 6<sup>th</sup> (30° F); 19<sup>th</sup> (32° F). There was frost on March 6<sup>th</sup> and 12<sup>th</sup>. It snowed on March 31<sup>st</sup>.<sup>116</sup>

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**1844 A.D.** On 4 & 5 January 1844, a hurricane struck the island of *Mauritius* in the Indian Ocean. Several ships were cast ashore. An Indiaman *Hugh Matthie*, 538 tons burden, and two immigrant ships, and two other vessels were completely wrecked. One of these ships was the *Amity*, 600 tons burden, with 180 immigrants onboard besides the crew.<sup>198</sup>

On 20 February 1844, a hurricane struck the island of *Rodrigues* in the Indian Ocean. It caused immense damage on the island, destroying many houses and all the crops.<sup>198</sup>

Accounts from *Africa* state that the weather was intensely hot and dry and many people had perished. Accounts from the *St. Helena* [an island in the South Atlantic Ocean] states that no rain has fallen in 15 months and great distress prevails.<sup>1</sup>

First known Gundagai flood in New South Wales, *Australia* occurred on February 1844.<sup>103</sup>

In 1844, there was a great flood on the Missouri River in Kansas and Missouri and its tributary, the Platte River, in Nebraska in the *United States*.<sup>132</sup>

During the 19<sup>th</sup> century, the greatest flood of the Mississippi River in the *United States* in the upper Mississippi basin occurred in 1844 while the greatest flood on the Mississippi River south of the mouth of the Ohio River occurred in 1897. The highest water levels recorded in the principal cities in the Mississippi basin are as follows:<sup>123</sup>

City/State	Flood Stage	Date
St. Paul, Minnesota	19.7 feet	29 April 1881
Omaha, Nebraska	23.8 feet	24 April 1881
Kansas City, Missouri	24.9 feet	21 May 1892
Kansas City, Missouri	37 feet	20 June 1844
St. Louis, Missouri	41.4 feet	27 June 1844
Cincinnati, Ohio	71.1 feet	14 February 1884
Cairo, Illinois	52.2 feet	27 February 1883
Memphis, Tennessee	37.1 feet	19-21 March 1897
Vicksburg, Mississippi	52.3 feet	16 April 1897
New Orleans, Louisiana	19.5 feet	13 May 1897

The high temperatures observed during the summer were:<sup>62</sup>

Biscara (Biskra) in northeastern <i>Algeria</i>	(111.2° F, 44.0° C) on 19 August
Nizhny Tagil (Sverdlovsk Oblast) in southern <i>Russia</i>	( 95.0° F, 35.0° C) on 9 June

On 11 May 1844, a sudden squall from the west struck Athens, Pennsylvania in the *United States* accompanied by torrents of rain, and hailstones as large as hickory nuts. Approximately 1,500 panes of glass were broken in the village and many valuable trees blown down.<sup>178</sup>

On 4-6 August 1844, a hurricane struck the Rio Grande Valley [southernmost tip of Texas] in the *United States* causing around 70 deaths.<sup>141</sup>

In September 1844 in New South Wales, *Australia*, there was a heavy flood in the Tumut and Murrumbidgee Rivers in September.<sup>103</sup>

On 4-5 October 1844, a hurricane struck *Cuba* causing approximately 100 deaths.<sup>141</sup>

In October 1844 in the *South of France*, there was a hailstorm. One of the hailstones weighed 11 pounds (5 kilograms). [It might be noted that M. Hue, the celebrated missionary, spoke of a hailstorm on the *Mongolian plateau*, wherein a hailstone fell of the size of a Millstone!]<sup>93</sup>

In *Ireland*, there were extensive floods in the east and south.<sup>47, 92</sup>

The year 1844 was a year of abundance in *Ireland*. But the condition of the peasants was one of privation and suffering. This was the result of taxation, rent-payers, and cold-hearted injustice.<sup>184</sup>

In 1844, there was the greatest flood ever known in Port Phillip in Victoria, *Australia*.<sup>103</sup>

In 1844 during the period between 14 August and 11 September, several regions of *China* experienced flooding including:<sup>153</sup>

— Chekiang (now Zhejiang province) on the east coast of *China* at Ch'êng. The dikes were damaged and over 70 persons were drowned.

- Hupeh (now Hubei province) in central *China* at Chiang-ling, Sung-tzŭ and Chih-chiang. At Chiang-ling, the city walls were damaged by the floodwaters.
- Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang, I-ch'un, P'o-yang and Nan-k'ang.
- Shantung (now Shandong province) on the east coast of *China* at Hui-min, Chan-hua and P'u-t'ai.

During the period between 8 August 1844 and 5 February 1845, a drought engulfed Hupeh (now Hubei province) in central *China* at Kuang-hua.<sup>153</sup>

*Also refer to the section 1843 A.D. – 1845 A.D. for information on the drought in Australia during that timeframe.*

**Winter of 1844 / 1845 A.D.** In the *United States*, on 29-30 September 1844, snow fell in the interior of Pennsylvania, New York and the New England states.<sup>1</sup>

During the winter of 1844-45 in Bradford County, Pennsylvania in the *United States*, there was an early September snowstorm. On 29 September 1844, a snowfall gave the surrounding county the aspect of winter. On Barclay Mountain, the snow lay on the ground to a depth of 28 inches [0.7 m]. This was an occurrence that has never happened before in the memory of the oldest inhabitants.<sup>178</sup>

At Thompson, Connecticut in the *United States*, the first measurable snowstorm of the season in 1844 occurred on 28 November. Snowed all day about 5 inches, mercury 10° F; some sleighs moved.<sup>116</sup>

Charles Pierce describes the winter of 1844-45 in Philadelphia, Pennsylvania in the *United States*:<sup>1</sup>

— In November 1844 from the 1<sup>st</sup> to the 19<sup>th</sup> the weather was remarkably mild. The mercury was not once so low as the freezing point until the morning of the 19<sup>th</sup> when it was 32° F, and on four other mornings, towards the close of the month, it was from 28° F to 30° F in this city, and we neither saw or heard of a flake of snow falling in this vicinity during November. Some rain fell on nine days, making in all three inches. There were eighteen clear days, and a great part of the month was like “Indian summer” in this vicinity. But it was far otherwise in some other parts of the *United States*, and in the British provinces. In Illinois, Indiana, Michigan and in the interior of New York, Vermont and some of the New England states, we read accounts in the newspapers of snow being from ten to twelve inches (25-30 centimeters) deep and good sleighing. In Canada, there was very severely cold weather, and in some places the snow was two feet (0.6 meters) in depth.

— In December 1844, the weather was very variable. Some rain fell on seven days, making in all three inches. A very little snow fell on the 23<sup>rd</sup> and 27<sup>th</sup>, about a quarter of an inch in all. There was much cloudy, overcast and chilly weather, but none that was severely cold or very mild in this vicinity. On the 17<sup>th</sup>, the river became so obstructed by ice from Kensington to Bordentown, that the up-river steamboats ceased to perform their regular trips. Although there was insufficient snowfall in this vicinity during December to whiten the earth, yet the whole state of New York and the New England States were bountifully supplied. On the 11<sup>th</sup> and 12<sup>th</sup> of the month there was a violent snowstorm from New York to the extreme part of Maine. On Long Island, the snow was blown into banks from ten to twelve feet (3.0-3.7 meters) high, so that the cars were stopped for several days. The papers said, the storm was the most violent for many years; in Connecticut the drifts were fifteen feet (4.6 meters) high. Beyond Rhode Island the storm was not so severe, and much less snow fell.

— Three and a half inches of rain, and about two inches of snow fell during January 1845. A milder and pleasanter winter month could scarcely be desired then was experienced in this latitude. But very few instances occurred in which the mercury sunk below the freezing point in the city; and it frequently ranged from 50° F to 60° F, from eleven to three o'clock. The Delaware River below Kensington, and the Schuylkill River below Fairmount, was as free from ice as in mid-summer.

— During February 1845, four and three quarter inches of rain, and five inches of snow fell. There was sleighing from the 8<sup>th</sup> to the 12<sup>th</sup>. From the 1<sup>st</sup> to the 10<sup>th</sup>, it was severely cold, the mercury ranging from 10° F to 20° F. From the 11<sup>th</sup> to the close of the month, the weather was mild particularly in the vicinity of Philadelphia. On the 4<sup>th</sup> and 5<sup>th</sup>, there was a very severe snowstorm in all the northern and eastern states, and through Canada; after which it cleared intensely cold. During the storm many disasters occurred to the shipping on the coast.

— In March 1845, two and a half inches of rain fell, and a very little snow, which soon melted. The weather for one week was very variable, producing the temperature of the four seasons; with the above exception, the weather was mild during the month. On four days the mercury ranged from 70° F to 74° F; and on four days from 26° F to 32° F.

— During April 1845, two and a half inches of rain fell. On the 25<sup>th</sup>, there was a heavy thundershower with very vivid lightning. On the 6<sup>th</sup> and 8<sup>th</sup>, there were snow squalls. On four mornings there was frost, and one morning ice. The month commenced and continued mild until the 8<sup>th</sup>. From the 8<sup>th</sup> to the 13<sup>th</sup>, it was quite cool and frosty. On the 13<sup>th</sup>, the wind changed from northwest to south, and the remainder of the month (with the exception of four days) was not only mild, but also summerlike, and vegetation came forward with great rapidity. Only a few sprinkles of rain fell from the 23<sup>rd</sup> of March to the 19<sup>th</sup> of April in this vicinity, when it then rained moderately for ten straight hours.

In the *United States* during the winter of 1844-45, the temperature at Savannah, Georgia fell to 18° F in January.<sup>113</sup>

The Saône River in *France* froze in December 1844.<sup>62</sup>

The winter of 1844-45 was remarkable in *Europe* because of its length and vast amount of snow that fell during several months. This abnormal winter was felt in *Sweden, England, Germany, France, Italy, and Spain* and up to Ceuta in *North Africa*. [Ceuta is an 18.5 square-kilometer (7.1 square mile) autonomous city of Spain and an exclave located on the north coast of North Africa surrounded by Morocco.] There were 65 days of frost in Paris, *France*, of which 20 were successive. The cold began on 2 December. On 8 and 11 December, the thermometer stood at 15.3° F (-9.3° C) in Paris and the cold persisted until the 16<sup>th</sup>. The cold weather came again from 22 to 27 December. In January, the temperature was fairly mild, and only freezing a little for 14 days with breaks of thaw. On 7 February intense cold weather arrived and lasted until 22 February. On the 21<sup>st</sup> of February was the cold day at 10.8° F (-11.8° C). The cold started again towards the end of February and stayed until 20 March. Some of the lowest temperatures observed during this winter were:<sup>62</sup>

Gefle (Gävle), <i>Sweden</i>	(-26.5° F, -32.5° C) on 11 February
Great St. Bernard Hospice, <i>Switzerland</i>	(-11.7° F, -24.3° C) on 8 December
Ossau, <i>France</i>	( -5.8° F, -21.0° C) in December
Metz, <i>France</i>	( -1.7° F, -18.7° C) on 21 February
Dijon, <i>France</i>	( -0.4° F, -18.0° C) on 21 February
Turin, <i>Italy</i>	( 1.4° F, -17.0° C) on 7 December
Rouen, <i>France</i>	( 8.8° F, -12.9° C) on 12 February
Brussels, <i>Belgium</i>	( 9.7° F, -12.4° C) on 12 December
<i>Ibid.</i>	( 5.0° F, -15.0° C) on 20 February
Catalonia, <i>Spain</i>	( 8.6° F, -13.0° C) in December
Le Havre, <i>France</i>	(14.0° F, -10.0° C) on 9 December
Toulouse, <i>France</i>	(14.0° F, -10.0° C) in December
Montpellier, <i>France</i>	(14.5° F, -9.7° C) on 8 December
Saint-Lô, <i>France</i>	(14.9° F, -9.5° C) on 6 December
Orange, <i>France</i>	(14.9° F, -9.5° C) on 10 December
<i>Ibid.</i>	(15.1° F, -9.4° C) on 13 February
Paris, <i>France</i>	(15.3° F, -9.3° C) on 8 and 11 December
<i>Ibid.</i>	(10.8° F, -11.8° C) on 21 February

The Seine River did not freeze this winter. But the Saône River froze in December, and the Loire River in *France* came to a halt. In *Germany*, the Neckar River froze on 13 February in some places. The Rhine River also began to drift ice. In *England*, on the banks of the River Thames, wild birds, gulls, etc., appeared as a precursor of a severe winter ahead. On 9 December, the Serpentine Lake in Hyde Park [in London] was frozen and thousands of skaters ventured out onto the 38 mm (1.5 inch) thick ice. Immense amounts of snow fell over a large part of *Europe*. The Ardennes, the Vosges, the Jura, the Alps, the Cévennes, the mountains of the Auvergne and the Pyrenees had a layer of snow cover three times as thick as ordinary winters. [The Ardennes Mountains are located in the Ardennes region in northeastern France. The Vosges Mountains are in northeastern France. The Jura Mountains are in east-central France. The Alps are in southeastern France. The Cévennes Mountains are in south-central France.] Also almost all

the roads in the south were full of snow and the transportation links were interrupted at many points. In Marseilles, *France*, 0.50 meters (1.6 feet) of snow fell in 36 hours, and in Pau 0.30 meters (1.0 feet) of snow fell. The railways at Harze, *Belgium* and in Schlesien, [now within *Poland*] and also the one from Leipzig / Magdeburg, *Germany* and the one from Dresden, *Germany* were covered with snow 7 meters (23 feet) deep. [Schlesien is the German name for Silesia.] In Upper Silesia, the houses were buried under snow along with their residents. The coast of southern *Spain*, from Estepona to Tarifa was covered with snow. The mountains in Tetuan showed the same phenomenon. [Tetuan now Tétouan is located in northern *Morocco*, a few miles south of the Strait of Gibraltar. To the south and west of the city, there are mountains.]<sup>62</sup>

Numerous accidents were reported during this winter. In Drôme in southeastern *France* in January, six men and twelve horses were buried under the snow. On the way from Le Puy after Nîmes in southern *France*, five men and twenty horses met the same fate. In Fos (Midi-Pyrénées, *France*), eight men and nine mules also came to the same fate in January. Several people died on the roads, among others, a soldier on the way from Lodève after Le Caylar in southern *France*. In Marseille, a little boy froze to death after falling asleep in a boat. In Turin, *Italy* during the night of 6/7 December, several sentries froze to death in their sentry posts. In *Sweden*, near Gefle, 11 people froze to death within eight days. The cold damaged the vines in the Upper and Lower Rhine, but in the rest of *France*, the plants were protected by snow cover.<sup>62</sup>

The winter of 1844-45 [in *England*] was remarkable for the long duration of cold weather. The whole of December was very cold, January not so severe, but still cold; February singularly cold, and the frost so severe in March that on Good Friday (March 21) the boats, which had been frost bound for weeks in the canals, were still locked tightly in ice.<sup>70</sup>

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#### 1845 A.D. – 1851 A.D. Ireland. Famine

[There was a great famine in *Ireland* that was caused less by the weather, but by blight, and the heavy reliance on a single crop, the potato. In 1845 a pestilential blight of unexampled severity caused the whole potato crop to rot. Three-fourths of the population of the island was entirely dependent of upon this staple for food at that time. The resulting suffering can scarcely be imagined. In March and April 1847, 2,500 died weekly in the workhouses alone. Thousands of starving peasants poured into *England*, many dying of famine fever while on board of emigrant ships. The total death toll was between 200,000 and 300,000. Owing to death and emigration, the population of the island was reduced from 8,300,000 in 1845 to 6,600,000 six years later in 1851.<sup>84</sup>]

In *Ireland* in 1845 there was a famine. The government expended 850,000*l.* in relief of sufferers.<sup>57, 91</sup>

In August 1846, a large and influential meeting, at which the Mayor presided, was held in Sydney, *Australia* to take measures for collecting subscriptions to relieve the famine then prevailing in *Ireland* and *Scotland*, in consequence of the failure of the crops in those countries. Similar meetings were held in various parts of the colony of New South Wales, and large sums were subscribed for that benevolent purpose.<sup>103</sup>

In *Ireland* during 1846-47, there was a great potato famine. Parliament advanced nearly 10,000,000*l.* About 275,000 persons are supposed to have perished. The famine on the whole lasted nearly six years. The population was reduced by about 2,500,000. The immigration to America was 1,180,409. There were 1,029,552 people who died from starvation and pestilence consequent upon it. This is probably overstated. It is further said that about 25% of the immigrants died within twelve months of leaving. The Commerce and Navigation Laws were repealed.<sup>57, 91</sup>



One of the most devastating of all famines occurred in 1846-47 in *Ireland*, when in consequence of the failure of the potato crop, over one million people perished of starvation, and the epidemic which was occasioned by the famine.<sup>155</sup>

In the Irish Potato Famine of 1845-46 about one million people, that is around 12% of *Ireland's* population at the time, perished from famine.<sup>151</sup>

The great Irish famine of 1846-47 was terrible in its severity. In the summer of 1845, the symptoms of the disease in the potato crop, which formed the staple food of the people of *Ireland*, became general and alarming. The heavy rains which swamped the country, seemed to increase the blight. The real horrors of the famine did not commence until the failure of the potato crop in the autumn of 1846. Deaths caused by the famine are estimated at upwards of a half million between 1846-50.<sup>188</sup>

In 1846-49, there was a great famine in *Ireland*. There were no less than 130 poorhouses in Ireland. Some contained 1,000 to 2,000 souls. "When the famine advanced, when funds decreased, when the doors were besieged by imploring applicants, who wanted a place to die, that they might be buried in a coffin, they were little else than charnel houses, while the living, shivering skeletons that squatted upon the floors, or stood with arms folded against the wall, half-clad, with hair uncombed, hands and face unwashed, added a horror if not terror to the sight." When the potato crops failed, people relied on turnips for food. The tops had to be cooked but the bottoms were taken raw. Some relied on nettles and chickweed as miserable substitutes for food. The government handed out black bread. "But it is much to be doubted whether the government, had they been served with a loaf of that bread, would have ordered it for either man or beast." The bread was sour, black, and with the consistency of liver. It was the color of peat. "Some twenty-nine years before, the government had deposited in that region some continental material for bread, which had become damaged, and then could not be sold." This became the main ingredient of black bread.<sup>184</sup>

[Ireland was in a state of turmoil long before the Great Potato Famine struck. The wealthy landowners employed cruel agents to collect the rents on their properties. The peasant farmers were barely surviving and unable to set aside anything for a time of want. When the famine struck, and they were no longer capable of paying their rents, the agent would appear and set their home on fire or by other means destroy them. This deprived the family of both shelter and fire (Fire for warmth and to cook their meager meals). This turned the population into wandering nomads that would take shelter in a ditches along the side of the road. Being cold, starving, sick and nearly naked, there they died by the tens of thousands.]

In the second year of the famine in *Ireland*, Mrs. Nicholson passed a corpse lying against a corner of a wall. The man [an agent for the landowner] had been killed by a tenant. Her coachman said it was good. This shocked her and she asked him why. "Why lady, he was the greatest blackguard that ever walked the airth [earth]; he was agent to a gentleman, and he showed no mercy to a poor man that was toilin' [toiling] for the potato; but as soon as the famine was sore on the cratures [creatures], he drove every one into the blake staurm [black storm?] that could not give the rent, and many's the poor bein' [being] that died with starvation, without the shelter; and wouldn't ye think that such a hard-hearted villain better be dead, that to live and kill so many poor women and helpless children, as would be wanderin' [wandering] in the black mountains this winter, if he should live to drive 'em [them] there." <sup>184</sup>

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**1845 A.D.** In *China*, there were great floods. "Along the shores of the Yellow Sea, the phenomenon took the character of a second deluge; whole provinces being submerged."<sup>47, 92</sup> [Yellow Sea is located between mainland *China* and the *Korean Peninsula*.]

In 1845 during the period between 5 July and 2 August, floods struck Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing, Ch'ing and Yüeh-t'ing; Chekiang (now Zhejiang province) on



the east coast of *China* at Chin-yün, Yün-ho and Wên-ling; and Hupeh (now Hubei province) in central *China* at Kung-an. During the same time period (5 July and 2 August), a drought engulfed Chekiang province at Ch'ing-t'ien. During the period between 3 August and 1 September, a drought engulfed Chekiang province at Chin-yün and Yün-ho.<sup>153</sup>

In May 1845 in *Ireland*, there were hail showers of more than ordinary weight.

A great drought struck Northern Ohio in the *United States* in 1845. Mr. Seabury Ford describes the drought as follows:<sup>115</sup>

“The district of country which suffered the most was about 100 miles in length and 50 or 60 in width, extending nearly east and west parallel with Lake Erie, and in some places directly bordering on the shore of this great inland sea. There was no rain from the last of March or the first of April until the 10<sup>th</sup> of June, when there fell a little rain for one day, but no more until the 2<sup>nd</sup> of July, when there probably fell half an inch, as it made the roads a little muddy. From this time no more rain fell until early in September. This long-continued drought reduced the streams of water to mere rills, and many springs and wells heretofore unfailing became dry, or nearly so. The grass crop entirely failed, and through several counties the pasture grounds in places were so dry that in walking across them the dust would rise under the feet, as in the highways. So dry was the grass in meadows that fires, when accidentally kindled, would run over them as over a stubble field, and great caution was required to prevent damage from them. The crop of oats and corn was nearly destroyed. Many fields of wheat so perished that no attempt was made to harvest them. Scions set in the nursery dried up for lack of sap in the stocks, and many of the forest trees withered, and all shed their leaves much earlier than usual. The health of the inhabitants was not materially affected, although much sickness was anticipated. Grasshoppers were multiplied exceedingly in many places, and destroyed every green thing that the drought had spared, even to the thistles and elder tops by the roadside.”

“The late frosts and cold drying winds of the spring months cut off nearly all the fruit, and what few apples remained were defective at the core and decayed soon after being gathered in the fall. Many of the farmers sowed fields of turnips in August and September, hoping to raise winter food for their cattle, but the seed generally failed to vegetate for lack of moisture. So great was the scarcity of food for the domestic animals that early in autumn large droves of cattle were sent into the valley of the Sciota [Scioto], where the crops were more abundant, to pass the winter, while others were sent eastward into the borders of Pennsylvania. This region of country abounds in grasses, and one of the staple commodities is the produce of the dairy. Many stocks of dairy cows were broken up and dispersed, selling for only four or five dollars a head, as the cost of wintering would be more than their worth in the spring. Such great losses and suffering from the effects of drought have not been experienced in that portion of Ohio for many years, if at all since the settlement of the country.”

In 1845 in *France*, the losses from hailstorms for the year were estimated at £2,000,000. [In today's currency, that would be the equivalent of £161,000,000 or \$262,000,000 U.S. dollars using the retail price index.]<sup>93</sup>

On 19 August 1845, a tornado ripped through northern *France*. At Rouen it tore up 180 trees, twisting and wrenching nearly all of them and destroyed a factory-drying house. In a valley near Malaunay and Monville [Montville], it broke off the trees in a forest near ground level. It destroyed three spinning mills and the working people within them. The width of the tornado was 715 feet [218 meters] at Malaunay; 995 feet [303 meters] in the middle of the tornado path of destruction; and 195 feet [59 meters] near Clères, where the cloud disappeared.<sup>205</sup>

On 17 December 1845, there was a great flood in Ipswich in Queensland, *Australia*.<sup>103</sup>

In 1845, there was a minor famine in Bombay [now Mumbai, *India*].<sup>179</sup>

*Also refer to the section 1843 A.D. – 1845 A.D. for information on the drought in Australia during that timeframe. Also refer to the section 1845 A.D. – 1851 A.D. for information on the famine in Ireland during that timeframe.*

**Winter of 1845 / 1846 A.D.** A New Orleans, Louisiana newspaper of 8 December said the Mississippi River in the *United States* was frozen, the temperature was 23° F (-5° C), and individuals were skating on the river. On 8 December, the Ohio River was frozen over at Pittsburg, Pennsylvania; Cincinnati, Ohio; and Wheeling, West Virginia. As early as November 30, the Wabash River was frozen at Vincennes, Indiana. In Kentucky, the temperature was -2° F (-19° C) on 3 December 1845. At St. Louis, Missouri, the temperature was -5° F (-21° C) and snow was a foot deep. This was the case of many western states. Snow was about a foot deep in Pennsylvania, New York, Connecticut and through the New England states. In Canada, eighteen to twenty-four inches (46-61 centimeters) of snow had fallen. In many parts of *Upper Canada*, the snow was blown into banks fifteen feet (4.6 meters) high and the temperature was -13° F (-25° C). At Albany, Saratoga and Utica, New York, the temperature on 11 December was -10° F (-23° C) and the temperature at Franconia, New Hampshire was -33° F (-36° C).<sup>1</sup>

In the *United States* during the winter of 1845-46, the temperature at Washington D.C. fell to -6° F in December.<sup>126</sup>

In March 1846, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 1<sup>st</sup> (32° F); 3<sup>rd</sup> (26° F); 4<sup>th</sup> (22° F). There was frost on March 11<sup>th</sup>, 22<sup>nd</sup>, and 31<sup>st</sup>. It snowed on March 2<sup>nd</sup>.<sup>116</sup>

**1846 A.D.** On 14 & 15 March 1846, a great flood of the Susquehanna River struck Bradford County, Pennsylvania in the *United States*. The rise was very sudden. Never within the memory of the oldest inhabitants has the Susquehanna been so high at Towanda as it was on Saturday and Sunday. Most bridges on the Susquehanna were either swept away or badly damaged, including the following: Lanesboro [PA], Great Bend [PA], Binghamton [N.Y.], Burlington [PA], Smithboro [N.Y.], Catawissa [PA], Danville [PA], Northumberland [PA], Clark's Ferry [PA] and Harrisburg [PA].<sup>178</sup>

On 18 March 1846 in *Ireland*, there was a great hailstorm in Waterford.<sup>93</sup>

Towards the end of March 1846, the melting snow and ice produced a freshet [flood] in several rivers and streams in New Hampshire and Maine in the *United States*.<sup>199</sup>

— On 26 March, a dam washed away at Somersworth, New Hampshire. On the same day, the railroad bridge over the river at Saco, Maine was damaged. On the Androscoggin River, the village of Livermore Falls, Maine was almost entirely swept away. Seventeen stores and houses floated downstream. The Kennebec River flooded the lower and central parts of Hallowell, Maine. The Kennebec River rose very rapidly at Gardiner, Maine and broke up the ice which was 2 feet [0.6 meters] thick driving it into the lower streets of the town, flooding cellars and carrying away several storehouses, barns and other buildings.

— The flood of the Penobscot River caused great destruction of property, which was caused by ice dams. Below the town of Orono, Maine at a place called the Basin, a block of 17 mills was destroyed. In the northern part of Bangor, Maine, an ice jam seriously threatened 21 sawmills and a large number of clapboard-, shingle-, and lath-mills. But the ice gave way and the threat was averted.

— The Franklin Bridge over the Kenduskeag River was carried away along with parts of the Smith's Bridge, and the Kenduskeag Bridge.

— [In Bangor, Maine], the water inundated the lower part of town, including the whole of Market Square, the Broad, Wall and Exchange Streets and a large portion of Maine Street to a depth of several feet. The water rose quickly – five feet [1.5 meters] in five minutes and as a result people in the square

had to wade through water 3 feet [0.9 meters] deep to reach the safety of higher ground. A temporary ferry was set up between Hammond Street near the City Hall and State Street near Exchange Street. Smith's block, including the post office was submerged almost to the tops of doors. The same was the case for the stores on Market Square. The floodwater was nearly up to the windows in the Exchange. The water was several feet deep in front of the old Hatch Tavern. The lumber dealers suffered most of the loss. The wharves were covered with millions of feet of valuable lumber, which was worth hundred of thousands of dollars. The greater part of this lumber were carried away and lost. The ice and the lumber combined with the wrecks of 44 sawmills and shingle and lath mills, and floating storehouses rushed downstream and demolished the Penobscot Bridge. Three persons drowned in the flood. After the flood, great sheets of ice were piled in some places to a height of 25 feet [7.6 meters].

On 24 June 1846 in *Ireland*, there was a great hailstorm in the northwest districts.<sup>93</sup>

In 1846, there was a severe drought in Iowa in the *United States*. "I recollect very well the dry season of 1846, which took all the surface water of Iowa away, so far as I knew it. The surface at the time was devoid of water to such an extent that none was to be had from wells, springs or streams for cattle and other stock, except in the channels of the largest streams of the State, the Des Moines, Iowa and Cedar rivers were at that time, but I can state for the Iowa river that all the water running in its channel during that summer passed through a hole two feet square in the penstock of what was called the Company Mills, about two miles and a half above Iowa City. Not a drop of water fell during that season in our part of the country from April to November, and during all this time the weather was extremely hot. The stock of the country had to be herded along streams where water could be had for their sustenance. Plowing fields and breaking prairie had to be given up for that season, and in many cases farmers were compelled to haul water in barrels long distances, in order to sustain themselves in their homes. The drouth [drought] from which we suffered in 1846 had begun in other parts of the *United States* one or two years previously. Two years before the New England region suffered severely, and during the years before the northern part of Ohio suffered so severely that the people along and on the southern border of Lake Erie were obligated to emigrate, for it was impossible to obtain water either for domestic or stock uses throughout a very large region of the country."<sup>111</sup>

The temperature of the summer of 1846 was very remarkable. *France, Belgium and England* suffered from the extreme heat. The summer in Paris, *France* was characterized by:

Hot days	48 days
Very hot days	9 days
Extremely hot day	2 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Toulouse, <i>France</i>	(104.0° F, 40.0° C) on 7 July
Quimper, <i>France</i>	(100.4° F, 38.0° C) on 19 June
Rouen, <i>France</i>	( 98.2° F, 36.8° C) on 5 July
Paris, <i>France</i>	( 97.7° F, 36.5° C) on 5 July
Orange, <i>France</i>	( 97.7° F, 36.5° C) on 13 July
Angers, <i>France</i>	( 95.0° F, 35.0° C) on 29 July
Metz, <i>France</i>	( 94.6° F, 34.8° C) on 1 August
Pau, <i>France</i>	( 92.1° F, 33.4° C) on 6 July
Görsdorf, <i>Germany</i>	( 88.9° F, 31.6° C) on 1 August
Geneva, <i>Switzerland</i>	( 88.9° F, 31.6° C) on 14 July
La Chapelle, <i>France</i>	( 88.5° F, 31.4° C) on 5 July
Saint-Lô, <i>France</i>	( 87.6° F, 30.9° C) on 6 June
Brussels, <i>Belgium</i>	( 87.1° F, 30.6° C) on 27 June
Dijon, <i>France</i>	( 86.4° F, 30.2° C) on 31 June
Rodez, <i>France</i>	( 82.4° F, 28.0° C) on 21 June

Krakow, *Poland*

( 82.2° F, 27.9° C) on 10 July

In Rouen, *France*, the summer of 1846 was very warm and the thermometer rose to a height that is rarely seen in that region. In *Brittany* accidents were reported at the market in Pont de Croix where several people fainted from the heat. In Beuzec, *France*, a little girl who had been left carelessly exposed to the sun for a few minutes died from the heat. In June, the temperature in Toulouse, Toulon and Bordeaux was extremely hot. In Landes, *France* there was a second harvest of rye. In the neighborhood of Niort, *France* in early July, three workers died in the fields.<sup>62</sup> [Rouen is in northern *France*. Beuzec is in northwestern *France*. Toulouse, Toulon and Landes are in southwestern *France*. Bordeaux and Niort are in western *France*.]

In 1846, there was a fall of red dust near Lyons in east-central *France*. It was estimated that the quantity of dust that fell was equal to 7,200 quintals [1.6 million pounds, 720,000 kilograms] spread out over 400 square miles [1,036 square kilometers]. The dust was analyzed and found to be composed of sand, clay, organic substances and infusoria. The infusoria was composed of animalcula, similar to miniature worms. [Other red dust fall specimens were collected on the Atlantic Ocean, Europe, Asia Minor and Syria. The infusoria matched that observed in the Lyons fall. The soil in different parts of Africa and South America were analyzed, and the animalcula appeared to match the area near the Orinoco and Amazon Rivers.]<sup>205</sup>

On 1 August 1846, there was a great rain and hailstorm that visited various parts of *England*. Upwards of 7,000 panes of glass were broken at the Houses of Parliament; 300 at the Police Office, Scotland Yard; other buildings in the Metropolis suffered severely. The glass in the Picture Gallery at Buckingham Palace was totally destroyed, and the apartment flooded.<sup>93</sup>

On 7-8 September 1846, a hurricane struck offshore Virginia in the *United States*. Several vessels were lost.<sup>141</sup>

In Burgundy, *France*, the grape harvest began on 14 September. The grape harvest only provided half a normal crop; but the wine produced was of very excellent quality. The cereal harvest was far from that of an average year.<sup>62</sup>

On 10-11 October 1846, a hurricane struck western *Cuba*, the Florida Keys in the *United States* and Cayman Islands in the *Caribbean* causing more than 164 deaths.<sup>141</sup>

On 22 October 1846, there were overwhelming inundations in the center, west and southwest of *France*; numerous bridges, with the viaduct of the Orleans and Vierzon Railway swept away. The latter had cost 6 million francs [140,000*l.*] to build. [The viaduct of the Orleans and Vierzon Railway is located in north-central *France*.] The Loire River rose 20 feet [6.1 meters] in one night. The total destruction was estimated at 4,000,000*l.* Sterling.<sup>47, 90, 92</sup>

In 1846, parts of *Germany* were in a state of famine.<sup>155</sup>

In 1846 in *Belgium*, there was a severe famine. But the people were relieved with supplies from neighboring countries.<sup>57, 91</sup>

On 11-13 October, a strong hurricane traveled up the Gulf of Mexico. It struck Havana *Cuba* and Key West, Florida in the *United States* causing an immense amount of damage both on land and sea.<sup>1</sup>

The four famines of 1810, 1811, 1846, and 1849 in *China* are said to have taken a toll of not less than 45,000,000 lives.<sup>84</sup>

In 1846 during the period between 27 January and 25 February, the Laun River flooded in Hopei (now Hebei province) in northern *China*. During the period between 25 May and 23 June, floods struck Hupeh (now Hubei province) in central *China* at Chih-chiang and Kiangsu (now Jiangsu province) on the east coast of *China* at Ch'ing-p'u. At Ch'ing-p'u, several thousand families were flooded. During the period between 23 July and 21 August, the Wên River flooded in Shantung (now Shandong province) on the east coast of *China* and in Hopei province at Ch'ing. The floods along the Wên River damaged the dikes. Also during the period between 23 July and 21 August, a severe drought engulfed Shensi (now Shaanxi province) in central *China* at Lan-t'ien and San-yüan.<sup>153</sup>

*Also refer to the section 1845 A.D. – 1851 A.D. for information on the famine in Ireland during that timeframe.*

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**Winter of 1846 / 1847 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1846 occurred on 25 November. A hard snowstorm all day.<sup>116</sup>

On the night of 26 November 1846, the steamer *Atlantic* on her passage from New London, Connecticut for New York with eighty persons on board, was overtaken by a violent storm and gale in Long Island Sound by which she was wrecked and stove to pieces on Fisher's Island, near the eastern end of Long Island, New York in the *United States*, whereby forty persons (men, women and children) perished.<sup>1</sup>

In March 1847, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 17<sup>th</sup> (30° F) (Manokin River frozen over). There was frost on March 6<sup>th</sup>, 15<sup>th</sup>, and 19<sup>th</sup>. It snowed on March 13<sup>th</sup> and 27<sup>th</sup>.<sup>116</sup>

This winter was very long in *France*, and severe in *Provence*, *Switzerland* and *Spain*. In *Poland*, the frost began to in October. In Paris, *France*, there was 60 days of frost, but only 10 were successive. The frost in Paris began on 12 November and lasted until 17 November when it began to thaw in the middle of the day. The frost began again on 2 December. On 3 December the thermometer sank to 22.3° F (-5.4° C). It thawed from 5 to 8 December. On 8 December, the frost returned and lasted until 19 December. On the 19<sup>th</sup> the temperature was 5.5° F (-14.7° C). The 19<sup>th</sup> of December was the only day this winter, when a cold was intense. The next period of thaw lasted from 19 to 24 December. The next period of frost lasted from 24 December until 3 January. The thaw this time lasted from 3 to 9 January. The next period of frost lasted from 10 to 15 January. The Seine River did not freeze but during the spring thaw the river swelled. On 27 December, at the bridge Pont de la Tournelle in central *France*, the river rose to 4.6 meters (15.1 feet) and flooded the low levels of Paris.<sup>62</sup>

Beginning on 13 December, the winter in Marseille, *France* was very severe and the violent northwest winds made walking very difficult. Throughout the South of *France* and *Spain* significant amounts of snow fell. In Victoria, *Spain*, 0.70 meters (2.3 feet) of snow was measured, and the thermometer sank to 11.7° F (-11.3° C). All roads in the east of the peninsula were full of snow. The water birds of the north appear in Barcelona, *Spain*. In Pontarlier, *France*, the temperature fell to -24.3° F (-31.3° C) and the birds of the field could be picked up with one's hands. This winter was very mild in St. Petersburg, *Russia*; where they only received an extreme amount of snow. The *United States* experienced very severe cold. The observed temperatures at different locations are:<sup>62</sup>

Pontarlier, <i>France</i>	(-24.3° F, -31.3° C) on 14 December
Le Locle, <i>Switzerland</i>	(-19.3° F, -28.5° C) on 14 December
Geneva, <i>Switzerland</i>	( -1.8° F, -18.8° C) on 14 December
Bern (Berne), <i>Switzerland</i>	( -1.8° F, -18.8° C) on 14 December
Zurich, <i>Switzerland</i>	( -1.8° F, -18.8° C) on 14 December
Rodez, <i>France</i>	( 5.0° F, -15.0° C) on 19 December
Paris, <i>France</i>	( 5.5° F, -14.7° C) on 19 December
<i>Ibid.</i>	( 17.8° F, -7.9° C) on 1 January



Wörsdorf, <i>Germany</i>	( 6.8° F, -14.0° C) on 6 December
Krakow, <i>Poland</i>	( 8.1° F, -13.3° C) on 15 December
<i>Ibid.</i>	( 7.7° F, -13.5° C) on 13 February
Dijon, <i>France</i>	( 9.7° F, -12.4° C) on 14 December
<i>Ibid.</i>	( 9.0° F, -12.8° C) on 12 February
Brussels, <i>Belgium</i>	( 9.3° F, -12.6° C) on 18 December
Victoria, <i>Spain</i>	( 11.7° F, -11.3° C) on 13 December
Metz, <i>France</i>	( 14.0° F, -10.0° C) on 1 January
Cambray (Cambrai), <i>France</i>	( 14.0° F, -10.0° C) on 1 January
Pau, <i>France</i>	( 14.0° F, -10.0° C) on 31 December
<i>Ibid.</i>	( 15.6° F, -9.1° C) on 2 January
Versailles, <i>France</i>	( 15.1° F, -9.4° C) on 31 December
Rouen, <i>France</i>	( 15.4° F, -9.2° C) on 30 December
Orange, <i>France</i>	( 16.3° F, -8.7° C) on 14 December
Saint-Lô, <i>France</i>	( 16.5° F, -8.6° C) on 31 December
La Chapelle (near Dieppe), <i>France</i>	( 17.4° F, -8.1° C) on 11 March
Toulouse, <i>France</i>	( 19.8° F, -6.8° C) on 14 February
Bordeaux, <i>France</i>	( 20.3° F, -6.5° C) on 3 December
<i>Ibid.</i>	( 19.8° F, -6.8° C) on 1 January
Draguignan, <i>France</i>	( 23.0° F, -5.0° C) in December
Cannes, <i>France</i>	( 26.6° F, -3.0° C) on 18 December
Marseille, <i>France</i>	( 26.6° F, -3.0° C) on 19 December
<i>Ibid.</i>	( 27.3° F, -2.6° C) on 12 March

#### 1847 A.D. – 1860 A.D. Australia. Drought

During this period 1847-59, a series of severe droughts took place in New South Wales, *Australia*.<sup>101</sup>

From 1854-59, the Adelaide area of *Australia*, suffered a long dry period according to rainfall records.<sup>101</sup> By November 1857, there was a drought in the region of Longford and to its east in Tasmania, *Australia*. The drought caused considerable damage to fruit due to lack of moisture and also widespread bushfires. Rain when it did fall in February 1858 was too late to repair the effects of a long and oppressive drought.<sup>99</sup>

In New South Wales, *Australia*, there was a drought from July 1847 to January 1848. There was a dreadfully dry December.<sup>103</sup>

In New South Wales, *Australia* in 1850, there was a drought from August to March.<sup>103</sup>

In New South Wales, *Australia*, the winter of 1849 was dry, and nothing but light showers fell till May 1851, being the severest drought remembered, and most serious in its consequences. This drought was confined to the western slopes, and was so severe that large quantities of livestock perished from thirst.<sup>103</sup>

On 1 March 1853, there was a tremendous dust storm and hot wind at Melbourne, *Australia*.<sup>103</sup>

In New South Wales, *Australia* on 18 August 1854, a strong drought had taken hold of the area. As a consequence, people fasted on account of the drought from September to January 1855.<sup>103</sup>

In New South Wales, *Australia*, there was a drought from October 1857 to February, 1858.<sup>103</sup>

In Queensland, *Australia* in 1858, there was a very serious drought. Lake Gracemere (Rockhampton) was dry.<sup>103</sup>

On 1 November 1847 on the Paterson River in New South Wales, *Australia*, the temperature was 127° F



(52.8° C) in the sun. On 1 January 1848 on the Paterson River, the temperature was 129° F (53.9° C) in the sun and 108° F (42.2° C) in the shade. On 3 January 1848 on the Paterson River, the temperature was 109° F (42.8° C) in the shade.<sup>103</sup>

In 1856 in *Western Australia*, the drought conditions caused sheep farmers to lose half their lambs.<sup>101</sup>

In 1854 in Victoria, *Australia*, there was a severe drought in the Maryborough district. In 1857-58 in Victoria, *Australia*, the hot winds and drought caused a loss of 209,000 bushels of wheat.<sup>101</sup>

In 1858 in Queensland, *Australia*, there was a drought in Richmond and Barcoo districts.<sup>101</sup>

In 1851, there was a drought in the eastern district of *South Australia*. There was a severe scarcity of water and feed for livestock. During 1858-60 in *South Australia*, livestock almost starved because of the drought.<sup>101</sup>

In 1860 in *Western Australia*, there was a drought.<sup>101</sup>

On 6 February 1851 in *Australia*, there was a great bushfire later known as *Black Thursday*. At its peak the bushfires raged from Barwon Heads in Victoria to Mount Gambier in South Australia. The smoke and haze from this fire spread as far as Tasmania, *Australia*. At 11 A.M. the temperature measured in the shade at Melbourne was 117° F (47° C). Ten people were known to have died during this bushfire and many settlements were totally destroyed.<sup>101</sup>

After five weeks of hot northerly winds, on 6 February 1851, a bushfire, later known as *Black Thursday*, began in Victoria, *Australia*. This was most likely Victoria's most extensive bushfires. The fire apparently started in the Plenty Ranges when two bullock drivers left some logs burning which set fire to long, drought-parched grass. From an early hour in the morning a hot wind blew from the north-northwest, accompanied by 117° F (47° C) temperatures in Melbourne. There was extensive damage in Victoria's Port Phillip district.<sup>99</sup>

Huge areas of southern and northeast Victoria were burnt out. Fires burnt from Mt Gambier in South Australia to Portland in Victoria as well as the Wimmera in the north and central and southern areas including Semour, the Plenty Ranges and much of Gippsland, Westernport, Geelong, Heidelberg and east to Diamond Creek and Dandenong; where a number of settlements were destroyed. One settler lost his wife, five children, his home and 1,100 sheep. Although approximately 1,300 buildings were destroyed, only about 100 people were left homeless. However, over one million sheep and thousands of cattle were lost.<sup>99</sup>

There were 3.7 million acres (1.5 million hectares) of forest burnt out plus vast areas of scrub and grasslands. The total land area burnt was approximately 12.4 million acres (5 million hectares). Farmers at Barrabool Hills were burnt out or ruined; three men perished at Mount Macedon and wholesale destruction of the Dandenong region was caused by similar widespread razings from Gippsland to the Murray (River). Other scorched areas included Omeo, Mansfield, Dromana, Yarra Glen, Warburton and Erica.<sup>99</sup>

In 1854, there was a bushfire in Tasmania, *Australia*. The bushfires struck in the vicinity of Port Cygnet, Lymington and Huon. Three deaths were reported with about 10 people sustaining injuries. Some houses were destroyed.<sup>99</sup>

In 1851 [1854?] in *Australia*, there was a serious brushfire in Van Diemen's Land (now Tasmania).<sup>101</sup>

**1847 A.D.** The summer of 1847 was average in Paris, *France*. In the south, summer began early. The summer in *Italy* and *Spain* to *Gibraltar* and in *Ireland* was glorious. This caused the agriculture crops to produce a high yield by mid-year and as a consequence, food became very inexpensive. The summer in Paris, *France* was characterized by:

Hot days	39 days
Very hot days	1 day
Extremely hot day	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Toulouse, <i>France</i>	(100.8° F, 38.2° C)	on 16 July
Angers, <i>France</i>	(100.4° F, 38.0° C)	on 17 July
Orange, <i>France</i>	( 99.5° F, 37.5° C)	on 11 July
Břeží, <i>Czech Republic</i>	( 98.6° F, 37.0° C)	
Bordeaux, <i>France</i>	( 96.4° F, 35.8° C)	on 17 July
Versailles, <i>France</i>	( 95.9° F, 35.5° C)	on 17 July
Paris, <i>France</i>	( 95.2° F, 35.1° C)	on 17 July
Constantinople (Istanbul), <i>Turkey</i>	( 92.1° F, 33.4° C)	on 7 August
Dijon, <i>France</i>	( 91.8° F, 33.2° C)	on 18 July
Metz, <i>France</i>	( 91.8° F, 33.2° C)	on 18 July
Pau, <i>France</i>	( 91.4° F, 33.0° C)	on 16 July
Rouen, <i>France</i>	( 91.0° F, 32.8° C)	on 17 July
Geneva, <i>Switzerland</i>	( 90.3° F, 32.4° C)	on 18 July
Brussels, <i>Belgium</i>	( 89.8° F, 32.1° C)	on 17 July
Marseille, <i>France</i>	( 89.4° F, 31.9° C)	on 15 July
Görsdorf (Storkow), <i>Germany</i>	( 88.5° F, 31.4° C)	on 18 July
Rodez, <i>France</i>	( 88.3° F, 31.3° C)	on 16 July
Cambray (Cambrai), <i>France</i>	( 87.8° F, 31.0° C)	on 2 August
La Chapelle, <i>France</i>	( 84.7° F, 29.3° C)	on 23 May
Bourg, <i>France</i>	( 79.0° F, 26.1° C)	in July

In *France*, the wheat harvest produced a very high yield, an enormous number of 20,913,041 hectoliters (59,346,170 bushels) in excess of French needs [export]. In Burgundy, the grape harvest began on 4 October. The grapes were plentiful but of wine produced was of poor quality.<sup>62</sup>

On 11 October 1847, a hurricane struck the *Caribbean* island of Tobago causing 27 deaths.<sup>141</sup>

*Germany* and *France* suffered famines in 1847.<sup>96</sup>

In *France*, there was scarcity. This produced food riots. At Chateauroux in central *France*, a wealthy corn [grain] merchant who defied the mob was set upon and beaten to death.<sup>57</sup>

In 1847, floods struck Hopei (now Hebei province) in northern *China* at Yen-shan. During the period between 6 May and 8 August, a severe drought engulfed Hupeh (now Hubei province) in central *China* at I-ch'êng. During the period between 8 August and 8 November, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui.<sup>153</sup>

*Also refer to the section 1845 A.D. – 1851 A.D. for information on the famine in Ireland during that timeframe. Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

**Winter of 1847 / 1848 A.D.** On 16 December 1847, a storm struck New England in the *United States*. The brig *Falconer*, 360 tons burden, was driven onto a sandy reef about ¾ mile [1.2 kilometers] from the shore and pounded continuously with tremendous waves of icy water. Seventeen of the 53 persons on

board perished, most by exposure rather than drowning. Various craft were wrecked at Cohasset, Nantucket and other places during the storm.<sup>199</sup>

In the *United States* during the winter of 1847-48, the temperature at Dartmouth College (at Hanover, New Hampshire) fell to -34° F in January.<sup>113</sup>

In March 1848, the temperature at Princess Anne, Maryland in the *United States* fell below freezing on the following dates: March 4<sup>th</sup> (31° F); 6<sup>th</sup> (26° F); 15<sup>th</sup> (26° F); 16<sup>th</sup> (22° F); 17<sup>th</sup> (30° F). There was a frost on March 25<sup>th</sup>.<sup>116</sup>

**1848 A.D.** In Inverness, *Scotland*, there was a great overflow of the River Ness, which swept away the old bridge and did other damage.<sup>47, 92</sup>

On 7 April 1848, the vessels *Georgina* and *Spy* were driven ashore near Hobart, *Australia*, during a gale. Three people were drowned.<sup>99</sup>

The maximum temperature during the summer in St. Bernard, *Switzerland* was 64.0° F (17.8° C) on 23 July.<sup>62</sup>

On 23 July 1848, a terrible storm of hail and rain struck Bradford County, Pennsylvania in the *United States*. The memory of the oldest inhabitant goes not back to anything equaling it in violence. Some of the hailstones measured 1½ inches [4 cm] in diameter. In Towanda, where it was strongest, there was a general demolition of awnings and gardens were entirely ruined (vegetables looking as if an army of worms had stripped them of their leaves). The storm was about a mile [1.6 km] in width. Fields of fine corn and oats were completely ruined.<sup>178</sup>

In 1848 during the period between 5 February and 6 May, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Wên-chou. During the period between 8 August and 8 November, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ang-p'ing.<sup>153</sup>

In 1848, many regions of *China* experienced flooding including:<sup>153</sup>

— Hupeh (now Hubei province) in central *China* at Sung-tzū, An-lu, Sui, Huang-kang and Pao-k'ang. At Pao-k'ang, houses and fields were damaged by the floodwaters.

— During the period 1-29 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Wuchang, Nan-ch'ang, I-ch'un, P'o-yang, Nan-k'ang, Yün-mêng, Hsien-ning, Huang-p'o, P'u-ch'i and Hanyang; Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-ch'un; Shantung (now Shandong province) on the east coast of *China* at Ling; and Hopei (now Hebei province) in northern *China* at Wu-ch'ing. At Yün-mêng, all the dikes were damaged.

— During the period between 26 January 1848 and 23 January 1849, floods struck Hupeh province at Sui, Ying-shan, Huang-kang, Chiang-ling and Kung-an.

*Also refer to the section 1845 A.D. – 1851 A.D. for information on the famine in Ireland during that timeframe.*

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

**Winter of 1848 / 1849 A.D.** In 1849 in *Norway*, the frost was very severe.<sup>47, 93</sup>

In 1849, the cold in *Sweden*, *Norway* and *Russia* was so severe that great numbers of persons were frozen to death in all those countries.<sup>63</sup>

On 2 January 1849, the frost was so intense in parts of *Norway*, that quicksilver froze and persons exposed to the atmosphere lost their breath.<sup>90</sup>

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1848 occurred on 11 November. Snowed steadily and pretty fast all day. November 20, a very uncommon fall of snow, said to be about 18 inches deep. Sleighs were very thick.<sup>116</sup>

According to the Reporter dated 21 February 1849, the winter of 1848-49 in Bradford County, Pennsylvania in the *United States*: "While most of December was spring like without any snow, the memory the oldest inhabitant is necessary to the recollection of a winter as severe as has been the present. The past winters have been mild and given rise to the belief that old fashioned seasons of snow and ice had passed away. The present, however, knocks the theory into a cocked hat—old Boreas himself could not desire a colder season." Even as late as 18 April 1849, a snowstorm of rare violence for this season of the year struck covering the fields with snow. In some parts of the adjacent country, the snow was a foot [30 cm] deep.<sup>178</sup>

In March 1849, the temperature at Princess Anne, Maryland in the *United States* did not fall below freezing. There was a frost on March 23<sup>rd</sup>.<sup>116</sup>

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**1849 A.D.** On April 16, 1849, at Florence, Alabama in the *United States*, "severe frosts, and vegetation supposed to be all killed."<sup>130</sup>

During the summer of 1849, southern *France* experienced very great heat. The high temperature in Orange was the highest temperature ever observed (in the shade) in *France*. The summer in Paris, *France* was characterized by:

Hot days	32 days
Very hot days	2 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The summer heat began in the south in May and June. The high temperatures observed during the summer were:

Orange, <i>France</i>	(106.5° F, 41.4° C) on 9 July
Toulouse, <i>France</i>	( 99.7° F, 37.6° C) on 23 June
Bordeaux, <i>France</i>	( 94.3° F, 34.6° C) on 7 July
Gent (Ghent), <i>Belgium</i>	( 93.9° F, 34.4° C)
Metz, <i>France</i>	( 92.5° F, 33.6° C) on 8 July
Versailles, <i>France</i>	( 91.9° F, 33.3° C) on 8 July
Dijon, <i>France</i>	( 91.6° F, 33.1° C) on 8 July
Constantinople (Istanbul), <i>Turkey</i>	( 91.4° F, 33.0° C) on 14 June
Rouen, <i>France</i>	( 91.2° F, 32.9° C) on 3 June
Brussels, <i>Belgium</i>	( 91.0° F, 32.8° C) on 9 July
Marseille, <i>France</i>	( 90.1° F, 32.3° C) on 25 June
Geneva, <i>Switzerland</i>	( 90.0° F, 32.2° C) on 12 July
Paris, <i>France</i>	( 89.6° F, 32.0° C) on 1 June
Görsdorf (Storkow), <i>Germany</i>	( 88.5° F, 31.4° C) on 9 July
Cayenne, <i>French Guiana</i>	( 87.3° F, 30.7° C) in October
Angers, <i>France</i>	( 86.9° F, 30.5° C) on 5 June
Rodez, <i>France</i>	( 86.0° F, 30.0° C) on 23 June and 8 August
Cherbourg, <i>France</i>	( 85.8° F, 29.9° C) on 7 July
Bourg, <i>France</i>	( 81.9° F, 27.7° C)

The grain harvest in *France* was much better than an average year. In Burgundy, the grape harvest began on 27 September. The wine produced was of a good quality.<sup>62</sup>

On 6 October 1849, a hurricane struck Massachusetts in the *United States*. One source identifies 143 deaths while another cites 27.<sup>141</sup>

On 7 October 1849, a gale struck New England in the *United States*. The storm did great damage along the shore. A considerable number of vessels were driven ashore or bilged. In Chelsea, Massachusetts, one of the brick walls of Universalist Society Church came crashing down. The brig *St. John* wrecked on Minot's ledge off Cohasset, Massachusetts. One hundred and forty-three men, women and children perished during this wreck.<sup>199</sup>

The four famines of 1810, 1811, 1846, and 1849 in *China* are said to have taken a toll of not less than 45,000,000 lives.<sup>84</sup>

In 1849, many regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 23 April and 21 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chia-hsing and Hu-chou; Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow; and Hupeh (now Hubei province) in central *China* at Ying-shan and Huang-kang. At Ying-shan, innumerable people drowned. At Hu-chou, crops were damaged by the floodwaters.

— During the period between 20 June and 19 July, floods struck Kiangsi (now Jiangxi province) in southern *China* at Hêng-fêng; and Hupeh province at Huang-p'o, Hanyang and along the Man River.

— During the period between 20 July and 17 August, floods struck Hupeh province at Kung-an, Lo-t'ien, Ma-ch'êng, Ch'i-shui, Tzŭ-kuei, I-ch'ang, P'u-ch'i, Hsien-ning, An-lu, Huang-kang and Chih-chiang.

— During the period between 18 August and 16 September, floods struck Shantung (now Shandong province) on the east coast of *China* at Jih-chao; Hupeh province at Ao-ch'êng; and Shensi (now Shaanxi province) in central *China* at San-yüan. At San-yüan, houses and fields were damaged by the floodwaters and many people drowned.

In 1849 during the period between 18 August and 16 September, a severe drought engulfed Kansu (now Gansu province) in northwest *China* at Chuang-lang.<sup>153</sup>

*Also refer to the section 1845 A.D. – 1851 A.D. for information on the famine in Ireland during that timeframe.*

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

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**1850 A.D.** Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>

In *Ireland* in April, there were great floods in County Kerry; bridges destroyed.<sup>47, 92</sup>

On 16 April 1850, "disastrous frosts, which killed vegetation, and even young oak trees, from Tennessee to the Gulf [in the *United States*]." <sup>130</sup>

On 18 April 1850, Dublin, *Ireland* was visited by one of the most terrible hailstorms ever recorded, which was attended with great thunder and lightning. The hailstones were an inch in diameter. "This appears to have been a true whirlwind." A similar storm passed over Mullingar about an hour and a half previously. Property to the value of £27,000 was destroyed in Dublin.<sup>93</sup>

In *France*, the losses in 1850 from hailstorms were estimated at £480,000.<sup>93</sup> [In present currency, that would be equivalent to £43.5 million in damages based on the retail inflation price index.]

In Bradford County, Pennsylvania in the *United States*, a severe storm, which began on 18 July 1850, continued with unabated violence until the 20<sup>th</sup>. In this county the damage was widespread, immense and disastrous. The various tributaries of the Susquehanna River, particularly the Towanda and Sugar Creeks were swollen in a few hours to a greater degree than ever before known. They left along their whole course, painful and powerful evidences of the terrific ability of the element to cause mischief. The

damage was very great at Monroeton and Greenwood, where mills, factories, houses, barns and bridges were swept away and farms cut to pieces. On Sugar Creek the chief destruction was to the milldams and farms along the stream. The Susquehanna River though not as high as it has been previously was still high enough to flood the flats in many places causing the entire destruction of crops.<sup>178</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Ambon Island, <i>Indonesia</i>	( 91.4° F, 33.0° C) on 22 December
Clermont-Ferrand, <i>France</i>	( 90.3° F, 32.4° C) on 5 August
Szczecin, <i>Poland</i>	( 88.3° F, 31.3° C) on 15 August

In *Ireland* in August, there were great floods in Limerick.<sup>47, 92</sup>

On 13 August 1850 in *Ireland*, there was a violent storm with much hail and sleet in Limerick.<sup>93</sup>

On 24 August 1850, a hurricane struck North Carolina in the *United States* and a pilot boat sank.<sup>141</sup>

In *Belgium* in August, there was a calamitous flood.<sup>47, 92</sup>

A fleet of nine vessels laden with cedar & bound for Sydney, *Australia* struck a severe southeasterly squall shortly after they left the Richmond River in New South Wales, *Australia* on 28 September 1850. The *Lucy Ann*, a 36-tons wooden schooner, was lost with 14 lives. Four were rescued when they were found clinging to their overturned vessel. Of the nine schooners which started off, five turned back shortly after sailing. Only one schooner, the *Anna Maria*, reached its destination.<sup>99</sup>

In Khartoum, Egypt (now *Sudan*), “an inundation occurred.”<sup>47, 92</sup>

In 1850 during the period between 13 January and 11 February, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at T’ung-hsiang. Crops were damaged by the floodwaters. Then during the period between 6 May and 8 August, a drought engulfed Chekiang province at Ch’êng; Anhwei (now Anhui province) in eastern *China* at T’ai-p’ing; Shantung (now Shandong province) on the east coast of *China* at Ning-yang; and Kansu (now Gansu province) in northwest *China* at Lanchow. Then during the period 9 July and 7 August, floods struck Shantung province on the east coast of *China* at Tung-p’ing; and Chekiang province on the east coast of *China* at Ch’ing-t’ien. Along the Yellow River, innumerable houses and fields were damaged by the floodwaters.<sup>153</sup>

*Also refer to the section 1845 A.D. – 1851 A.D. for information on the famine in Ireland during that timeframe. Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

**1851 A.D.** On 14 April 1851 a severe storm of rain, hail and snow struck New England in the *United States*. It began the day before in Washington D.C. It reached New York the next morning and New England that afternoon. The storm lasted a week. Wharves were greatly damaged all along the coast of New Hampshire and Massachusetts. A large amount of property was swept into the sea and many vessels were wrecked and many lives were lost. This storm was known as the Lighthouse Storm because it carried away the most advanced lighthouse at Minot’s Ledge near Cohasset, Massachusetts.<sup>199</sup>

— Considerable damage was done inland with trees blown over, roofs torn off and chimneys and buildings blown down. A barn was demolished in Lawrence, Massachusetts. The winds were so strong that it carried a man, his horse and a load of calves into the river as he crossed the Cambridge Bridge. The Lowell bleachery dry house, which was 300 feet [91 meters] long and 3 stories high, was blown down. The railroad depot at Wilmington junction and 2 barns in Tewksbury were demolished. In Danvers, a house and many chimneys were blown down. The steeple of the Baptist Church in Charlestown was blown down killing a man below. The steeple of the Catholic Church at Pawtucket,



Rhode Island was blown down. The Episcopal Church in Boston was moved from its foundation and then blown down by the wind.

— The wind drove the tidewaters across the wharves all along the coast from one to four feet [0.3-1.2 meters] deep. At Provincetown on Cape Cod, Many wharves and salt mills were swept away.

— At Boston, Massachusetts, the water was 3 to 4 feet [0.9-1.2 meters] over the Central and Long wharves. Many houses were flooded. The lower part of Washington Street was flooded 2 feet [0.6 meters] deep. The South Boston Bridge was washed away. The Eastern Railroad Depot was underwater. The Charlestown and Chelsea Bridges were so submerged that they were impassable. The high tidewaters completely breached over Deer Island in the Boston Harbor. Several vessels went ashore on a small island called Pleasant Beach and a number of lives were lost.

— At Salem, Massachusetts, Derby wharf was greatly damaged. Many streets near the harbor and the floors of the lead mills were flooded. Many cellars were filled with water.

— At Beverly, Massachusetts, Water Street was flooded. The sea washed over Tuck's point. A store was carried away by the sea.

— A great flood took place on the Merrimac River [now Merrimack River] at Newburyport, Massachusetts. It was 22 inches [56 centimeters] higher than in December 1839. Warehouses and cellars on the lower side of Water Street were flooded. Many of the wharves were badly damaged. The engine and boiler rooms of the Essex mill were almost filled with water. Workshops and outbuildings were swept away.

— At Newcastle, New Hampshire, the sea broke through the breaches and made an island out of Jaffrey Point.

— Along the coasts, roads and railroad tracks were washed away by the storm. The water was high enough that the fires in locomotives were extinguished.

— During the storm, the sea broke completely over Plum Island, Massachusetts. The brig *Primrose* was driven by the breakers and struck a reef 600 feet [183 meters] offshore. At Rockport, several vessels were damaged. In Salem Harbor, several schooners were driven ashore. At Marblehead, seven vessels were cast ashore and several mariners lost their lives on Marshfield Beach.

In *Ireland*, there were great and destructive floods alike in spring and autumn.<sup>47, 92</sup>

In 1851, there was a severe flood in the Bega and Twofold Bay Region of New South Wales, *Australia*. It cost the lives of 20 people and caused property damage.<sup>99</sup>

In August 1851, there was a great flood in Adelaide, *Australia*. Bridges collapsed. The town of Noarlunga was completely inundated. Two people were killed.<sup>99</sup>

On 18 August 1851, a hurricane struck the *Dominican Republic*. There were many casualties.<sup>141</sup>

On 22 August 1851, a tornado tore through Massachusetts in the *United States*. The path of the tornado passed over Quinsigamond, Wayland, Waltham, West Cambridge [now Arlington], Medford, Malden, Lynn, and Rockport. At Medford, the path of destruction was up to 76 rods [1,300 feet, 380 meters] in width. Great trees were uprooted, twisted, shattered; carried long distances and tossed about like straws. These included oaks, walnuts and maples between 2 and 3 feet [0.6-0.9 meters] in diameter. A great number of houses were damaged, unroofed or completely destroyed. A heavy baggage train car was blown from its tracks and carried for 60 feet [18 meters].<sup>199</sup>

On 12 September 1851, a hurricane struck offshore Virginia in the *United States*. The schooner *Free Trade* was capsized. Nothing was ever heard from the persons on board, and it was feared that they were lost.<sup>141</sup>

The *Marie* was wrecked near Cape Bridgewater, near Portland, *Australia* in mid-September 1851 during a

heavy gale. Twenty-five members of the crew drowned. There were no survivors.<sup>99</sup>

In *France*, the losses in 1851 from hailstorms were estimated at £600,000.<sup>93</sup> [In present currency, that would be equivalent to £55.6 million in damages based on the retail inflation price index.]

In 1851 during the period between 1 February and 2 March, floods struck Shantung (now Shandong province) on the east coast of *China* at Tung-p'ing. During the period between 6 May and 8 August, floods struck Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing. During the period between 8 August and 8 November, floods struck Honan (now Henan province) in central *China* at Ch'in-yang.<sup>153</sup>

*Also refer to the section 1845 A.D. – 1851 A.D. for information on the famine in Ireland during that timeframe.*

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1851 / 1852 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1851 occurred on 27 October. A tedious snowstorm.<sup>116</sup>

The winter of 1851-52 in Bradford County, Pennsylvania in the *United States* was noted for an early November snowstorm. On 25 November 1851, the snow began falling with scarcely a warning and continued until evening, covering the ground with a fleecy mantle to the depth of nearly a foot [30 cm]. On 27 December, the temperature dropped to the range of -24° F to -26° F [-31° C to -32° C] in the county. But by noon the weather moderated and the temperature rose 60 degrees in less than 12 hours. This thaw combined with rain caused the ice in the river to break up and for the Susquehanna River to flood. Lumberman suffered from this unexpected freshet, losing lumber, which had been placed in the river.<sup>178</sup>

In the *United States* during the winter of 1851-52, the temperature at Shelbyville, Indiana fell to -28° F on December 17<sup>th</sup>, then -26° F on January 19<sup>th</sup> and then -28° F on January 20<sup>th</sup>. The temperature at Baton Rouge, Louisiana fell to 8° F in January. The temperature at New Orleans, Louisiana fell to 17° F in January. The temperature at Charleston, South Carolina fell to 16° F in January.<sup>113, 126</sup>

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**1852 A.D.** In Holmfirth, near Huddersfield (York) in northern *England* on February 5th, the reservoir burst, consequent upon a rain flood. Between 90 and 100 persons perished; and property was destroyed of the value of 600,000*l.*, consisting of woolen mills, houses, etc. in the valley.<sup>47, 92</sup> [In present currency, that would be equivalent to £55.2 million in damages based on the retail inflation price index.]

On 4 February 1852, an inundation caused a lamentable catastrophe at Holmfirth, *England*.<sup>90</sup>

In 1852, the Brazos River in Texas in the *United States* flooded. The overflow of 1852 commenced during the latter part of February, and its crest reached the Gulf of Mexico about March 5. Because the overflow occurred early in the season, there was no material damage to crops. The high water mark of 1852 is 2 to 3 feet below that of the flood of 1899, at Allen Farm, Brazos County.<sup>123</sup>

On 19 April 1852, snow in the morning in Florence, Alabama in the *United States*.<sup>130</sup>

In [May 23] 1852, a great flood caused the Barwon River in Victoria, *Australia* to overflow its banks causing heavy damage in the floodplain in the region of Wilsons Promontory.<sup>99</sup>

Gales destroyed several small vessels off the New South Wales coast in *Australia* during June and July 1852. This included the *Highlander*, a 28-ton wooden schooner. The vessel floundered off Cronulla, in Sydney's south, during a gale on 23 June. Eleven members of the crew were lost and eleven were injured. At the same time on 22-23 June 1852, the Murrumbidgee River was at high flood levels at Cavan (near

Yass) in New South Wales.<sup>99</sup>

In 25 June 1852, there was an extreme flood on the Murrumbidgee River, which swept through most of Gundagai and the surrounding countryside in New South Wales, *Australia*. The flood destroyed 60 homes, leaving only three houses damaged but standing. Eighty-nine lives were lost. The death toll represented 36% of the town's population of 250. The entire town was later relocated to a higher and safer location.<sup>99</sup>

On 26 June 1852, there was a great flood at Gundagai in New South Wales, *Australia*. The Valley of the Murrumbidgee was converted into an inland sea; the town of Gundagai was swept away, only seven buildings remaining out of 78, and 89 persons perished out of a population of 250. The waters commenced rising on Thursday night, and did not begin to fall until Saturday morning.<sup>103</sup>

In New South Wales, *Australia*, the winter of 1852 was the wettest known, and then occurred the great flood at Gundagai on June 26, 1852.<sup>103</sup>

On 25 June 1852 in New South Wales, *Australia*, the Murrumbidgee River flooded. In Gundagai, 89 of the 250 inhabitants of the city were swept away and drowned.<sup>101</sup>

The summer of 1852 was remarkably hot in *Russia, England, Holland [now the Netherlands], Belgium* and *France*. The summer in Paris, *France* was characterized by:

Hot days	30 days
Very hot days	6 days
Extremely hot days	1 day

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

In Paris, *France* a series of unusually hot days occurred in July. The temperature readings were:

88.0° F (31.1° C) on 9 July; 92.3° F (33.5° C) on 10 July; 87.8° F (31.0° C) on 11 July; 90.5° F (32.5° C) on 12 July; 92.8° F (33.8° C) on 13 July; 93.6° F (34.2° C) on 14 July; 93.6° F (34.2° C) on 15 July; 95.2° F (35.1° C) on 16 July. The high temperatures observed in *Europe* during the summer were:<sup>62</sup>

Constantinople (Istanbul), <i>Turkey</i>	( 101.3° F, 38.5° C) on 27 July
Rouen, <i>France</i>	( 97.0° F, 36.1° C) on 5 July
Versailles, <i>France</i>	( 96.3° F, 35.7° C) on 16 July
Dunkirk, <i>France</i>	( 96.3° F, 35.7° C) on 7 July
Orange, <i>France</i>	( 95.5° F, 35.3° C) on 25 August
Paris, <i>France</i>	( 95.2° F, 35.1° C) on 16 July
Verviers, <i>Belgium</i>	( 95.2° F, 35.1° C) on 18 July
London, <i>England</i>	( 95.0° F, 35.0° C) on 12 July
Vendôme, <i>France</i>	( 95.0° F, 35.0° C) on 16 July
Oran, <i>Algeria</i>	( 95.0° F, 35.0° C) on 5 August
Saint-Etienne, <i>France</i>	( 95.0° F, 35.0° C) on 16 July
Sint-Truiden, <i>Belgium</i>	( 94.5° F, 34.7° C) on 17 July
Toulouse, <i>France</i>	( 93.4° F, 34.1° C) on 11 July
Périgueux, <i>France</i>	( 93.2° F, 34.0° C) on 16 July
Namur, <i>Belgium</i>	( 92.7° F, 33.7° C) on 17 July
Nemours, <i>France</i>	( 92.5° F, 33.6° C) on 16 July
Munich, <i>Germany</i>	( 92.3° F, 33.5° C) on 17 July
Stavelot, <i>Belgium</i>	( 91.9° F, 33.3° C) on 18 July
Bordeaux, <i>France</i>	( 91.4° F, 33.0° C) on 16 July
Gent (Ghent), <i>Belgium</i>	( 91.4° F, 33.0° C) on 10 July
Liège, <i>Belgium</i>	( 91.4° F, 33.0° C) on 17 July
Amsterdam, <i>the Netherlands</i>	( 91.4° F, 33.0° C) on 12 July

Dijon, <i>France</i>	( 91.2° F, 32.9° C ) on 17 July
Brussels, <i>Belgium</i>	( 90.9° F, 32.7° C ) on 16 July
Angers, <i>France</i>	( 90.5° F, 32.5° C ) on 12 July
Görsdorf (Storkow), <i>Germany</i>	( 90.3° F, 32.4° C ) on 17 July
Nagasaki, <i>Japan</i>	( 90.0° F, 32.2° C ) on 9 & 11 August
Château-Thierry, <i>France</i>	( 89.6° F, 32.0° C ) on 12 & 13 July
Marseille, <i>France</i>	( 89.1° F, 31.7° C ) on 17 July
Geneva, <i>Switzerland</i>	( 88.9° F, 31.6° C ) on 15 and 17 July
La Flèche, <i>France</i>	( 86.9° F, 30.5° C ) on 12 July
Oviedo, <i>Spain</i>	( 84.2° F, 29.0° C ) on 3 July
Rodez, <i>France</i>	( 83.3° F, 28.5° C ) on 11 July

In Alphen near Leyden, *the Netherlands*, two farmers were found in the fields killed by the heat. In the interior of *France*, the thermometer remained more than 10 days over 86° F (30° C). Many domestic work animals died. Madrid, *Spain* suffered much from the heat. On 11 August in Thourout, *Belgium*, a disastrous hailstorm struck. Many hailstones weighed 75 grams (2.6 ounces) and were 7 to 8 centimeters (2.8 to 3.2 inches) in diameter.<sup>62</sup>

On 17-24 July 1852, there was a flood at Launceston, Tasmania, *Australia*. The Jordan River rose to extraordinary heights. This was the highest flood since 1828. Fingal Bridge was washed away. There was a great amount of damage to the main roads. Water rose 5 feet (1.5 meters) above the parapet of the Ross Bridge. Two lives lost at Green Ponds.<sup>99</sup>

On 11 August 1852, there was a higher and more destructive flood than any previously known in Launceston, Tasmania, *Australia*. The Esk Rivers, Macquarie, Nile, and all other tributaries rose to unprecedented heights. Losses of livestock reported from drowning.<sup>99</sup>

On 23-25 August 1852, a hurricane struck the Gulf coast of the *United States* and produced the highest flood [storm surge] ever known (except for the hurricane of 1772).<sup>117</sup>

In *France*, the grain harvest took place shortly after mid-July and the yield was satisfactory. In contrast, the grape harvest began in the beginning of October. The yield was low in many vineyards and wine produced was of poor quality.<sup>62</sup>

In *England* in September through November, dreadful storms and floods in many parts of the country, more especially in the Severn valley; also in Derbyshire; in Sussex, and in *Scotland* and in Dublin.<sup>47, 92</sup>

On 5 September 1852, there was an inundation of the valleys of the Severn and Teme rivers in *Wales* after a violent thunderstorm.<sup>90</sup>

On 5 September 1852, a hurricane struck *Puerto Rico* causing more than 100 deaths. [This total may come from two storms. According to the 3 November 1852 issue of *The London Times*, "In Puerto Rico, heavy thunderstorms and hurricanes had been experienced, and over 100 lives were lost." Salivia (1970) indicates hurricanes on 5 and 22 (or 26) September and that the first occasioned many deaths.]<sup>141</sup>

On 19 September 1852 in western *Europe*, there were inundations in the basins of the Rhine and the Rhône rivers, which overflowed the country to a great extent.<sup>90</sup>

On 6-8 November 1852, a hurricane struck *Jamaica*. Many lives were lost on ships in ports.<sup>141</sup>

*Switzerland* and parts of *Belgium*, *France*, and *Germany*, suffered severely from floods.<sup>47, 92</sup>

In 1852, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ting-hai and Ch'ang-shan. Then during the period between 17 July and 14 August, floods struck Hopei (now Hebei province) in northern *China* at Kao-yang and Yunnan province in southwest *China* at Chiang-ch'êng [uncertain name, "P'ing-ho"]. During the period between 15 August and 13 September, floods struck Hupeh (now Hubei province) in central *China* at Chung-hsiang, Ku-ch'êng, Hsiang-yang, Ch'ien-chiang and Kung-an.<sup>153</sup>

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1852 / 1853 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1852 occurred on 23 November. It snowed all day.<sup>116</sup>

January 1853 was unseasonably warm on the Pacific Coast of the *United States*.<sup>140</sup>

In *England* in December 1852 and January 1853, there were many storms of great severity, with much destruction of property.<sup>57, 90</sup>

In the *United States* in 1853, the Mississippi River froze solid enough to walk 200 miles from St Louis, Missouri to La Claire, Iowa.<sup>33</sup>

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**1853 A.D.** The year 1853 in Bradford County, Pennsylvania in the *United States* was notable for many destructive summer hailstorms and a severe June drought. On 25 June 1853, it was reported, "the heat is intense, the dust multitudinous [multitudinous] and the parched and thirsty earth fairly gasps for moisture. The fields are becoming brown and the trees covered with a coating of dust."<sup>178</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Staouéli, <i>Algeria</i>	(106.7° F, 41.5° C) on 22 August
Oran, <i>Algeria</i>	( 95.5° F, 35.3° C) on 25 August
Munich, <i>Germany</i>	( 95.0° F, 35.0° C) on 9 July
Amsterdam, <i>the Netherlands</i>	( 91.4° F, 33.0° C) on 12 July
Ambon Island, <i>Indonesia</i>	( 91.4° F, 33.0° C) on 18 February

In the south of *Wales* on July 9, there were great floods caused by rain. At Brecon, the Houdda River rose to a great height, and carried away the bridge. Many houses inundated. People escaped by resorting to the upper parts of their dwellings.<sup>47, 92</sup>

On 6-7 September 1853, a hurricane struck the western *Atlantic Ocean* causing 40 deaths. [According to Snow (1952), "scores of lives were lost and seventy-five vessels were either sent to the bottom or dismantled." Also, the brig *Albermarle* was lost off Hatteras, North Carolina. This event is possibly related to "two men overboard" from *Henry Horbeck* in a hurricane at 38° N 56° W on 13 September.]<sup>141</sup>

On 2 November 1853, in Cork, *Ireland*, there was a great overflow of the River Lee. St. Patrick's bridge swept away, with many people on it.<sup>47, 92</sup>

A great rainstorm struck New England in the *United States* on 13 November 1853 causing a freshet [flood]. A railroad bridge with a 30 to 40 foot [9.1 – 12.2 meter] span between Dummerston and Putney was carried away by the floodwaters in Vermont. In Maine, the Penobscot River was greatly flooded. A boom at Veazie broke, and a great number of logs were carried away. Kenduskeag was badly flooded and a dam was carried away. The Connecticut River was greatly swollen. There was significant damage on the Housatonic, Naugatuck and Danbury and Norwalk railroads. The bridge at Mittineague, Connecticut was swept away. The railroad bridge at Seymore, Connecticut and a highway bridge at Ansonia,



Connecticut were carried off along with other bridges in the region. Several people were drowned. Many of these people were on the Ansonia Bridge when it collapsed.<sup>199</sup>

In southwestern *India* during 1853-54, there was a great scarcity in the Bellary district (Madras Presidency). “The rains which usually fall in the months of October and November, ceased at an unusually early period in the year 1853; and the showers which usually fall in June and July, had been scanty. The grain harvests were consequently almost universally deficient, and considerable distress occurred in several parts of this presidency. In Bellary district, the season had been exceptionally unfavorable; an average fall of only 9.5 inches of rain having taken place during the year, against an average of about double that quantity in previous years. The stocks of grain on hand were small: for serious damage had been occasioned by a storm in 1851 to several of the irrigation works of the district; and in 1852 the fall of rains had been unseasonable, and the crops short.”<sup>57</sup>

In 1853, there was a famine in Madras in *India*.<sup>156</sup>

In 1853, there was a great flood in *China*. The Yellow River cut a new course to the sea.<sup>142</sup>

In 1853 during the period between 8 April and 7 May, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. During the period between 7 June and 5 July, floods struck Shensi (now Shaanxi province) in central *China* at Tso-shui; Chekiang province at Ch'êng; and Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing. During the period between 6 July and 4 August, floods struck Tso-t'ien and Ju-tê [uncertain names and uncertain provinces]. During the period between 5 August and 2 September, floods struck Hopei (now Hebei province) in northern *China* at Pao-ting and Hupeh (now Hubei province) in central *China* at I-ch'êng and Chün. At I-ch'êng, the dikes and city walls were damaged by the floodwaters.<sup>153</sup>

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1853 / 1854 A.D.** The Seine River in *France* was frozen from 28 December 1853 until 6 January 1854.<sup>62</sup>

On the Continent [*Europe*], the winter of 1853-54 was not only protracted but also severe, especially towards the end of December. Several rivers were frozen over. The cold lasted from November until March with scarcely any interruptions. In *England*, the winter was less severe.<sup>70</sup>

The winter of 1853-54 was a severe winter in the temperate zones of *Europe*. It lasted from November to March, and caused many rivers to freeze. In many areas, the cold was more beneficial to agriculture than harmful. In St. Petersburg, *Russia*, towards the end of December, there was much ice. Beginning on 20 December, Kronstadt Bay was covered in ice. The cold weather in *Russia* did not seem unusual for this northern climate. In Copenhagen, *Denmark* there was just a single day, when it was cold in December at 28.4° F (-2.0° C); and the shipping in the straits remained free. In *France*, the frost began on 10 November on the coast of the Pas-de-Calais, on the Oise, and on the higher elevations in northern and central *France*. The coldest weather during this winter in *France* fell between 26 and 31 December except for Puy because that city was at a higher elevation.<sup>62</sup>

The cold, although moderate in *Belgium*, extended over *Germany, England, France, Spain* and *Lombardy*. Almost everywhere, the snow and severe cold came together during the month of December. The thick blanket of snow in *France* protected the ground until 1 March. It was unusual that despite the moderate temperatures the Seine River in Paris, *France* froze.<sup>62</sup>



The water level of the Seine River was very low which explains why the Seine froze at only moderately cold temperatures. At the bridge Pont de la Tournelle in Paris, *France*, the water level of the river on 7 January began to swell very strongly. On the 8<sup>th</sup> the water rose to the 2.5 meter (8.2 feet) level; on the 9<sup>th</sup> to 3 meters (9.8 feet); and on the 10<sup>th</sup> to 3.5 meters (11.5 feet).<sup>62</sup>

Many rivers in *Germany* were hard frozen. This included the Vistula River (now in *Poland*), in which the ice was so thick that wagons traveled across it towards the end of December. In *England*, the rivers of the royal parks were covered with ice. In *France*, the Loire River froze at various points from 26 December to 8 January. The Saône River froze between Mâcon and Chalon, *France*. The Rhine River froze on 26 December. The Garonne River froze on 28 December. The rivers and lakes in the Vosges Mountains [in east-central *France*] were covered with ice. In Barcelona, *Spain*, all the rivers and ponds were frozen. In Madrid, *Spain* the lake at the royal park of Retiro was covered in ice. In some areas of the Manzanares and Jarama rivers were frozen.<sup>62</sup>

The number of frost days during this winter:<sup>62</sup>

Le Puy, <i>France</i>	123 days of frost
Clermont, <i>France</i>	118 days of frost
Hendecourt, <i>France</i>	111 days of frost
Goersdorf, <i>France</i>	105 days of frost
Metz, <i>France</i>	99 days of frost
Bourg, <i>France</i>	97 days of frost
La Châtre, <i>France</i>	75 days of frost
Orange, <i>France</i>	65 days of frost
Vendôme, <i>France</i>	54 days of frost
Lille, <i>France</i>	52 days of frost
Toulouse, <i>France</i>	51 days of frost
Paris, <i>France</i>	47 days of frost
Marboue, <i>France</i>	44 days of frost
Régusse, <i>France</i>	39 days of frost
Beyrie, <i>France</i>	27 days of frost
Nantes, <i>France</i>	22 days of frost
Bordeaux, <i>France</i>	21 days of frost
Marseille, <i>France</i>	20 days of frost

The lowest temperature observed at different locations during the winter:<sup>62</sup>

Goersdorf, <i>France</i>	( -7.2° F, -21.8° C ) on 27 December
Les Mesneux, <i>France</i>	( -4.2° F, -20.1° C ) on 26 December
Clermont, <i>France</i>	( -4.0° F, -20.0° C ) on 26 December
Châlons-sur-Marne, <i>France</i>	( -4.0° F, -20.0° C ) on 26 December
Hendecourt, <i>France</i>	( -1.3° F, -18.5° C ) on 26 December
Lille, <i>France</i>	( -0.4° F, -18.0° C ) on 26 December
Kehl, <i>Germany</i>	( 0.3° F, -17.6° C ) on 26 December
Bourg, <i>France</i>	( 0.3° F, -17.6° C ) on 30 December
Metz, <i>France</i>	( 0.5° F, -17.5° C ) on 27 December
Le Puy, <i>France</i>	( 1.2° F, -17.1° C ) on 15 February
Brussels, <i>Belgium</i>	( 3.0° F, -16.1° C ) on 26 December
La Saulsaye (Ain), <i>France</i>	( 5.0° F, -15.0° C ) on 30 December
Toulouse, <i>France</i>	( 5.0° F, -15.0° C ) on 31 December
Lyon, <i>France</i>	( 5.7° F, -14.6° C ) on 30 December
Paris, <i>France</i>	( 6.8° F, -14.0° C ) on 30 December
Vendôme, <i>France</i>	( 6.8° F, -14.0° C ) on 30 December
La Châtre, <i>France</i>	( 9.5° F, -12.5° C ) on 30 December
Marboue, <i>France</i>	( 11.8° F, -11.2° C ) on 30 December
Beyrie, <i>France</i>	( 13.6° F, -10.2° C ) on 30 December

Bordeaux, <i>France</i>	(14.0° F, -10.0° C) on 30 December
Orange, <i>France</i>	(14.4° F, -9.8° C) on 31 December
Nantes, <i>France</i>	(14.9° F, -9.5° C) on 30 December
Marseille, <i>France</i>	(18.1° F, -7.7° C) on 30 December
Nîmes, <i>France</i>	(19.4° F, -7.0° C) on 30 December
Régusse, <i>France</i>	(21.2° F, -6.0° C) on 30 December and 14 & 15 February

The frost was severe towards the end of December in the north and east of *France*. One person froze to death in Mortefontaine and another in Vervins. And in the Pyrenees, several people were buried under the snow.<sup>62</sup> [Mortefontaine and Vervins are in northern *France*. The Pyrenees is in southwestern *France*.]

From 15 December until the end of the cold, there was an unusual amount of snow in Holland [now *the Netherlands*], *England*, *Belgium*, *Rhine Prussia*, *France*, *Spain* and *Lombardy*. In Sétif, *Algeria* in November, a considerable amount of snow fell. The heavy snowfalls blocked the trains from Strasbourg and Le Havre, *France* and on all other tracks in *Belgium* and the *Rhine Prussia* [now west-central *Germany*]. The family of the King of Belgium had to travel by sleigh from Brussels in order to put a coating on the castle walls.<sup>62</sup>

In the *United States*, a furious storm on 22 January struck the Ohio River destroying a large number of canal boats. Seventy-nine boats proved a total loss and 17 boatmen were drowned. Boston, Massachusetts and vicinity on 29 January experienced one of the coldest days of the winter season when temperatures dropped to -6° F (-21° C) at sunrise. Throughout New England the day was one of the coldest known for many years. On 4 February another very cold spell of weather struck with the thermometer falling below 0° F. The months of January and February were noted for their tempestuous weather, and for the immense damage done to shipping. Also for the extreme cold weather in the United States. On 20 February, a terrible snowstorm raged at New York, Philadelphia, Baltimore and that vicinity. Drifts four to five feet high were found in each of these cities, and more snow fell than at one time for ten years previous. The railroads were all obstructed. Another violent snowstorm raged throughout the country on 23 February. On 18 March a fearful gale prevailed in New England, the wind being very high and destructive. On 16 April a fearful storm raged on the Atlantic coast, and a large number of marine disasters occurred. During spring thaw on 1 & 2 May, floods devastated New England. A tremendous freshet occurred on the Connecticut and Farmington rivers, the water rising 15 inches higher than in the great freshet of 1801. Much damage was done all along the valley to farms, houses, bridges, railroads, etc. Destructive freshets occurred in all parts of the country. In Maine great damage was done. In Pennsylvania immense loss was sustained in the valleys of the Lehigh and the Delaware.<sup>77</sup>

The winter of 1853-54 in Bradford County, Pennsylvania in the *United States* was primarily noted for the lack of snow. One exception was the early October snowstorm on the 24<sup>th</sup>, which deposited 8 inches [20 cm] of snow. A few warm days and rain converted this to an overabundance of moisture and mud. According to the Reporter: "If the past winter was distinguished for the total absence of snow in this region, the present month of April will long be remembered for the body of snow, whose coming at this late day in such quantities is almost unexampled. On Friday, the 14<sup>th</sup> commenced a fall of snow, which continued almost without cessation until Monday night (3 days). At Towanda it is supposed that at least three feet [0.9 m] of snow must have fallen, some of it melting as it reached terra firma, but leaving a body remaining, measuring two feet [0.6 m] in depth. In the woods we are assured the snow measured three feet [0.9 m]."<sup>178</sup>

There is no doubt that the western slope of the Sierra Nevada foothill region and also that part of southern California in the *United States*, inland, of which Riverside is a fair representative, offer very favorable climatic conditions for the growth of citrus fruit. They are subject, however, although rarely, to minimum

temperatures, which have affected and which may affect citrus fruit disastrously. The winter of 1854 was probably more severe than the winter of 1888 or of 1898, when minimum temperatures fell below 20° F in some portions of these citrus regions. It appears that the region of the Santa Barbara foothills and probably of the entire foothill region of the Coastal Range southeast of Santa Barbara, wherever the foothills do not recede too far from the ocean, is never affected in such winters to a degree sufficient to injure the growth of citrus fruit. Regular observations of temperature have been taken at Santa Barbara, California since 1870. Since 1870, the two lowest temperatures observed at Santa Barbara were 28.5° F, on one January morning, 1888, and the next lowest, 30.5° F, on another morning of the same month and year.<sup>138</sup>

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

**1854 A.D.** There were floods in southern Tasmania, *Australia* from 26 February to 22 March 1854. This was caused by tremendous rainfall throughout Tasmania. A total of six people lost their lives and 15 injured. Several lives were lost due to floods in Hobart. The Jordan River was at its highest since 1828. At Richmond the Coal River rose to 11.8 feet (3.6 meters). Three bridges were destroyed between New Norfolk and Lachlan. The Clyde Bridge at Hamilton washed away. There were substantial livestock and crop losses.<sup>99</sup>

On 27 February 1854, there was a great flood at Hobart Town, *Australia*.<sup>103</sup>

The high temperatures observed during the summer were:<sup>62</sup>

Le Havre, <i>France</i>	( 89.6° F, 32.0° C) in July
Saint-Léonard, <i>France</i>	( 89.6° F, 32.0° C) on 23, 24 & 25 July

During the autumn of 1854, a drought prevailed in Bradford County, Pennsylvania in the *United States*. In September, the drought was becoming terrible in its effect upon vegetation. Corn, potatoes and buckwheat in the neighborhood of Towanda were almost a failure. The meadows and pastures were brown and withered, while the atmosphere was filled with dust and smoke from numerous [forest] fires upon the mountains. The memory of the oldest inhabitant had no recollection of the like.<sup>178</sup>

In 1854, there was an extensive drought in the *United States*. The latter part of the season of 1854 was extremely dry, followed by a mild and dry winter and a very dry spring [of 1855], so dry in fact, that one of the early settlers of Webster county drove from Muscatine to Fort Dodge [Iowa], the last of April 1855 without wetting his wagon tire. Despite the drought in Iowa and the western states, the crops turned out better than in the States east of the Mississippi River.<sup>111</sup>

In 1854, several regions of *China* experienced flooding.<sup>153</sup>

During the period of 27 May – 24 June, the following areas were affected:

- Chekiang (now Zhejiang province) on the east coast of *China* at Sung-yang experienced flooding.
- Kiangsi (now Jiangxi province) in southern *China* at Kuang-ch'ang experienced flooding. The city walls and 80% of the houses were damaged. Several tens of thousands of people were drowned.

During the period of 8 August – 8 November, the following area was affected:

- Hopei (now Hebei province) in northern *China* at Pao-ting experienced flooding.

In 1854 during the period between 27 May and 24 June, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui. During the period between 25 July and 23 August, a drought engulfed Hupeh (now Hubei province) in central *China* at Hsien-ning and Pao-k'ang.<sup>153</sup>

On 5 June 1854, a tornado cut a path through Cedar County, Iowa in the *United States*. The path of the storm was half a mile wide as it cut its way through the timber. Everything was taken clean – nothing

left. When the storm crossed Cedar River it took large stones from the bottom and carried them on land. It appears this storm reached Lake Erie.<sup>123</sup>

On 27 August 1854, a tornado struck Louisville, Kentucky in the *United States*. Twenty-five persons were killed and \$1,000,000 in property damage was sustained. [In present currency, that would be equivalent to \$27 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>197</sup>

On 7 September 1854, Charleston, South Carolina in the *United States* was struck by a violent gale.<sup>124</sup>

On 7-13 September 1854, a hurricane struck the mid-Atlantic coast of the *United States* causing 26 deaths.<sup>141</sup>

On 18 September 1854, a hurricane struck the eastern coast of Texas in the *United States*. Two people were killed. The steamer *Kate Ward* and crew were lost.<sup>141</sup>

On the *Black Sea* on the 13<sup>th</sup> through 16<sup>th</sup> of November, there was a great storm, causing much loss of life and destruction of shipping and stores sent for allied armies in Crimea.<sup>57, 90</sup> [The Crimea is now an autonomous republic of *Ukraine*, on the northern coast of the Black Sea, occupying a peninsula of the same name.]

In 1854, a powerful cyclone struck *India* 1854 causing 50,000 deaths.<sup>98</sup>

In 1854, there was a minor famine in Madras [now Chennai] and Hyderabad [in southern *India*].<sup>179</sup>

A scarcity struck the Madras Presidency in *India* in 1854. The rains which usually fall in the months of October and November, ceased at an unusually early period in 1853 and the showers of June and July 1854 were short. The grain harvest was deficit and grain prices rose to great heights. The Bellary district of the Karnataka state of India received only 9.5 inches of seasonal rainfall compared to an average that was double this amount in prior years. About 1/3 of the cattle perished.<sup>188</sup>

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1854 / 1855 A.D.** In *Northern Europe* on the 31<sup>st</sup> of December, there was a great storm, which caused considerable damage.<sup>57, 90</sup>

In Hamburg, *Germany* on January 1, an overflow of the Elbe River laid the greater part of the city under water.<sup>47</sup>

The weather was so cold in the spring that a great frost froze the River Thames in London, *England*.<sup>29</sup>

In *England*, the frost was very severe between the 14<sup>th</sup> of January 1855 and the 24<sup>th</sup> of February; and very cold up to the 26<sup>th</sup> of June. On 22 February, fires were made on the Serpentine in Hyde Park. There was traffic on the ice for a length of 35 miles in Lincolnshire.<sup>47, 90, 93</sup>

The winter of 1854-55 was severe. The frost commenced in the east of *France* in October and lasted till the 28<sup>th</sup> of April. The mean temperatures for January and February in *England* were 31° F and 29° F (-0.6° C and -1.7° C) respectively. This year will be remembered as that during which the British army suffered so terribly from the cold in the *Crimea*.<sup>70</sup>

The winter of 1854-55 was quite severe in *southern Russia*, in *Denmark*, *England*, *France*, *Spain* and *Italy*. The winter was unusually long. The frost began in eastern *France* in October and continued until

28 April. In Paris, there were 50 frost days, with 17 in succession. The following is a list of the number of frost day in various locations in *France*:<sup>62</sup>

Le Puy, <i>France</i>	123 days of frost
Clermont, <i>France</i>	108 days of frost
Hendecourt, <i>France</i>	102 days of frost
Goersdorf, <i>France</i>	90 days of frost
Les Mesneux, <i>France</i>	74 days of frost
Strasbourg, <i>France</i>	73 days of frost
Metz, <i>France</i>	70 days of frost
Bourg, <i>France</i>	62 days of frost
Saint-Léonard, <i>France</i>	58 days of frost
Lille, <i>France</i>	56 days of frost
Vendôme, <i>France</i>	55 days of frost
Marboue, <i>France</i>	53 days of frost
Orange, <i>France</i>	51 days of frost
Montpellier, <i>France</i>	50 days of frost
Paris, <i>France</i>	50 days of frost
Toulouse, <i>France</i>	42 days of frost
La Châtre, <i>France</i>	40 days of frost
Nantes, <i>France</i>	40 days of frost
Régusse, <i>France</i>	33 days of frost
La Chapelle-d'Angillon, <i>France</i>	28 days of frost
Bordeaux, <i>France</i>	26 days of frost
Beyrie, <i>France</i>	17 days of frost
Marseille, <i>France</i>	14 days of frost

At various places precursors were observed foretelling the coming of a severe and long winter: the early appearance of the birds from the *Polar Regions*, and the migration of the swans. In several northern, eastern and southern areas of *France* received substantial amounts of snow. Without this snow cover, the effects of frost damage would have been even more severe. In February at Strasbourg the snow was 0.30 meters (11.8 inches) deep; in Marboue 0.30 meters (11.8 inches); in Nantes 0.40 meters (15.8 inches); in Gorsdorff 0.65 meters (25.6 inches). In Lille, the frost penetrated 0.40 meters (15.8 inches) deep in the ground. The neighboring countries, *Switzerland*, *Spain* and *Lombardy* also experienced significant snowfalls. This snowfall also occurred in Sétif, (*Algeria*) in Africa.<sup>62</sup> [Marboue is in north-central *France*. Nantes is in northwestern *France*. Lille is in northern *France*.]

On 17 January, drift ice began to appear on the Loire River; and on the next day the river was frozen over. On 19 January, ice began to appear on the Seine River but it was not completely frozen. The Rhône River froze on January 20. The Saône River froze at the bridge at Serin on 20 January and by the next day the river was completely frozen. On 24 January, the Rhine River was frozen over completely at Mannheim, *Germany*. Individuals crossed the Rhine on foot.<sup>62</sup>

The lowest temperatures observed in various cities are listed below:<sup>62</sup>

Les Mesneux, <i>France</i>	( -7.6° F, -22.0° C ) on 19 January
Goersdorf, <i>France</i>	( -4.9° F, -20.5° C ) on 29 January
Vallec d'Huchigny, <i>France</i>	( -0.4° F, -18.0° C ) on 20 January
Clermont, <i>France</i>	( 1.4° F, -17.0° C ) on 21 January
Brussels, <i>Belgium</i>	( 1.9° F, -16.7° C ) on 2 February
Turin, <i>Italy</i>	( 2.3° F, -16.5° C ) on 24 January
Metz, <i>France</i>	( 3.2° F, -16.0° C ) on 29 January
Strasbourg, <i>France</i>	( 3.2° F, -16.0° C )
Montpellier, <i>France</i>	( 3.2° F, -16.0° C ) on 21 January
Le Puy, <i>France</i>	( 4.8° F, -15.1° C ) on 21 January
La Châtre, <i>France</i>	( 5.5° F, -14.7° C ) on 19 January

Hendecourt, <i>France</i>	( 6.3° F, -14.3° C) on 16 February
La Chapelle-d'Angillon, <i>France</i>	( 6.8° F, -14.0° C)
Saint-Léonard, <i>France</i>	( 6.8° F, -14.0° C) on 20 January
Lille, <i>France</i>	( 7.2° F, -13.8° C) on 2 February
Bourg, <i>France</i>	( 7.2° F, -13.8° C) on 21 January
Orange, <i>France</i>	( 8.2° F, -13.2° C) on 22 January
Vendôme, <i>France</i>	( 9.0° F, -12.8° C) on 20 January
Marboue, <i>France</i>	(10.0° F, -12.2° C) on 19 January
Paris, <i>France</i>	(11.7° F, -11.3° C) on 21 January
Toulouse, <i>France</i>	(12.7° F, -10.7° C) on 20 January
Bordeaux, <i>France</i>	(13.1° F, -10.5° C) on 19 January
Nantes, <i>France</i>	(14.0° F, -10.0° C) on 19 January
Beyrie, <i>France</i>	(15.8° F, -9.0° C) on 20 January
Régusse, <i>France</i>	(19.4° F, -7.0° C) on 22 January
Marseille, <i>France</i>	(23.5° F, -4.7° C) on 20 January
Algiers, <i>Algeria</i>	(23.9° F, -4.5° C) on 21 January and 10 April

This winter in *France* was of an unusually long duration. This can be observed by the fact that the frost continued to April. For example: <sup>62</sup>

In Hendecourt on 6 April the temperature was 26.6° F (-3.0° C) and on the 23<sup>rd</sup> it was 28.4° F (-2.0° C).

In Clermont on 6 April it was 24.8° F (-4.0° C), on the 23<sup>rd</sup> it was 28.0° F (-2.2° C), and on the 28<sup>th</sup> it was 28.4° F (-2.0° C).

In Le Puy on 9 April it was 26.1° F (-3.3° C) and on the 23<sup>rd</sup> the temperature was 26.6° F (-3.0° C).

In Montpellier on 2 April the temperature was 28.0° F (-2.2° C).

In Toulouse on 1 April the temperature was 28.4° F (-2.0° C).

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1854 occurred on 16 November. Some snow. <sup>116</sup>

January 1855 was unseasonably warm in the West and Southwest of the *United States*. <sup>140</sup>

In the *United States*, on 20 December 1854, very cold weather set in. Bangor, Maine recorded -27° F (-33° C). On 7 February 1855, the thermometer in Boston, Massachusetts for thirty-four hours, ranged from -5° to -12.5° F (-20.6° to -24.7° C). Throughout the whole of New England, and as far south as Washington, D.C., the weather was unprecedentedly cold. During the first ten days of February, a most terrific snowstorm prevailed through all parts of U.S., north of forty degrees latitude. The storms in the West were of unprecedented fury. All communications on many of the railroads were stopped for several days and great suffering occurred. Passengers in many cases narrowly escaped with their lives from the cold and starvation. <sup>77</sup>

In 1854 in Bradford County, Pennsylvania in the *United States*, the fall was warm. Farmers continued to plough their fields until December when snow fell. Snow remained on the ground until April 1855. Sleighing was good over these months. People continued to cross the Susquehanna River on sleighs at Towanda until April 6, when the ice broke up and passed out. <sup>178</sup>

In the *United States* during the winter of 1854-55, the temperature at Fort Canby (now Fort Disappointment at the mouth of the Columbia River in Washington) fell to -20° F in January. <sup>113</sup>

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

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**1855 A.D.** On 1 January 1855, Hamburg, *Germany* was half-flooded by the Elbe River. <sup>90</sup>



On 1 January 1855 at Hamburg, *Germany*, an overflow of the Elbe laid the greater part of the city under water.<sup>92</sup>

On 6 August 1855, a hurricane struck Tampico, *Mexico*. The loss and damage done to goods was very heavy, and the destruction of life and property was no less severe.<sup>141</sup>

On 26 August 1855, a hurricane struck the *Dominican Republic*. There were many casualties.<sup>141</sup>

The maximum temperature during the summer in Algiers, *Algeria* was 99.5° F (37.5° C) on 8 September.<sup>62</sup>

In 1855 during the period between 17 February and 17 March, a drought engulfed Kansu (now Gansu province) in northwest *China* at Lanchow. During the period between 6 May and 8 November, a drought engulfed Hupeh (now Hubei province) in central *China* at Ao-ch'êng. During the period between 16 May and 13 June, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ing. Then during the period between 13 August and 10 September, floods struck Hupeh province at Huang-p'ô, Ma-ch'êng, Huang-kang, Ch'i-ch'un and Kuang-chi; and Chekiang (now Zhejiang province) on the east coast of *China* at Li-shui, Yün-ho and Ching-ning. At Ching-ning, all the houses and fields were damaged by the floodwaters.<sup>153</sup>

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1855 / 1856 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1855 occurred on 17 November. Snowy afternoon. November 20, snowed all day and night; good sleighing.<sup>116</sup>

On 5 January 1856, a violent snowstorm extended from Washington D.C. in the *United States* to Halifax, Nova Scotia, *Canada*. Travelling on the railroads was much obstructed for some days. On the 8<sup>th</sup> of January, the Potomac River froze from shore to shore. Many people crossed the river on foot with safety. On the 12<sup>th</sup> of January, the roof of the station house of the Richmond and Danville railroad in Richmond, Virginia, gave way and collapsed because of the great weight of the snow upon it. On the 3<sup>rd</sup> of February, in Kansas the thermometer sunk as low as -30° F (-34.4° C). The cold extended over the United States, and in some parts to a degree unknown before. On the 24<sup>th</sup> of February, owing to the breaking up of the ice in the Ohio River, six steamers and several barges were sunk, causing a great loss of property. On the 30<sup>th</sup> of May, there was a snowstorm on the Baltimore and Ohio Railroad.<sup>77</sup>

The winter of 1855-56 in Bradford County, Pennsylvania in the *United States* was long with biting cold and many snowstorms in January, February and March. The first snowstorm struck on 24 October 1855 producing a snowfall of 3 inches [8 cm]. On March 10, the temperature was -19° F [-28° C]. Ice in the Susquehanna River at Towanda passed out on 11 April.<sup>178</sup>

In the *United States* during the winter of 1855-56, the temperature at Fort Canby (now Fort Disappointment at the mouth of the Columbia River in Washington) fell to -25° F in December. The temperature at Fort Jones, California fell to -17° F in December. The temperature at Fort Union (near Watrous, New Mexico) fell to -28° F in December. The temperature dropped to -14° F at Mount Auburn, Ohio, a suburb of Cincinnati in January. The temperature at Shelbyville, Indiana fell to -30° F on February 4. The temperature at Allegheny Arsenal (near Pittsburgh, Pennsylvania) fell to -22° F in February.<sup>126</sup>

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**1856 A.D.** In May and June 1856, inundations in south of *France* caused immense damage.<sup>90</sup>

On 1 June 1856, in the South of *France*, there were great floods, occasioning loss of agricultural produce and other property to the extent of 140 million francs (5,600,000*l.*).<sup>47, 92</sup> [In present currency, that would be equivalent to £443 million in damages based on the retail inflation price index.]

On 6 June 1856, destructive floods occurred in *France*, especially in the neighborhood of Lyons. In some places whole villages were swept away, and many lives lost. The railway station at Tours was ten feet (3 meters) under water.<sup>77</sup>

On 1 July 1856, there was a heavy gale on the coast of Labrador, *Canada* and 29 vessels out of a fleet of 30 were driven ashore and lost.<sup>77</sup>

On 10 August 1856, Last Island [now Isle Dernière, Louisiana] in the *United States*, a summer resort in the Gulf of Mexico was destroyed during a terrific storm, which raged for three days. The island was entirely submerged, and every house on the island gave way. One hundred and seventy three people are known to have perished. The effect of the storm was felt greatly at New Orleans, Louisiana.<sup>77</sup>

On 10-11 August 1856, a hurricane struck Louisiana in the *United States*. [Various accounts give differing fatality figures of 400, 320, >250, <200, and >155 deaths.]<sup>141</sup>

On 19 August 1856, a hurricane swept the coast of Louisiana in the *United States*, but was not particularly severe on the Alabama and Mississippi coasts; Lost Island [Last Island] was submerged and 300 lives lost.<sup>117</sup>

In Prome, *Burmah* (Pyay, *Burma*), a great overflow of the Irrawaddy River nearly destroyed this town.<sup>47, 92</sup>

In 1856 during the period between 8 January and 5 February, floods struck Hupeh (now Hubei province) in central *China* at Chung-hsiang. During the period between 3 June and 1 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'êng, and Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing.<sup>153</sup>

In 1856, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period between 6 May and 8 November, a drought engulfed Hupeh (now Hubei province) in central *China* at I-ch'êng and An-lu. Many trees withered.

— During the period between 3 June and 1 July, a severe drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at T'ung-hsiang and Hupeh province at Hsien-ning, Huang-p'o, Chung-hsiang and Ch'ien-chiang. The rivers dried up.

— During the period between 30 June and 28 August, a severe drought engulfed Hupeh province at Sui.

— During the period 2-31 July, a drought engulfed Chekiang province at Chia-hsing and Kiangsu (now Jiangsu province) on the east coast of *China* at Soochow and Ch'ing-p'u.

— During the period 1-29 August, a drought engulfed Kiangsu province at Wu-chin and Nan-t'ung; Hupeh province at Lo-t'ien; and Shantung (now Shandong province) on the east coast of *China* at Ling and Fei-ch'êng. The rivers dried up.

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1856 / 1857 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1856 occurred on 29 November. Hard snowstorm; very high wind.<sup>116</sup>

In the *United States*, a great snowstorm struck the Northeast and Mid-Atlantic States in January 18-19, 1857. Snow accumulations in North Carolina and Virginia exceeded 12 inches (30 centimeters). Raleigh,

North Carolina reported a 24-inch (61 centimeter) snowfall; 18 to 24 inches (46-61 centimeters) of snow was reported at Washington D.C., Baltimore, Maryland, and Philadelphia, Pennsylvania with snowdrifts as high as 6-10 feet (1.8-3.0 meters).<sup>27</sup>

During the winter of 1856-57 in Bradford County, Pennsylvania in the *United States*, there was one of the severest storms ever witnessed, which swept over the country on 18 & 19 January 1857. The amount of snowfall was very great and the wind blew with great fury for nearly 24 hours blockading the railroads, stopping the mail and putting a complete embargo on travel. Snowdrifts were as high as the tops of houses. The cold of 25 January has probably not been equaled in the 19<sup>th</sup> century. In Bradford County, temperatures dropped to -30° F [-34° C]. At Watertown, New York, the mercury fell to -37° F [-38° C] and froze. On 19 & 20 April 1857, there was a snowfall varying from 12 to 24 inches [30 – 61 cm] in depth. It rained continuously from the spring ice break-up until July.<sup>178</sup>

The winter of 1856-57 was a very severe winter in New England in the *United States*. There were 32 snowstorms during the winter. The winter began earlier than usual and continued far into the spring. Snow fell to a depth of six feet and two inches [1.9 meters].<sup>199</sup>

— On 17 December 1856, a cold spell gripped the region. The temperature fell to -12° F [-24° C] in Massachusetts and -16° F [-27° C] in Maine. On 23 December there was a violent snowstorm that dropped 4 to 5 inches [10-13 centimeters] of snow on the level.

— On 3 January 1857, another snowstorm hit the region. The snow was now 12 inches [30 centimeters] deep on the level. Temperatures fell to -6° F to -8° F [-21° to -22° C] and almost unbearable due to the strong winds. On 12 January, the temperature in New Hampshire fell to -19° F [-28° C] and a very severe snowstorm struck the region. The gale caused damage to the shipping along the coast. On 17 January, the temperature at Salem, Massachusetts fell to -20° F [-29° C]. The next day, the temperature at Lowell, Massachusetts was -20° F [-29° C]. Snow fell to great depths; drifts on Essex Street in Salem were between 8 and 12 feet [2.4-3.7 meters] deep. Transportation ground to a halt. The snow in Washington D.C. was 2 feet deep [0.6 meters]. The streets of Boston were piled full of snow. Snowshoes were required for traveling. Several people were nearly smothered or frozen to death. The steeple of the church in Campello, Massachusetts was blown down. The steeples of the Episcopal and Second Congregational churches in Waterbury, Connecticut were also blown down. The spire on the Congregational Church in Fairhaven, Massachusetts was destroyed. A house in New Bedford, Massachusetts was completely demolished by the wind.

— The storm on 18 & 19 January at Provincetown, Massachusetts on Cape Cod blew with the strength of a hurricane. Seventeen of the twenty vessels in the harbor were driven ashore. A schooner Bonita anchored off Cape Ann parted her cables and was driven ashore at Provincetown about a half mile [0.8 kilometers] east of Race point. Two crewmembers perished.

— The following are the lowest temperatures observed on 19 January 1857 in New England:

Coventry, Connecticut	(-32° F, -36° C)
Hartford, Connecticut	(-32° F, -36° C)
New Haven, Connecticut	(-27° F, -33° C)
Bangor, Maine	(-44° F, -42° C)
Bath, Maine	(-52° F, -47° C)
Portland, Maine	(-29° F, -34° C)
Boston, Massachusetts	(-16° F, -27° C)
Fall River, Massachusetts	(-26° F, -32° C)
Lowell, Massachusetts	(-30° F, -34° C)
Malden, Massachusetts	(-30° F, -34° C)
New Bedford, Massachusetts	(-20° F, -29° C)
Salem, Massachusetts	(-26° F, -32° C)
Springfield, Massachusetts	(-33° F, -36° C)
Taunton, Massachusetts	(-30° F, -34° C)
Worcester, Massachusetts	(-26° F, -32° C)

Dover, New Hampshire	(-31° F, -35° C)
Franconia, New Hampshire	Mercury Froze
Keene, New Hampshire	(-24° F, -31° C)
Manchester, New Hampshire	(-35° F, -37° C)
Nashua, New Hampshire	(-28° F, -33° C)
Providence, Rhode Island	(-26° F, -32° C)
Woonsocket, Rhode Island	(-35° F, -37° C)
Montpelier, Vermont	(-50° F, -46° C)
Northfield, Vermont	(-40° F, -40° C)
St. Johnsbury, Vermont	(-50° F, -46° C)

— The 18<sup>th</sup> and 19<sup>th</sup> were the two coldest days known in New England in the past century. But the temperatures continued to remain low until the 26<sup>th</sup> of January. For example on the 23<sup>rd</sup>, the temperature fell to:

Auburn, Maine	(-22° F, -30° C)
Bangor, Maine	(-44° F, -42° C)
Lawrence, Massachusetts	(-32° F, -36° C)
Amherst, New Hampshire	(-35° F, -37° C).
Weare, New Hampshire	(-40° F, -40° C)
North Field, Vermont	(-40° F, -40° C)
White River Junction, Vermont	(-43° F, -42° C)

Then on January 24<sup>th</sup>, the temperature fell to:

Auburn, Maine	(-40° F, -40° C)
Manchester, Massachusetts	(-37° F, -38° C)
Amherst, New Hampshire	(-37° F, -38° C)
Franconia, New Hampshire	(-49° F, -45° C)

— This week [week of January 18] was one of the coldest weeks in New England. The harbor at Portsmouth, New Hampshire was frozen over. Long Island Sound was frozen the whole width for the first time as far as ever known. During the entire period between 20 December and 27 January, snow on the roofs of buildings in a greater portion of New England did not melt.

— On 27 January, a thaw set in and rain fell. There were 2 heavy rainstorms. The rainstorm of 8 February was great which caused freshets [floods] on the 9<sup>th</sup> and 10<sup>th</sup>. Vast amounts of snow were carried away. The destruction at Norwich, Connecticut was great. The Lord's and Lathrop's bridges were swept away. The waterfront was swept over by a raging flood. An ice dam formed below the city, and the water flooded the wharves and buildings on Water Street.

— The rest of the winter was very changeable. Often a cold spell would permeate the area and drive temperatures below zero. Towards the end of February, the weather was mild. On the first of March, bluebirds, blackbirds and robins appeared in Massachusetts, three weeks earlier than usual. But in the afternoon, snow began to fall and the temperatures fell below freezing. This variable weather dragged on until the middle of April.

— This was one of the coldest winters ever known in the southern as well as in the northern and western *United States*. This is the first winter known when there was a snowstorm in Mexico City, *Mexico*. This occurred on 31 January 1857.

Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>

In the *United States* during the winter of 1856-57, the temperature at Fort Gibson (now Muskogee and Cherokee Counties, Oklahoma) fell to -20° F in January. The temperature at Mount Auburn, Ohio, a suburb of Cincinnati dropped to -13° F in January. The temperature at Fortress Monroe (at Hampton, Virginia) dropped to 2° F in January.<sup>113, 126</sup>

In April 1857, snow lay on the ground near Fayette, Missouri in the *United States* from the 17<sup>th</sup> to the 20<sup>th</sup> to a depth of several inches.<sup>123</sup>

**1857 A.D.** The spring and early summer of 1857 was extremely rainy in Bradford County, Pennsylvania in the *United States*. There had not been a week since the spring break-up that the Susquehanna River was not swollen from one bank to the other. As of 2 July, there was a heavy freshet and the water was still rising.<sup>178</sup>

In *France*, the summer of 1857 was warmer than normal, and the months of July and August produced very warm temperatures. The heat during the summer was distributed as follows:

<u>City</u>	<u>Hot Days</u>	<u>Very Hot Days</u>	<u>Extremely Hot Days</u>
Lille, <i>France</i>	41 days	4 days	1 day
Hendecourt, <i>France</i>	38 days	2 days	0 days
Clermont, <i>France</i>	74 days	32 days	9 days
Metz, <i>France</i>	54 days	8 days	2 days
Görsdorf, <i>Germany</i>	42 days	5 days	0 days
Paris, <i>France</i>	44 days	4 days	1 day
Marboue, <i>France</i>	36 days	1 day	0 days
Vendôme, <i>France</i>	49 days	6 days	0 days
Nantes, <i>France</i>	65 days	12 days	0 days
La Châtre, <i>France</i>	54 days	8 days	1 day
Bourg, <i>France</i>	53 days	12 days	3 days
Saint-Léonard, <i>France</i>	54 days	5 days	0 days
Le Puy, <i>France</i>	44 days	6 days	0 days
Bordeaux, <i>France</i>	58 days	10 days	0 days
Orange, <i>France</i>	66 days	23 days	14 days
Beyrie, <i>France</i>	56 days	14 days	2 days
Régusse, <i>France</i>	56 days	15 days	2 days
Toulouse, <i>France</i>	62 days	12 days	6 days
Montpellier, <i>France</i>	68 days	29 days	14 days
Marseille, <i>France</i>	60 days	2 days	0 days
Algiers, <i>Algeria</i>	109 days	7 days	0 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The high temperatures observed during the summer were:<sup>62</sup>

Montpellier, <i>France</i>	(101.5° F, 38.6° C) on 29 July
Perpignan, <i>France</i>	(101.5° F, 38.6° C) on 29 July
Orange, <i>France</i>	(100.9° F, 38.3° C) on 18 July
Les Mesneux, <i>France</i>	( 98.6° F, 37.0° C) on 4 August
Toulouse, <i>France</i>	( 98.2° F, 36.8° C) on 27 July
Clermont, <i>France</i>	( 98.2° F, 36.8° C) on 14 & 15 July and 3 August
Beyrie, <i>France</i>	( 97.9° F, 36.6° C) on 15 July
Blois, <i>France</i>	( 97.7° F, 36.5° C) in August
La Chapelle d'Angillon, <i>France</i>	( 97.7° F, 36.5° C) in August
Paris, <i>France</i>	( 97.2° F, 36.2° C) on 4 August
Tours, <i>France</i>	( 96.8° F, 36.0° C) in August
Sétif, <i>Algeria</i>	( 96.4° F, 35.8° C) in July
Bourg, <i>France</i>	( 96.1° F, 35.6° C) on 4 August
Metz, <i>France</i>	( 96.1° F, 35.6° C) on 4 August
La Châtre, <i>France</i>	( 95.4° F, 35.2° C) on 4 August
Lille, <i>France</i>	( 95.0° F, 35.0° C) on 4 August
Rousson, <i>France</i>	( 95.0° F, 35.0° C) in July
Régusse, <i>France</i>	( 95.0° F, 35.0° C) on 30 & 31 July
Algiers, <i>Algeria</i>	( 94.8° F, 34.9° C) on 9 September
Görsdorf, <i>Germany</i>	( 93.9° F, 34.4° C) on 4 August
Vendôme, <i>France</i>	( 93.9° F, 34.4° C) on 3 August
Le Puy, <i>France</i>	( 93.6° F, 34.2° C) on 28 July

Nantes, <i>France</i>	( 93.2° F, 34.0° C ) on 3 August
Rodez, <i>France</i>	( 92.3° F, 33.5° C ) in July
Hendecourt, <i>France</i>	( 91.4° F, 33.0° C ) on 4 August
Saintes, <i>France</i>	( 90.5° F, 32.5° C ) on 3 August
Bordeaux, <i>France</i>	( 89.6° F, 32.0° C ) on 15 July and 3 August
Marseille, <i>France</i>	( 89.2° F, 31.8° C ) on 30 July
Saint-Léonard, <i>France</i>	( 88.7° F, 31.5° C ) on 29 July
Marboue, <i>France</i>	( 88.3° F, 31.3° C ) on 15 July and 4 August
Brussels, <i>Belgium</i>	( 86.4° F, 30.2° C ) on 1 August

In 1857 there were three distinct periods of summer heat. The first began on 27 June on the highest and most southerly resorts in *France* and by 28 June reached the northern borders. The second wave passed from 14 to 16 July to the northwest. The third and strongest heat wave spread slowly and gradually progressing from south to north during the period 27 July to 4 August.<sup>62</sup>

In *France* during the greater part of the summer, there was an extraordinary drought. Fortunately, in many places in mid-August a weak but fertile rain fell. During several days in July, August and September, the Seine River at the bridge “Pont de la Tournelle” in Paris fell below the zero water level [the low water mark of the year 1719]. In Burgundy, the grape harvest began on 16 September. The yield was reasonably in quantity and vintage quality of the wine was good. The cereals harvest produced average yields.<sup>62</sup>

In the Bolwarra - Maitland region of New South Wales, *Australia*, 26 people were killed and there was great damage from severe floods in 1857.<sup>99</sup>

The *Dunbar*, an emigrant ship (1,980 tons fully loaded, 1,321 tons register) was wrecked near South Head, Sydney, *Australia* on the night of 20 August 1857. The *Dunbar* arrived off Sydney Heads in a rising southeasterly gale and poor visibility carrying 63 passengers and 59 crew. Her master, Captain Green, anxious to terminate the voyage, posted extra lookouts and ran for the Port Jackson entrance, but shortly after midnight her port bow struck rocks just north of the signal station, midway between the lighthouse on South Head and The Gap. Immediately she struck the topmasts went overboard and the huge sea swept over her starboard carrying away people, boats, bulwarks and masts. Next morning floating wreckage showed that a ship had been wrecked and anxious relatives who had been expecting the *Dunbar* joined searchers who found only battered bodies floating in the surf. On the second day a young able seaman named Johnson was sighted on the rocks and hauled up the cliffs to safety. He was the sole survivor.<sup>99</sup>

On 11 September 1857, a hurricane struck North Carolina in the *United States* causing approximately 424 deaths.<sup>141</sup>

On 23 November 1857, there was a great storm on the northeast coast of *Scotland*; 42 fishermen lost.<sup>57, 90</sup>

In 1857 during the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch’ang-p’ing, T’ang-shan and Wang-tu. During the period between 6 May and 8 August, a drought engulfed Hopei province at Pao-ting, Yüan-shih, Wu-chi, Yung-ch’ing, Wu-i, Kuang-tsung and Pai-hsiang. Then during the same time (6 May and 8 August), floods struck Hupeh (now Hubei province) in central *China* at Sung-tzū and Chih-chiang. During the period between 20 August and 17 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Chin-yün and Pin-chou [uncertain name and province].<sup>153</sup>

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*



**Winter of 1857 / 1858 A.D.** The winter was a little more severe than average. The Danube River and the Russian ports in the *Black Sea* were frozen over in January 1858.<sup>70</sup>

The winter of 1857-58 was moderately cold for the temperate zone. Beginning in mid-November, on the Atlantic coast of the *United States* great cold struck, and several ports became blocked by the ice and the Erie Canal froze. In *France* and *Germany*, during the months of November and December the temperatures were noticeably milder than normal. North of the Loire River, the winter began as a vision of springtime in the fields. The primroses, violets, anemones were in bloom. January [in *Europe*] was colder than average and in the South there was a series of frosts, which lasted 20-30 days. Fortunately, the cold was not severe, for the ground had no snow this winter in *France*, except in the high places. If the cold was worse because of the lack of snow, the damage of the frost on the defenseless and already green fields could have been very significant. The continuing drought was sad for the farmers. There was sufficient rain only along the *Mediterranean Sea* in Provence, *France*. The drought was so great that the wells dried up in almost every village, and the springs dried up; so individuals were forced to travel several leagues in order to obtain water for the cattle. In Eure in northern *France* one hectoliter (26.4 gallons) of water was sold for 2 francs 50 centimes which was normally the price paid for cider in a good year.<sup>62</sup>

There were two cold spells in *France* that drove the temperature lows. These were from 5 to 8 January and from 24 to 29 January. The lowest temperatures observed this winter in France are the following:<sup>62</sup>

Goersdorf, <i>France</i>	( 6.1° F, -14.4° C) on 28 January
Le Puy, <i>France</i>	( 6.3° F, -14.3° C) on 25 January
Clermont, <i>France</i>	( 6.8° F, -14.0° C) on 7 January
Les Mesneux, <i>France</i>	( 7.7° F, -13.5° C) on 7 January
Bourg, <i>France</i>	( 9.5° F, -12.5° C) on 29 January
Hendecourt, <i>France</i>	( 10.4° F, -12.0° C) on 8 January
Marboue, <i>France</i>	( 10.8° F, -11.8° C) on 7 January
Vendôme, <i>France</i>	( 12.2° F, -11.0° C) on 6 January
Lille, <i>France</i>	( 14.0° F, -10.0° C) on 5 & 7 January
Saint-Léonard, <i>France</i>	( 14.0° F, -10.0° C) on 7 January
La Châtre, <i>France</i>	( 14.5° F, -9.7° C) on 5 January
Metz, <i>France</i>	( 15.1° F, -9.4° C) on 29 January
Paris, <i>France</i>	( 15.8° F, -9.0° C) on 7 January
Montpellier, <i>France</i>	( 17.2° F, -8.2° C) on 6 January
Beyrie, <i>France</i>	( 17.6° F, -8.0° C) on 8 January
Toulouse, <i>France</i>	( 17.6° F, -8.0° C) on 7 January
Nantes, <i>France</i>	( 20.3° F, -6.5° C) on 7 January
Orange, <i>France</i>	( 20.8° F, -6.2° C) on 27 January
Bordeaux, <i>France</i>	( 23.0° F, -5.0° C) on 5 January
Régusse, <i>France</i>	( 23.0° F, -5.0° C) on 25 January
Marseille, <i>France</i>	( 25.0° F, -3.9° C) on 24 January
Algiers, <i>Algeria</i>	( 37.0° F, +2.8° C) on 13 March

In *France* the number of frost days were quite large; but in *Algeria* it was not cold. In Paris, the average number of frost days per winter since the end of the last century was 43 frost days. In the winter of 1857-58, there were 57 days of frost.<sup>62</sup>

Goersdorf, <i>France</i>	108 days of frost
Bourg, <i>France</i>	94 days of frost
Le Puy, <i>France</i>	91 days of frost
Les Mesneux, <i>France</i>	88 days of frost
Hendecourt, <i>France</i>	87 days of frost
Clermont, <i>France</i>	81 days of frost
Saint-Léonard, <i>France</i>	78 days of frost

Metz, <i>France</i>	77 days of frost
Marboue, <i>France</i>	65 days of frost
Lille, <i>France</i>	63 days of frost
Montpellier, <i>France</i>	63 days of frost
Vendôme, <i>France</i>	59 days of frost
Paris, <i>France</i>	57 days of frost
La Châtre, <i>France</i>	53 days of frost
Toulouse, <i>France</i>	52 days of frost
Régusse, <i>France</i>	52 days of frost
Beyrie, <i>France</i>	33 days of frost
Nantes, <i>France</i>	33 days of frost
Orange, <i>France</i>	32 days of frost
Bordeaux, <i>France</i>	21 days of frost
Marseille, <i>France</i>	8 days of frost
Algiers, <i>Algeria</i>	0 days of frost

A few frost in *France* occurred late in the season during the month of April. On 2 April it was 24.8° F (-4.0° C) in Clermont; on 14 April it was 27.5° F (-2.5° C) in Hendecourt; 28.4° F (-2.0° C) in Les Mesneux; and 29.3° F (-1.5° C) in Goersdorf.<sup>62</sup>

During this winter, several rivers froze. The Danube and the Russian ports of the *Black Sea* were frozen in January. In Lombardy [*Italy*] the Tanaro River was frozen from one shore to the other side, and powder wagons drove across the ice. Many rivers froze in *France* because of the extremely low water levels brought on by the drought, even though the temperatures were only moderately cold. Most froze in areas where the water currents were low. The Seine River froze in Paris on 5 January in small arms between the bridge *Pont de l'Archevêché* and the lock. At several other points on the river the Seine froze in the middle with ice. The Cher River in central *France* was frozen to a certain extent. The Loire River was also frozen in several places as well as the Nièvre River in central *France*. The Mayenne River in eastern *France* was frozen over in its entire width. The Rhône and Saône rivers froze twice in different places. The Dordogne River was covered with ice floes.<sup>62</sup>

The contrast between the climate of *North America* and ours was revealed in January as in November; when the cold prevailed in one part of *Europe*, the weather on the banks of the St. Lawrence River became exceptionally mild.<sup>62</sup>

The snow, which was almost completely absent in *France*, Piedmont [*Italy*], the Papal States [*Italy*], the Kingdom of the Two Sicilies. But the foreign newspapers were full of detail about major snowstorms to the east. They lasted a month on the *Bosphorus*, on the *Black Sea* and *Marmara Sea*. Several people were killed. A Greek monastery was buried in Mersina, *Turkey*. One individual wrote from Constantinople published in a journal on 3 February: "During one month we have been besieged by snow and wolves. . . . You could go into the streets only on narrow sidewalks, which were limited on each side by 1.5 to 2 meters (4.9 to 6.6 feet) high snow. The cold was one of the most intense ever experienced. The wolves advanced to the gates of the city and tore apart many unfortunate people. In the open place in a barracks, two hundred paces from Pera [now part of Istanbul], *Turkey*, the wolves strangled a horse. In Scutari [now Uskudar, a district of Istanbul], *Turkey*, a woman but a short distance from a guard post, fell prey to the wolves. In certain villages of *Bosnia*, the snow rose so high that they went through the windows in the houses. Everything was closed in the city; one could not obtain any burning materials to keep warm. The extreme lack of all the items necessary to sustain life brought the public great misery."<sup>62</sup>

In the *United States* during the winter of 1857-58, the temperature at Fort Jones, California fell to -17° F in December.<sup>126</sup>

**1858 A.D.** The summer of 1858 was marked by a severe drought and a heat wave that was more sustained than intense in *England*, *Belgium*, central and southern *France*, as well as in *Algeria*. The heat during the summer was distributed as follows:

<u>City</u>	<u>Hot Days</u>	<u>Very Hot Days</u>	<u>Extremely Hot Days</u>
Lille, <i>France</i>	28 days	9 days	1 day
Hendecourt, <i>France</i>	27 days	5 days	1 day
Clermont, <i>France</i>	69 days	13 days	3 days
Les Mesneux, <i>France</i>	29 days	17 days	4 days
Metz, <i>France</i>	44 days	17 days	1 day
Görsdorf, <i>Germany</i>	42 days	5 days	0 days
Paris, <i>France</i>	26 days	3 days	0 days
Vendôme, <i>France</i>	48 days	9 days	3 days
Nantes, <i>France</i>	64 days	6 days	0 days
La Châtre, <i>France</i>	53 days	3 days	2 day
Bourg, <i>France</i>	55 days	7 days	0 days
Le Puy, <i>France</i>	47 days	3 days	0 days
Saint-Léonard, <i>France</i>	36 days	1 day	0 days
Bordeaux, <i>France</i>	61 days	3 days	0 days
Orange, <i>France</i>	66 days	27 days	8 days
Beyrie, <i>France</i>	59 days	3 days	0 days
Régusse, <i>France</i>	76 days	5 days	0 days
Toulouse, <i>France</i>	70 days	14 days	0 days
Montpellier, <i>France</i>	81 days	47 days	21 days
Marseille, <i>France</i>	60 days	2 days	0 days
Algiers, <i>Algeria</i>	105 days	24 days	3 days

[It appears that hot days are defined as those with temperatures of 25° C and greater but less than 31° C, very hot days are those with temperatures 31° C or greater but less than 35° C, and extremely hot days are those with temperatures of 35° C or greater.]

The heat was most remarkable in *France* from 13 to 20 June. On 13 June, the heat wave hit the high-altitude stations. By 15 June, the heat wave reached from Lille to Bordeaux. From 19 and 20 June, the heat in Montpellier rose to an extraordinary height. Heat waves struck again from 14 to 10 July and from 12 to 18 August. The exceptions were Bar, the Vaucluse and the upper Garonne, which sustained their highest temperatures in July. The high temperatures observed during the summer were:<sup>62</sup>

Montpellier, <i>France</i>	(100.9° F, 38.3° C) on 20 June
Orange, <i>France</i>	(100.9° F, 38.3° C) on 19 July
Les Mesneux, <i>France</i>	( 99.5° F, 37.5° C) on 15 June
Algiers, <i>Algeria</i>	( 98.8° F, 37.1° C) on 25 July
Sétif, <i>Algeria</i>	( 98.6° F, 37.0° C) in July
La Chapelle d'Angillon, <i>France</i>	( 98.6° F, 37.0° C) in June
Vendôme, <i>France</i>	( 97.0° F, 36.1° C) on 15 June
Tours, <i>France</i>	( 96.8° F, 36.0° C) in June
Clermont, <i>France</i>	( 96.4° F, 35.8° C) on 16 June
Lille, <i>France</i>	( 95.9° F, 35.5° C) on 15 June
Metz, <i>France</i>	( 95.0° F, 35.0° C) on 15 June
Hendecourt, <i>France</i>	( 95.0° F, 35.0° C) on 15 June
London, <i>England</i>	( 94.8° F, 34.9° C) on 16 June
Gevrolles, <i>France</i>	( 94.6° F, 34.8° C) in June
Toulouse, <i>France</i>	( 94.3° F, 34.6° C) on 14 July
Rousson, <i>France</i>	( 94.1° F, 34.5° C) in July
Nantes, <i>France</i>	( 93.2° F, 34.0° C) on 15 June
Beyrie, <i>France</i>	( 93.2° F, 34.0° C) on 2 June
Bourg, <i>France</i>	( 91.9° F, 33.3° C) on 15 June
Görsdorf, <i>Germany</i>	( 90.7° F, 32.6° C) on 15 June
La Châtre, <i>France</i>	( 90.5° F, 32.5° C) on 16 June
Le Puy, <i>France</i>	( 90.1° F, 32.3° C) on 13 June
Régusse, <i>France</i>	( 89.6° F, 32.0° C) on 19 July

Paris, <i>France</i>	( 89.6° F, 32.0° C) on 3 July
Bordeaux, <i>France</i>	( 88.7° F, 31.5° C) on 15 July
Saintes, <i>France</i>	( 88.7° F, 31.5° C) in June
Marseille, <i>France</i>	( 88.5° F, 31.4° C) on 19 June
Saint-Léonard, <i>France</i>	( 87.8° F, 31.0° C) on 15 June
Rodez, <i>France</i>	( 85.1° F, 29.5° C) in June

Beginning early in the year and lasting almost for half the summer, *France* experienced a very great drought. The drought affected the livestock. During June, the sky had remarkable clarity. There was very little rain in July. But numerous thunderstorms struck in August in the north. The lack of water sterilized the meadows. The harvest in the south took place on 1 July and in the north on 1 August. The yield was mediocre but the quality was quite good. Only the early corn was a failure. Various vegetables were very abundant. In Burgundy the grape harvest took place on 18 September. The yield of grapes was remarkable and the quality of wine vintage was excellent. The temperature was mild for so long that the trees, especially the chestnuts, bloomed twice in 1858. The fruit harvest was held earlier than usual.<sup>62</sup>

On 13 August 1858, there was severe flooding at Hobart, Tasmania, *Australia*. The Jordan River flooded at Pontville. One person died in the flood. Antill Ponds road was covered by 5 feet (1.5 meters) of water.<sup>99</sup>

On 14 August 1858, hurricane force winds contributed to the loss of the *John Nussey*. The foremast and fore gaff were destroyed and the jib was torn to ribbons. Pumps were used to keep the water level down, but when the stay foresail ripped, the vessel became unmanageable, drifting broadside onto a reef at the back of Griffiths Point in Victoria, *Australia*. Five members of the crew were lost.<sup>99</sup>

In 1858 during the period between 6 May and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ing.<sup>153</sup>

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1858 / 1859 A.D.** In Venice, *Italy* on 5 November 1858 there was an unusual abundant snowfall. In Rome, *Italy* on 10 November, the cold was extraordinary and it snowed without regard for the season. The Journal of 11 November 1858 in Rome read “After 8 days of bad weather, wind, cold and rain continued, says in the provinces of Ancona and Piceno at five o’clock this morning the sun in all its glory reflected its rays on the earth covered with an inch of snow that fell during the night.” In the memory of man it is not remembered a time when snow fell in early November in the districts of Ancona. It was most surprising to see Rome on Saturday the snow falling in large flakes.<sup>81</sup> [Ancona is in central *Italy*. Piceno is in west-central *Italy*.]

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1858 occurred on 14 November. Heavy snow.<sup>116</sup>

During the winter of 1858-59 in Bradford County, Pennsylvania in the *United States*, temperatures dropped to -20° F [-29° C] on January 10<sup>th</sup>. Two days of disagreeable storm culminated on 23 April 1859, in a snowfall to the depth of several inches. On 9 June, there was snow on the highlands. On 4 July, there was a flurry of snow in parts of the county.<sup>178</sup>

In the *United States* during the winter of 1858-59, the temperature at Fort Crook (now Offutt Air Force Base, Nebraska) fell to -20° F in January. The temperature at Brunswick, Maine fell to -32° F in January.<sup>113</sup>

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**1859 A.D.** On 30 January 1859, there was a lightning storm in Rio Janeiro [Rio de Janeiro, *Brazil*] that produced bifurcated lightning. “At seven o’clock some flashes of lightning appeared in the east, and at ten minutes past seven the storm had attained its full intensity. At this moment there appeared continuously, at intervals of one or two seconds, zigzag flashes of lightning, more than the third of which were bifurcated. Besides these bifurcated flashes, and those with three or four branches, which were also very frequent, not a minute passed without the appearance of what may be called arborescent flashes. These were tracks of fire which divided into many principal branches, which in their turn divided into a multitude of boughs. One of them, which I particularly remarked, and which appeared to propagate itself as it descended, divided at first into three parts, which subdivided afterwards, so as to form in all fifteen branches.”<sup>271</sup> [This phenomena is frequent in the intertropical zones but rare in Europe.]

In 1859 a heat wave struck California in the *United States*. The following maximum temperatures were observed:<sup>112</sup>

102° F, (38.9° C) at San Diego, California in June.

117° F, (47.2° C) at Fort Yuma, California in June.

133° F, (56.1° C) at San Bernardino, California.

The year 1859 was memorable in Bradford County, Pennsylvania in the *United States* as the year of the "cold summer." There was a heavy or killing frost every month in the year. There was a flurry of snow on the 4<sup>th</sup> of July, and the temperature was so cold “that persons wore overcoats at the celebrations”.<sup>178</sup>

In *England*, a dreadful storm struck on the 25<sup>th</sup> and 26<sup>th</sup> of October. The “Royal Charter,” and many other vessels lost. Another great storm occurred on the 31<sup>st</sup> of October and the 1<sup>st</sup> of November.<sup>57</sup>

On 25-26 October 1859, there was a dreadful storm that struck during the night in *Wales*. The Royal Charter was totally lost along with many other vessels. [The Royal Charter was a steam clipper, which was wrecked on the northeast coast of Anglesey, *Wales* on 26 October 1859. Although the precise number of dead is uncertain as the passenger list was lost in the wreck; around 459 lives were lost.] There was another storm on 31 October and another storm on 1 November 1859.<sup>90</sup>

In 1859 during the period between 4 January and 2 February, floods struck Hupeh (now Hubei province) in central *China* at Chiang-ling, Sung-tzū and Kung-an. During the period between 5 February and 6 May, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Chi-mo. During the period between 6 May and 8 August, a drought engulfed Shantung province at Lin-ch’ü, Pin and Huang. During the period between 30 July and 27 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Yüan-shih and Luan.<sup>153</sup>

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1859 / 1860 A.D.** In the *United States* during the winter of 1859-60, the temperature at Camp Stockton (now Fort Stockton, Texas) fell to -9° F in December. The temperature at Fort Crittenden (near Fairfield, Utah) fell to -22° F in December. The temperature at Fort Ripley (near Little Falls, Minnesota) fell to -44° F in January.<sup>113</sup>

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**1860 A.D. – 1862 A.D. India, Afghanistan and South Africa. Drought**

In *India* during the years 1860-61, there was a severe drought in parts of the Punjaub [Punjab] and northwest provinces.<sup>47</sup>

In 1860, there was a famine in the Northwest Provinces, Punjab, and Bombay in *India*.<sup>156</sup>

In *India* during 1860-61, there was a famine. “In 1859-60, the Delhi territory suffered from want of rain. The great Nujjufghur Jheel [great marsh] became entirely dry – a thing never before known within the memory of man. The rains of 1860 completely failed in the country between the Jumna [Yamuna River] and the Sutlej [River]; and except where irrigation was available, no autumn or spring crop could be sown.”<sup>57</sup> [Nujjufghur Jheel is possibly today the Okhla Bird Sanctuary, a neighbourhood around the old Okhla village in South Delhi district. The Jumna River is in northern *India*. The Sutlej River flows through the historic crossroad region of Punjab in northern *India* and *Pakistan*.]

In 1860-61 in northwest *India*, there was a famine and thousands perished.<sup>90</sup>

In 1860, there was a famine in *India*. Two scanty years were followed by a failure of the rains in 1860. The affected region lied between Delhi and Agra and encompassed approximately 5.5 million people.<sup>181</sup>

In 1860-61, there was a famine in Panjab, *Afghanistan*.<sup>187</sup>

In 1861 in *India*, there was a famine in the northwest provinces; failure of crops; thousands starved.<sup>91</sup>  
In *India* during 1861-62, there was considerable scarcity of food in Kach and various other districts of the Bombay Presidency, owing to scanty and unseasonable rains in 1861, and to short rainfall in the early part of 1862.<sup>57</sup>

During 1861-1862, *South Africa* experienced drought conditions.<sup>167</sup>

— At Genadendal in 1861, “The continued severe drought, which prevailed not only in this neighbourhood, but over the whole colony, and even beyond its boundaries, caused great distress throughout the country.”

— At Cradock “Farmers who have lived upwards of fifty years in this locality state that the drought of 1862 is the greatest ever known.”

— In North-Eastern Colony in 1862, “The drought continues unabated, Colesburg, Hanover, Hopetown, the western part of the Free State, Griquatown, and the country beyond it, are all in a pitiable state.”

**1860 A.D.** In 1860, there were floods in the Terara Nowra (Shoalhaven River Region) of New South Wales in *Australia*. A total of 16 people lost their lives in this flood. The severity of the floods caused great damage and led to the rebuilding [and relocation] of Nowra. The city was originally located in a low-lying area near the Shoalhaven River.<sup>99</sup>

In 1860, there were severe floods at Araluen and Braidwood in New South Wales, *Australia*. Twenty-four lives were lost. The flood produced significant property damage.<sup>99</sup>

In February 1860, a great flood took place in almost all parts of New South Wales, *Australia*. The country adjacent to the Shoalhaven and Araluen Rivers in the south, suffered the most from this flood. The prospects of the agriculturists and the diggers [farmers and miners] were alike blasted by the overwhelming waters. Many lives were lost, and in some instances whole families were drowned. Entire houses were overwhelmed, and cattle, crops, fences, agricultural implements, the wreck of households and farms were carried to the sea, strewing the sea coast for a distance of miles; one proprietor near Goulburn lost 2,000 sheep. At Braidwood, another proprietor lost to the extent of £5,000; the railway works lost to a great extent, embankments being washed from under the rails, culverts burst, and bridges destroyed by the combined force of the rushing waters and masses of floating timber.<sup>103</sup>

On 24 April 1860, there was a great flood at Ballarat in Victoria, *Australia*.<sup>103</sup>

In *England*, there was a great storm in the [English] Channel, causing much loss of life and property on 1 January. There was a dreadful gale on the 26<sup>th</sup>-28<sup>th</sup> of February, on the 28<sup>th</sup> of May, and on the 2<sup>nd</sup> of June.<sup>57, 90</sup>



On 11 August 1860, a hurricane struck Louisiana in the *United States* causing 47 deaths.<sup>141</sup>

On 11 August 1860, storm [hurricane] at Mobile, Alabama in the *United States*; the [storm surge] high-water mark was 18 inches lower than that of 1852 hurricane.<sup>117</sup>

On 15 September 1860, a storm [hurricane] at Mobile, Alabama in the *United States*; the [storm surge] high-water mark was 12 inches lower than that of 1852 hurricane.<sup>117</sup>

On 20 October 1860, Bradford County, Pennsylvania in the *United States* experienced a great flood. Heavy rains caused great damage by raising the creeks and rivers, overflowing the bottoms and carrying away the crops. The Susquehanna River rose extremely rapidly to a mark higher than ever known at this season. The low flats were flooded and much damage done. But damage was greatest in the creeks. Sugar Creek had not been so high for some years. Bridges, milldams and crops suffered terribly. Not a bridge is left on Bentley Creek, all having been swept away by the flood. On Towanda Creek the damage was very severe. A new bridge erected just above Franklin was swept away. A portion of Bull's milldam was carried away and a sawmill greatly damaged. The floods swept away the harvest; stouts of corn and a shower of apples were seen floating downstream.<sup>178</sup>

In 1860 during the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ing-fêng; Shantung (now Shandong province) on the east coast of *China* at P'êng-lai; and Kansu (now Gansu province) in northwest *China* at Lanchow. During the period between 18 July and 16 August, a severe drought engulfed Hopei province at Ch'ing.<sup>153</sup>

*Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe. Also refer to the section 1860 A.D. – 1862 A.D. for information on the drought in India, Afghanistan and South Africa during that timeframe.*

**Winter of 1860 / 1861 A.D.** In *England*, there was a very severe frost from 20<sup>th</sup> December to 5<sup>th</sup> January; many of the less hardy shrubs destroyed.<sup>47, 90, 93</sup>

In *England*, the frost of December 1860 and January 1861 were remarkable. Christmas eve was extremely cold. In the valley of the Rea [in the west Midlands], the temperature dropped to -5.0° to -7.0° F (-20.6° to -21.7° C).<sup>70</sup>

The winters of 1860, 1863 and 1864 was very severe and covered southern *Europe* with snow and ice, and was very severe even in *Egypt*.<sup>205</sup>

In the *United States* during the winter of 1860-61, the temperature at Middletown, Connecticut fell to -18° F in December. The temperature at Fort Abercrombie, North Dakota, fell to -40° F in February and March. The temperature at Stratford, New Hampshire fell to -37° F in February. The temperature at Newark, New Jersey fell to -7° F in February.<sup>113,126</sup>

During the winter of 1860-61 in Bradford County, Pennsylvania in the *United States*, was noted for early snowstorms. The first snowfall occurred on 14 October 1860, which deposited 8 inches [20 cm] of snow. Snow fell each day beginning 30 November for 11 straight days. On 6 February 1861, temperatures dropped to -12° F [-24° C]. Then on 14 February, temperatures dropped to -20° F [-29° C] at Towanda and -29° F [-34° C] at Rome.<sup>178</sup>

**1861 A.D.** In Holland [now *the Netherlands*], there were great inundations. About 30,000 of the peasantry rendered destitute.<sup>47, 92</sup>

In January 1861 in Holland, an inundation submerged nearly 40,000 acres [16,187 hectares].<sup>90</sup>

In Montreal, *Canada* in January and February, there was a flood occasioned by the breaking of the ice of the St. Lawrence in the spring, laid the greater part of the city under water, and occasioned the destruction of a large amount of property.<sup>47, 92</sup>

In *England* on the 20<sup>th</sup> and 21<sup>st</sup> of February, there were great gales; part of the Crystal Palace [in London] blown down; Chichester Cathedral [in Sussex in southern *England*] steeple fell.<sup>57, 90</sup>

In May 1861, there was an inundation at Kiev, *Ukraine* and Moscow, *Russia*. 615 houses under water.<sup>97</sup>

In *Britain* on 28 May, there were great storm on the British coast – 143 shipwrecks. And then on the 13<sup>th</sup> and 14<sup>th</sup> of November there was another storm on the north coast producing another 50 shipwrecks.<sup>57, 90</sup>

On 10 July 1861, a hurricane struck the western *Atlantic Ocean*. The ship *Bowditch*, while in a tremendous hurricane, was overwhelmed by large waves, which washed all hands overboard. Only the captain survived.<sup>141</sup>

On 2 November 1861, a hurricane struck North Carolina and Massachusetts in the *United States* causing 33 deaths.<sup>141</sup>

In 1861 during the period between 5 February and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ing. Then during the period between 8 July and 5 August, floods struck Hupeh (now Hubei province) in central *China* at Chung-hsiang. Dikes were damaged. During the period between 6 August and 4 September, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ching-ning. Also during the period between 6 August and 4 September, a drought engulfed Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing. During the period between 5 September and 3 October, a severe drought engulfed Kansu (now Gansu province) in northwest *China* at Lanchow, T'ung-wei and Ch'in-an.<sup>153</sup>

*Also refer to the section 1860 A.D. – 1862 A.D. for information on the drought in India, Afghanistan and South Africa during that timeframe.*

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**Winter of 1861 / 1862 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1861 occurred on 29 & 30 November. Slight snowfall.<sup>116</sup>

In the *United States* during the winter of 1861-62, the temperature at Colebrook fell to -28° F in December. The temperature at Fort Riley, Kansas fell to -29° F in January. The temperature at Fort Dalles (The Dalles, Oregon) fell to -23° F in January. The temperature at Fort Walla Walla (Walla Walla, Washington) fell to -24° F in January.<sup>113</sup>

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**1862 A.D.** In Cape Colony [today in the southern part of *South Africa*], there was a disastrous drought.<sup>47</sup>

In April 1862, the North Branch of the Susquehanna River in Pennsylvania in the *United States* flooded for a week. There was very little rain in this region during the spring. The floodwaters came from the immense snow banks of New York State. Then in the autumn, a general drought prevailed in Bradford County, Pennsylvania.<sup>178</sup>

At St. Germain's (near King's Lynn, Norfolk, *England*) on May 4, there was a great inundation through the bursting of the Middle Level Sluice. Some 10,000 acres (4,000 hectares) of cultivated land submerged. Then on October 4, another marshland sluice burst; large tract flooded.<sup>47,92</sup>

On 4-15 May 1862, a great inundation was caused by the bursting of the outfall sluice at St. Germain's, near King's Lynn in *Great Britain*.<sup>90</sup>

In July 1862, the Swan, Murray and other rivers overflowed their banks and caused unprecedented widespread flooding of Perth, Bunbury, York and surrounding areas of *Western Australia*. The floods caused 12 deaths and destroyed many buildings.<sup>99</sup>

In *England* on the 2<sup>nd</sup> of September, there was a great hailstorm. The hailstones were 6 to 7 feet deep on the ground at Market Laverton; much damage to crops.<sup>57</sup> [There is a Market Laverton Parish Council in Wiltshire in southwestern *England*. Wiltshire borders on to Somerset.]

On 2 September 1862, a storm at Market Laverton [in *England*] caused much damage to crops by hail.<sup>90</sup>

On 2 September 1862 in *England*, there was a great hailstorm in Somersetshire. The hailstones accumulated 6 or 7 feet (1.8 or 2.1 meters) deep on the ground. The storm produced severe damage.<sup>93</sup>

On 4 October 1862, a marshland sluice [in *Great Britain*] bursts; many acres inundated.<sup>90</sup>

In *England* on the 19<sup>th</sup> and 20<sup>th</sup> of October, there was a great storm on the British coasts; many shipwrecks.<sup>57,90</sup>

On 30 October 1862, a hurricane struck off the coast of North Carolina in the *United States*. Twenty-five Federal vessels left Hampton Roads, Virginia with coal for the fleet about to attack Port Royal in South Carolina. The next day, fifty more vessels sailed. On the 30 October, off Cape Hatteras, North Carolina they were swallowed up and spewed everywhere by appalling winds and seas. Two steamers were lost.<sup>141</sup>

In 1862, a powerful cyclone struck Canton, *China* causing 37,000 deaths.<sup>98</sup> [Canton (Guangzhou) is in southeastern *China*.]

In 1862, a drought engulfed many regions of *China* including:<sup>153</sup>

— During the period 1-29 March, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ing.

— During the period between 27 June and 26 July, a drought engulfed Shensi (now Shaanxi province) in central *China* at Tso-shui and Kansu (now Gansu province) in northwest *China* at Lanchow.

— During the period between 27 July and 24 August, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ch'i-hsia; Hupeh (now Hubei province) in central *China* at Wuchang and Hsien-ning; and Wei-hsien [uncertain name and province, possible misprint].

In 1862 during the period between 28 May and 26 June, floods struck Hupeh (now Hubei province) in central *China* at Kung-an and Shantung (now Shandong province) on the east coast of *China* at Jih-chao. During the period between 8 August and 8 November, floods struck Kiangsi (now Jiangxi province) in southern *China* at Ch'ing-chiang [uncertain name, "Lin-chiang"].<sup>153</sup>

*Also refer to the section 1860 A.D. – 1862 A.D. for information on the drought in India, Afghanistan and South Africa during that timeframe.*

**Winter of 1862 / 1863 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1862 occurred on 7 & 8 November. Violent storm; much snow.<sup>116</sup>

The winter of 1862-63 in Bradford County, Pennsylvania in the *United States* was memorable because it produced much snow but little sleighing. On 7 November, an incessant snowstorm lasted all day.<sup>178</sup>

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**1863 A.D.** In 1863, the Murrumbidgee River flooded in New South Wales, *Australia*. At Gundagai, the river rose to 38 feet 10 inches above the high water mark. At Wagga Wagga, the river rose to 35 feet 9 inches above the high water mark.<sup>103</sup>

In 1863 in New South Wales, *Australia*, the Macleay and Darling Rivers flooded. Ten people perished in these floods. Queensland experienced flooding during most of the year. South-central Victoria rivers flooded. Also severe flood damage was reported in Hobart, Tasmania.<sup>101</sup>

On 5 January 1863, the temperature at Sydney, *Australia* reached 106.9° F (41.6° C).<sup>103</sup>

In *England* on the 19<sup>th</sup> of January, there were extensive gales, accompanied by numerous whipwrecks.<sup>57</sup>

On 19 January 1863, there were severe gales [in *Great Britain*], doing much damage, and causing much loss of life.<sup>90</sup>

In 1863, there was a prolonged drought in the Oatlands region of Tasmania, *Australia*, which caused crops to fail.<sup>99</sup>

In 1863, the Yarra River in Victoria, *Australia*, overflowed its banks and caused heavy damage in the floodplain including the city of Melbourne.<sup>99</sup>

On 16 February 1863, a cyclone struck Rockhampton in Queensland, *Australia*. The cyclone brought damaging winds and seas to the region between Rockhampton and Hervey Bay. Houses were unroofed and trees uprooted. At least one boat was lost. The storm caused severe erosion. Thirty-three feet (10 meters) of shoreline at Hervey Bay was lost and a further 20 acres (8 hectares) of forest were swept away by the sea. In February 1863, widespread flooding caused tremendous damage in Queensland, New South Wales and Victoria in *Australia*. Ten people drowned when the Macleay and Darling Rivers overflowed their banks.<sup>99</sup>

In 1863 there were heavy floods in Queensland, *Australia*.<sup>103</sup>

On 26 May 1863, a hurricane struck the northeast *Gulf of Mexico* causing 37 deaths.<sup>141</sup>

On 21 August 1863, a hurricane struck near the Outer Banks in North Carolina in the *United States* causing 80 deaths.<sup>141</sup>

On 12 September 1863 in *England*, there was a most destructive hailstorm in Berkshire. Near midnight, the hailstorm, near East Illsley (taking a northeasterly direction), caused great damage to grain crops cut, but not carted, and also to glass and fruit. The storm was accompanied with lightning; killing sheep and cattle. Rabbits, partridges, and many small birds were found killed by the hail.<sup>93</sup>

In Melbourne, *Australia* on December 14-24, there was a flood, caused by the rising waters of the Yarra Yarra River, 40 feet above their usual level, submerged the greater portion of the city and destroyed property to the value of 250,000*l*.<sup>47, 92</sup> [In present currency, that would be equivalent to £20 million in damages based on the retail inflation price index.]

In Buenos Aires, *Argentina*, a drought occurred in 1863 and 1864. “The ground is baked hard, and in some places cracked open. The surface is like burnt ground. When the winds prevail, storms of dust sweep over the plains, almost depriving the remaining animals of life. Dust storms, in which houses are unroofed, trees blown down, and thousands of sheep driven to parts unknown, have occurred in several places.” Over hundreds of miles of territory affected, losses in millions of dollars.<sup>66</sup>

From 9 - 12 December 1863, a severe northeast gale, with heavy snowstorm struck St. John’s *Newfoundland*.<sup>66</sup>

On December 13, 1863, the coast of *England* was visited with a terrible gale, which inflicted very great distress on shipping, and caused much loss of life. It was also very destructive on land as well as at sea and on the coast – chimneys, trees, roofs, barns, houses, etc. being blown down by the violence of the wind. The list of casualties extended over thirty columns of the London papers, and embraces almost every locality on the coast of the United Kingdom, and many points on the adjacent continental seaboard.<sup>66</sup>

On 14-20 December 1863, severe floods struck eastern Tasmania, *Australia*. The flooding followed a southerly gale at Hobart and in the Derwent Valley. Extensive damage occurred at New Town. Flooding also caused agricultural losses at Oatlands and Richmond. The barometer fell to 977 millibar at Hobart. On 16 December, in Launceston, floodwaters rose 16 inches (40 centimeters) above the 1929 flood level making it the most severe on record in the city's history. These record floods caused heavy livestock and crop losses in the Tooms Lake, Macquarie and South Esk areas.<sup>99</sup>

In 1863, a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ch’êng. During the period between 5 February and 6 May, floods struck Chekiang province at Hu-chou. During the period between 16 July and 13 August, floods struck Hupeh (now Hubei province) in central *China* at Chung-hsiang, Ch’ien-chiang, Pao-k’ang and Kung-an. At Ch’ien-chiang, the dikes were damaged. At Pao-k’ang, houses and fields were damaged by the floodwaters. During the period between 8 August and 8 November, floods struck Hupeh province at Yün-hsi.<sup>153</sup>

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**Winter of 1863 / 1864 A.D.** The meteorological condition in the northern hemisphere during December 1863 and January 1864 were remarkable. A cold polar current flowed southward dramatically dropping temperatures in the middle of the *United States* (this was confined to a narrow band), and at the same time warm equatorial currents flowed northward over contiguous spaces, and thus restoring the general equilibrium of temperature and of pressure by opposite and parallel streams. At the same time an unbroken sheet of cold air, swept down through *Eastern Europe*, on the one side, to at least the *Sandwich Islands* [now *Hawaiian Islands*] on the other, flowed southward. Everywhere in this wide band severe temperatures were experienced.<sup>66</sup>

A severe cold wave swept over the whole of *North America*. The thermometer went to -60° F (-51° C) in the northwest. The Mississippi River in the *United States* was blocked with ice in a single night, and in twelve hours froze from St. Paul, Minnesota to Cairo, Illinois.<sup>63</sup>

The *United States* experienced severe cold and extensive snowstorm in the end of December 1863 and beginning of January 1864. The deepest snow was east of the Mississippi river and north of the Ohio, and the severest cold was in the same region and further west; but the depression of temperature and the atmospheric disturbance extended over the whole country. The following is a list of cold temperatures observed in U.S. cities:<sup>66</sup>

Fort Laramie, Wyoming	(colder than -38° F / -39° C) on 5, 6 & 7 January
Forest City, Minnesota	(-38° F, -39° C) on 1 January 1864

St. Paul, Minnesota	(-35° F, -37° C)	on 1 January 1864
Tamarack, Minnesota	(-35° F, -37° C)	on 1 January 1864
Canton, Missouri	(-33° F, -36° C)	on 6 January 1864
Fort Madison, Iowa	(-33° F, -36° C)	on 1 January 1864
Milwaukee, Wisconsin	(-30° F, -34° C)	on 1 January 1864
Beloit, Wisconsin	(-29° F, -34° C)	on 1 January 1864
Debuque, Iowa	(-29° F, -34° C)	on 1 January 1864
Waterloo, Iowa	(-28° F, -33° C)	on 7 January 1864
Winnebago, Illinois	(-28° F, -33° C)	on 1 January 1864
Littleton, New Hampshire	(-28° F, -33° C)	on 19 February 1864
North Littleton, New Hampshire	(-27° F, -33° C)	on 19 February 1864
Gouverneur, New York	(-27° F, -33° C)	on 18 February 1864
Manitowoe, Wisconsin	(-26° F, -32° C)	on 1 January 1864
Muscatine, Iowa	(-26° F, -32° C)	on 2 January 1864
Sandwich, Illinois	(-26° F, -32° C)	on 1 & 7 January 1864
Augusta, Illinois	(-26° F, -32° C)	on 1 January 1864
Pleasant Plain, Iowa	(-26° F, -32° C)	on 1 January 1864
Independence, Iowa	(-26° F, -32° C)	on 2 January 1864
Ottawa, Illinois	(-25° F, -32° C)	on 1 January 1864
Stratford, New Hampshire	(-25° F, -32° C)	on 19 February 1864
Lanenburg, Vermont	(-25° F, -32° C)	on 18 & 19 February 1864
Tishkila, Illinois	(-24° F, -31° C)	on 1 January 1864
Waverley, Illinois	(-24° F, -31° C)	on 1 January 1864
Lyons, Iowa	(-24° F, -31° C)	on 1 January 1864
Mount Pleasant, Iowa	(-24° F, -31° C)	on 1 January 1864
Iowa Falls, Iowa	(-24° F, -31° C)	on 1 January 1864
Algona, Iowa	(-24° F, -31° C)	on 1 & 2 January 1864
Galesburg, Illinois	(-23° F, -31° C)	on 1 January 1864
St. Louis, Missouri	(-22° F, -30° C)	on 1 January 1864
Rockville, Indiana	(-22° F, -30° C)	on 1 January 1864
Peoria, Illinois	(-22° F, -30° C)	on 8 January 1864
Lansing, Michigan	(-22° F, -30° C)	on 1 January 1864
Harrisonville, Missouri	(-22° F, -30° C)	on 1 January 1864
Elkhorn, Nebraska	(-22° F, -30° C)	on 7 January 1864
Upper Alton, Illinois	(-21° F, -29° C)	on 1 January 1864
Brandon, Vermont	(-21° F, -29° C)	on 18 February 1864
West Waterville, Maine	(-21° F, -29° C)	on 19 February 1864
Muncie, Indiana	(-20° F, -29° C)	on 1 January 1864
Burlington, Vermont	(-20° F, -29° C)	on 7 January 1864
Pekins, Illinois	(-20° F, -29° C)	on 1 January 1864
Hoylton, Illinois	(-20° F, -29° C)	on 1 January 1864
South Bend, Indiana	(-20° F, -29° C)	on 1 January 1864
Athens, Missouri	(-19° F, -28° C)	on 6 January 1864
Newcastle, Indiana	(-19° F, -28° C)	on 1 January 1864
Spiceland, Indiana	(-19° F, -28° C)	on 1 January 1864
Laborville, Missouri	(-18° F, -28° C)	on 1 January 1864
Craftsbury, Vermont	(-18° F, -28° C)	on 7 January and 18 February 1864
Middlebury, Vermont	(-17° F, -27° C)	on 7 January 1864
Bellevue, Nebraska	(-17° F, -27° C)	on 1 January 1864
Lawrence, Kansas	(-17° F, -27° C)	on 1 January 1864
Claremont, New Hampshire	(-17° F, -27° C)	on 19 February 1864
Urbana, Ohio	(-16° F, -27° C)	on 6 January 1864
Steuben, Maine	(-16° F, -27° C)	on 19 February 1864
Baldwinsville, Massachusetts	(-16° F, -27° C)	on 19 February 1864
New Harmony, Indiana	(-15° F, -26° C)	on 1 January 1864
South Hartford, New York	(-15° F, -26° C)	on 18 February 1864



Jamestown, New York	( -14° F, -26° C ) on 2 January and 17 February 1864
Westerville, Ohio	( -14° F, -26° C ) on 6 January 1864
Welshfield, Ohio	( -13° F, -25° C ) on 2 January 1864
Manhattan, Kansas	( -13° F, -25° C ) on 6 January 1864
Austinburg, Ohio	( -12° F, -24° C ) on 2 January 1864
Fort Riley, Kansas	( -12° F, -24° C ) on 1 January 1864
Cincinnati, Ohio	( -12° F, -24° C ) on 1 January 1864
College Hill, Ohio	( -12° F, -24° C ) on 1 January 1864
New Lisbon, Ohio	( -12° F, -24° C ) on 18 February 1864
Tioga, Pennsylvania	( -12° F, -24° C ) on 19 February 1864
Kelly's Island, Ohio	( -11° F, -24° C ) on 1 January 1864
Cornishville, Maine	( -11° F, -24° C ) on 17 February 1864
Connellsville, Pennsylvania	( -10° F, -23° C ) on 7 January 1864
New Albany, Indiana	( -10° F, -23° C ) on 1 January 1864
Louisville, Kentucky	( -10° F, -23° C ) on 8 January 1864
Williamsville, Massachusetts	( -10° F, -23° C ) on 18 February 1864
Buffalo, New York	( -9° F, -23° C ) on 2 January 1864
Rutland, Vermont	( -8° F, -22° C ) on 18 February 1864
Auburn, New York	( -8° F, -22° C ) on 17 February 1864
Westfield, Massachusetts	( -7° F, -22° C ) on 11 January 1864
Fredonia, New York	( -7° F, -22° C ) on 2 January 1864
Fleming, Pennsylvania	( -7° F, -22° C ) on 19 February 1864
Oswego, New York	( -6° F, -21° C ) on 2 January 1864
Springfield, Massachusetts	( -6° F, -21° C ) on 18 February 1864
Pomfret, Connecticut	( -6° F, -21° C ) on 18 February 1864
Mendon, Massachusetts	( -6° F, -21° C ) on 18 February 1864
Topsfield, Massachusetts	( -6° F, -21° C ) on 18 February 1864
Skaneateles, New York	( -5° F, -21° C ) on 2 January and 17 February 1864
Kingston, Ohio	( -5° F, -21° C ) on 2 January 1864
Monroe City, Michigan	( -4° F, -20° C ) on 1 January 1864
Amherst, Massachusetts	( -4° F, -20° C ) on 18 February 1864
New Haven, Connecticut	( -2° F, -19° C ) on 11 January and 18 February 1864
Seneca Falls, New York	( -2° F, -19° C ) on 2 January 1864
Sandwich, Massachusetts	( -2° F, -19° C ) on 18 February 1864
Nazareth, Pennsylvania	( 0° F, -18° C ) on 2 January and 18 February 1864
Portsmouth, Ohio	( 0° F, -18° C ) on 2 January 1864
Sykesville, Maryland	( 0° F, -18° C ) on 17 & 18 February 1864
New Bedford, Massachusetts	( 0° F, -18° C ) on 18 February 1864
Mount Holly, New Jersey	( 1° F, -17° C ) on 2 January 1864
Newark, New Jersey	( 2° F, -17° C ) on 18 February 1864
White Plains, New York	( 3° F, -16° C ) on 18 February 1864
Fishkill Landing, New York	( 3° F, -16° C ) on 7 January 1864
Providence, Rhode Island	( 4° F, -16° C ) on 8 January 1864
Throg's Neck (Long Island) New York	( 5° F, -15° C ) on 18 February 1864
Philadelphia, Pennsylvania	( 5° F, -15° C ) on 17 & 18 February 1864
Chestertown, Maryland	( 5° F, -15° C ) on 18 February 1864
Washington, D.C.	( 5° F, -15° C ) on 18 February 1864
St. Mary's City, Maryland	( 7° F, -14° C ) on 18 February 1864
New York, New York	( 8° F, -13° C ) on 17 & 18 February 1864
Beaufort, South Carolina	( 18° F, -8° C ) on 2 January 1864

In the *United States* during the winter of 1863-64, the temperature at Bellefontaine, Ohio dropped to -28° F on January 1<sup>st</sup>. In January, the temperature at Milwaukee, Wisconsin fell to -30° F. Also in January, the temperature at Dubuque, Iowa fell to -29° F. The temperature in Chicago, Illinois fell to -25° F. The

temperature at Salt Lake City fell to  $-8^{\circ}$  F. The temperature at Fort Laramie, Wyoming fell to  $-40^{\circ}$  F. The temperature at Fort Ruby, Nevada fell to  $-23^{\circ}$  F.<sup>113, 126</sup>

The winter of 1863-64 in Bradford County, Pennsylvania in the *United States* produced a heavy March snowfall. On 20 March 1864, there was a snowfall of 20 inches [51 cm].<sup>178</sup>

U.S. Colonel W. O. Collins at Fort Laramie, Wyoming in the *United States* reported on 15 January “The weather has been so intensely cold, and the snow so deep, that we have not been able to keep open our communication with the different detachments posted in the mountains. In endeavoring: to do so, and in furnishing the necessary wood, stores, &c, and taking care of the stock, probably one hundred men of my command have been frost-bitten. Two or three may lose their feet, but others will recover without permanent injury.”<sup>66</sup>

*Hourly observations of thermometer at Fort Laramie, Wyoming  
from 4 p.m. January 4, to 4 p.m., January 7, 1864*

Hour	January 4, 1864	January 5, 1864	January 6, 1864	January 7, 1864
1 a.m.	...	-33° F, -36° C	Mercury frozen	Mercury frozen
2 a.m.	...	-34° F, -37° C	Mercury frozen	Mercury frozen
3 a.m.	...	-35° F, -37° C	Mercury frozen	Mercury frozen
4 a.m.	...	-37° F, -38° C	Mercury frozen	Mercury frozen
5 a.m.	...	-39° F, -39° C	Mercury frozen	Mercury frozen
6 a.m.	...	Mercury frozen	Mercury frozen	Mercury frozen
7 a.m.	...	Mercury frozen	Mercury frozen	Mercury frozen
8 a.m.	...	Mercury frozen	Mercury frozen	-32° F, -36° C
9 a.m.	...	-39° F, -39° C	Mercury frozen	-29° F, -34° C
10 a.m.	...	-36° F, -38° C	-34° F, -37° C	-20° F, -29° C
11 a.m.	...	-31° F, -35° C	-23° F, -31° C	-15° F, -26° C
12 a.m.	...	-22° F, -30° C	-20° F, -29° C	-12° F, -24° C
1 p.m.	...	-20° F, -29° C	-20° F, -29° C	-11° F, -24° C
2 p.m.	...	-22° F, -30° C	-20° F, -29° C	-10° F, -23° C
3 p.m.	...	-22° F, -30° C	-23° F, -31° C	-9° F, -23° C
4 p.m.	-15° F, -26° C	-23° F, -31° C	-30° F, -34° C	-8° F, -22° C
5 p.m.	-19° F, -28° C	-32° F, -36° C	-35° F, -37° C	...
6 p.m.	-21° F, -29° C	-36° F, -38° C	-38° F, -39° C	...
7 p.m.	-22° F, -30° C	Mercury frozen	Mercury frozen	...
8 p.m.	-23° F, -31° C	Mercury frozen	Mercury frozen	...
9 p.m.	-24° F, -31° C	Mercury frozen	Mercury frozen	...
10 p.m.	-25° F, -32° C	Mercury frozen	Mercury frozen	...
11 p.m.	-30° F, -34° C	Mercury frozen	Mercury frozen	...
12 p.m.	-32° F, -36° C	Mercury frozen	Mercury frozen	...

The mercury in mercury thermometers solidifies (freezes) at -37.89 °F (-38.83 °C).

Leavenworth, Kansas in the *United States* on 18 December 1863 reported, “Accounts from the plains represent great suffering among the men and stock. In consequence of a severe snowstorm, no hay or grass could be had, and the stock was dying off by hundreds of starvation, and many lives were known to be lost by the intense cold. Fourteen inches of snow has fallen here, and much of it being drifted all the roads are blocked up. No mail have been received here for three days.”<sup>66</sup>

Natchez, Mississippi in the *United States* on 31 December 1863 reported, “This morning was sultry and close; thermometer 80° F (27° C); wind south; cloudy. About 9 a.m. a remarkable change occurred, and the wind increased and became chilly, and then stinging cold, with occasional warmer gust. What was remarkable this cold wind blew strongly directly up the river [Mississippi River], or from a point south 30° west. At 12 o’clock noon the ground began to freeze, and the wind had veered round to west. At 7 p.m. the thermometer stood at 23° F (-5° C), and next morning at 10° F (-12° C), and in some localities in the country as low as 8° F (-13° C). The cold lasted till about the 10<sup>th</sup> of January.”<sup>66</sup>

Sandwich, Illinois in the *United States* described the storm, “At 3 a.m., January 1, 1864, it began to increase in violence, and continued until it became impossible for man or beast to withstand its violence; at 7 a.m., January 1, the mercury marked -26° F (-32° C), and snow falling rapidly; railroads became blocked, and the Chicago, Burlington and Quincy road was so obstructed that for one week no mail express passed this station. Many cattle perished in the cornfields; stock [livestock] in transportation on the cars perished by hundreds, and thousands of fowls froze upon their perches. The depth of snow

falling here was about two and a half feet. The extreme cold continued about eight days. Peaches are destroyed, that is, the fruit germs, and in many instances the trees are ruined. The fruit germs upon nearly all early varieties are also destroyed. Early Richmond cherries also, and probably plums. Peaches are said to be destroyed more than a hundred miles south of Memphis [Tennessee].”<sup>66</sup>

Geneva, Wisconsin in the *United States* on 1 January 1864 reported, “snow-drifts are from four to twelve feet high; roads running north and south are impassable. Large numbers of quails are found frozen in the snow.”<sup>66</sup>

Athens, Missouri in the *United States* reported, “From the 23d of December to the 23d of January the ground has been covered with snow to the depth of seventeen inches on a level, and drifted to the height of the fences. Many roads became impassable, the general depth of the drifts being six feet. We have had as deep snows before, but not so cold, nor drifted so badly. The timber was loaded down with snow, and much of it broken, especially the pin oak and black jack, which had the leaves on. Great numbers of cattle, sheep, hogs, and fowl have perished, and many persons have been frozen to death.”<sup>66</sup>

Mount Pleasant, Iowa in the *United States* described the weather on 31 December, “The wind blew a gale all day from the northwest, and the driving snow rendered the air dark, and made it almost impossible to go about out of doors. More stock [livestock] died on this night in Iowa than was ever before known in any month of time; cattle, sheep, and hogs were often buried in-snow-banks, where they perished by being smothered.”<sup>66</sup>

Pleasant Plain, Iowa in the *United States* reported that on 31 December, “a strong gale blew from the northwest all day and night, drifting the snow in such a manner as to fill roads so full as to entirely stop them, compelling everybody to take to the fields; all communication was stopped for several days.”<sup>66</sup>

New Bedford, Massachusetts in the *United States* reported that high winds on 2 January prevented the freezing of the Acushnet River and harbor. But on the 3<sup>rd</sup> a sheet of ice covered the river and harbor. On the 4<sup>th</sup> the River was passable by pedestrians and skaters above the bridge; ice broken daily below the bridge by the steam ferryboat to Fairhaven. The ice began to disappear on the 29<sup>th</sup>.<sup>66</sup>

Skaneateles, New York in the *United States* reported on January 8, the Skaneateles Lake was nearly frozen over. On the 12<sup>th</sup>, ice cutting commenced [ice for underground ice houses – early form of refrigeration]. On the 23<sup>rd</sup> it was reported that great quantities of ice taken from the lake the week past.<sup>66</sup>

Lyons (Clinton), Iowa in the *United States* reported that on 10 January the ice in the Mississippi River was from sixteen to twenty-two inches thick.<sup>66</sup>

Fishkill Landing (Beacon), New York in the *United States* on 11 January reported the Hudson River was crossed with heavy teams.<sup>66</sup>

Byberry, Pennsylvania in the *United States* on 18 January reported, “The cold spell for the greater part of this month has been something unusual in this vicinity. Ice has been housed ten inches in thickness. The Delaware River has been frozen over at Andalusia sufficiently to bear a man walking across. At Bristol, horses have been driven across on the ice.”<sup>66</sup>

Pekin, Illinois in the *United States* on 22 January reported the Illinois River frozen sufficiently to allow crossing on the ice. Muscatine, Iowa reported on 23 January that the ice on the Mississippi River was eighteen to twenty inches thick; very solid. St. Louis, Missouri on 26 January reported the Mississippi River began to break up and the ice to move after having been closed for a period of twenty-three days, and during that time crossed by heavy teams. Beverly Philipstown, Garrison's post office on 31 January

reported the Hudson River obstructed by floating ice on the 10th of December; closed on the 17th; remained closed throughout January; crossing good for teams most of the time; ice a foot in thickness. Iowa Falls, Iowa on 31 January reported the ice on the Iowa River was about twenty-eight inches thick.<sup>66</sup>

Manna Loa and Mauna Kea, the high mountain peaks on *Hawaii*, and Mount Haleakala, on Maui, were covered on their summits with beautiful white mantles of snow; the drifts in the gulches and valleys being often from twenty to thirty feet deep. The presence of snow on these mountains indicates cold weather higher up, their altitude being from ten thousand to fourteen thousand feet. There were several snowstorms on them during the several weeks in the winter. Snowstorms in the tropics are among the most beautiful sights imaginable, and the few who are privileged to see them witness some of nature's grandest exhibitions.<sup>66</sup>

The winters of 1860, 1863 and 1864 was very severe and covered southern *Europe* with snow and ice, and was very severe even in *Egypt*.<sup>205</sup>

In Shanghai in east-central *China*, during the winter, there was ice-skating [on the Yangtze River Delta] on three different occasions. The thermometer would stand at 50° F (10° C) at noon, and fall at night to 18° F (-8° C).<sup>66</sup>

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#### **1864 A.D. – 1866 A.D. Australia. Drought**

During 1864-66 in *Australia*, there was a national drought. A drought that prevailed over New South Wales caused losses in livestock and crop failure. A severe drought affected Queensland and this drought continued until 1869. The northern areas of Victoria were severely affected by the drought. But even the southern areas of Victoria saw reduced wheat harvest. In South Australia, drought conditions were particularly harsh in the north. The drought caused cattle to be reduced by a half and sheep by 330,000. Western Australia saw one of the worst seasons ever experienced in 1864, when much of the wheat crop failed. The De Gray and the Gascoyne Rivers dried up.<sup>101</sup>

In New South Wales, *Australia* in 1864, there was a drought.<sup>103</sup>

In New South Wales, *Australia* in 1865, there was a very dry summer. January 12<sup>th</sup> was declared a day of fast on account of the drought.<sup>103</sup>

In 1866 in New South Wales, *Australia* it was very dry from October to January.<sup>103</sup>

On 8 January 1866, the temperature at Lochinvar, New South Wales, *Australia* was 108° F (42.2° C) in the shade.<sup>103</sup>

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**1864 A.D.** At Bradfield Reservoir (near Sheffield, South Yorkshire, *England*) on March 11, the embankment [the reservoir embankment of the Dale Dyke Dam] gave way at midnight; the water rushed in torrents through the neighboring villages. Great destruction of property, and 250 persons drowned.<sup>47, 92</sup>

On 11 March 1864, The Bradfield reservoir in *England* burst drowning about 250 persons.<sup>90</sup>

On 17 March 1864, a cyclone struck Brisbane in Queensland, *Australia*. There were three days of cyclonic winds from Brisbane to Gladstone. The storm damaged and unroofed houses in Brisbane, Cleveland, Toowoomba and Gladstone. The flooding at Maryborough reached the eaves of houses. The sailing ship *Panama* was driven onto a sand spit near Sandy Cape and broke in two. Eleven seamen died, only one body was found.<sup>99</sup>

On 14 May 1864, the Chemung River flooded and ran across the upper end of Athens, Pennsylvania in

the *United States* into the Susquehanna River.<sup>178</sup>

In June 1864, there was a major flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 48 feet (14.64 meters) above the water mark at Windsor.<sup>99, 109</sup>

In 1864, California in the *United States* suffered from a serious drought caused by a lack of winter rains. There was a regular downpour in November 1863, and from that time until November 1864, there was no rain. Dead cattle covered the ground from Monterey to Southern California.<sup>200</sup>

On 5 October, a great cyclone struck at Calcutta, *India*. Immense damage was done on land and sea. A great part of Calcutta was laid to waste. About 200 ships were reported to be lost and about 70,000 people perished. Whole towns nearly destroyed.<sup>47, 57</sup>

On 5 October 1864, a dreadful hurricane in the Indian Ocean struck Calcutta, *India*.<sup>90</sup> [The typhoon killed 60,000 people and many more died later from sicknesses and diseases that followed.]

On 5 October 1864, a great cyclone struck Calcutta, *India*. Captain Watson, of the *Clarence*, observed the barometer falling foretelling the approaching cyclone and saved his ship by steering out of its range.<sup>90</sup>

On 5 October 1864, a great cyclone struck Calcutta, *India*. This was followed by a "bore" or spring tide in the Hooghly River. Water rose 30 feet high. Immense damage was done to shipping and houses. About 60,000 persons said to have perished.<sup>94</sup> [Calcutta is now Kolkata, capital of the northwestern Indian state of West Bengal. A "bore" or spring tide is a Hugli tidal bore. The tide runs rapidly on the Hugli, and produces a remarkable example of the fluvial phenomenon known as a "tidal bore". This consists of the head-wave of the advancing tide, hemmed in where the estuary narrows suddenly into the river, and often exceeds 7 feet (2.1 m) in height. It is felt as high up as Calcutta, and frequently destroys small boats. The Hooghly River is in West Bengal in *India*.]

In 1864, a powerful cyclone struck Calcutta, *India* causing 60,000 deaths.<sup>98</sup>

On 5 October 1864, a storm wave, 16 feet deep, caused the loss of 45,000 lives on the Ganges delta in *India* and *Bangladesh*.<sup>124</sup>

On 31 October 1864 at Arelas (Arles, *France*), the bridge of boats and much property destroyed by the sudden rising of the Rhône River.<sup>47, 92</sup>

In Lisbon, *Portugal* on the 13<sup>th</sup> of December, there was a great hurricane; much damage.<sup>57</sup>

On 13 December 1864, a hurricane struck at Lisbon, *Portugal* caused much damage. This was the worst storm in many years.<sup>90</sup>

On 13 December 1864, a gale struck Lisbon, *Portugal*. The gale destroyed 100 lives and caused \$2,000,000 in property damage. [In present currency, that would be equivalent to \$54.3 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>197</sup>

In 1864 during the period between 6 May and 8 August, floods struck Hupeh (now Hubei province) in central *China* at Kung-an. Also during the same period (between 6 May and 8 August), a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-shan. During the period between 8 August and 8 November, a drought engulfed Hupeh province at Ch'ung-yang and Hopei (now Hebei province) in northern *China* at Fu-ning. Also during the same period (between 8 August and 8 November), floods struck Hupeh province at Yün-hsi.<sup>153</sup>



Also refer to the section **1864 A.D. – 1866 A.D.** for information on the drought in Australia during that timeframe.

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**Winter of 1864 / 1865 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1864 occurred on 13 & 14 November. It snowed enough for sleighing.<sup>116</sup>

The winter of 1864-65 in Bradford County, Pennsylvania in the *United States* was long and cold with deep snow. It was followed by a great flood on March 17<sup>th</sup>.<sup>178</sup>

The winter lasted from December to the end of March. The Seine River was frozen over at Paris, *France*, and people crossed the ice near the Pont des Arts.<sup>70</sup>

The winters of 1860, 1863 and 1864 was very severe and covered southern *Europe* with snow and ice, and was very severe even in *Egypt*.<sup>205</sup>

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### **1865 A.D. – 1866 A.D. Bangladesh and India. Famine**

In 1865-66 in Bengal and Orissa there was a severe famine and about 1,000,000 perished.<sup>90</sup> [Orissa is in *India*. Bengal is in *Bangladesh* and *India*.]

In *India*, there was a severe drought in Orissa and parts of Madras [Chennai].<sup>47</sup>

In 1865, there was a famine at Orissa in *India* and in Bengal [Bengal today is West Bengal in *India* and East Bengal in *Bangladesh*].<sup>156</sup>

The Orissa [now Odisha on the east coast of *India*] famine in 1865-66 owed its severity to floods.<sup>179</sup>

In 1866, many crops were lost due to a hailstorm in some districts of Behar [now Bihar in northern *India*].<sup>179</sup>

A famine struck the Madras Presidency in *India* in 1866. The years 1864-65 were unfavorable to agriculture. In January 1866, the laboring classes were in dire straits and were forced to subsist on wild roots and plant leaves. Drinking water was failing in the district. In April; Vizagapatam, Bellary, Coimbatore, Salem and North Arcot were feeling the effect of the famine. In Bellary, people were subsisting on leaves, tamarind and date seeds. In June, the shortages became critical. The rains failed in many parts of the country. All agricultural operations came to a standstill. There was considerable suffering among the poorer classes in the Madras Presidency during the months of June through mid-November. The famine caused approximately 200,000 deaths throughout the Presidency.<sup>188</sup>

In *India* in 1866, there was an awful famine in the lower provinces of Bengal, Orissa, Behar, etc. It was reported that 1,500,000 persons perished.<sup>91</sup> “The total quantity of rainfall for the year [1865] was not unusually small in most of the districts of Bengal, but it fell abnormally and out of its normal time. Much rain fell early in the season, before the usual time for sowing, while the later rains, which are usually expected in the end of September and October, failed.” There was a great scarcity also in Madras Presidency, through many districts.<sup>57</sup>

After the great famine of 1769-70 in *India*, there were twenty great famine and over fifteen lesser ones that afflicted the country up to 1898. But the greatest of these was the famine of 1866, when between seven and eight million people in *India* fell victim to the famine.<sup>155</sup>

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**1865 A.D.** In *England* on the 14<sup>th</sup> of January, there were severe gales; great damage to shipping.<sup>57</sup>

On 14 January 1865 in *Wales*, there were severe gales, doing much damage, and loss of life.<sup>90</sup>

In 1865 in Bradford County, Pennsylvania in the *United States* the year was noted for a spring flood and a remarkably mild fall. On 17 March 1865 (St. Patrick's Day), the highest water level (28 feet [8.5 m]) ever known in the Susquehanna River occurred. The warm weather and the rains melted the heavy body of snow, which caused the river to rise rapidly. By Friday morning (March 17) the water was several feet above high water mark. The floodwaters flowed over the banks at Towanda, submerging buildings and filling cellars on Water Street and in the lower part of the borough reaching Main Street. Floodwater in the lower story of the Court House was 4 feet 10 inches [1.5 m] from the floor of the jail. The rise was so rapid and unexpected that in many of the submerged dwellings and storehouses there was insufficient time to remove the furniture and goods to safety and as a result great damage was done. Much lumber piled upon the riverbank was swept away. The loss and damage to property in the northern part of the county, particularly between the Susquehanna and Chemung Rivers, was very great.<sup>178</sup>

In 1865 in *England*, there were destructive hailstorms in Cambridge, Huntingdon, Norfolk, and Oxford; and severe ones in other counties.<sup>93</sup>

On 9 May 1865 in northeastern *France*, there was a hailstorm at Catelet (Department of Aisne). In a tract of meadowland 1¼ miles in length, and about 2000 feet broad, there fell during the storm a quantity of hail, which was estimated as equal to 21,000,000 cubic feet of ice, approximating to 630,000 tons in weight.<sup>93</sup>

[On 9 May 1865] a hailstorm struck Vendhuile and Catelet in northern *France*. "A small side ditch of the canal of Saint Quentin, which serves to drain 500 hectares (1,250 acres) of land, received so much water and hail, that the flood mounted over the high embankments of the canal, swept before it a heap of 800 hectolitres (2,800 cubic feet) of coal, with which it precipitated itself into the bed of the navigable canal, which it obstructed in the most complete manner. I observed the day after the storm that this deposit of hail, extended over the length of 462 metres [500 yards], and a width of 20 metres (22 yards), presented at certain points a height exceeding 5 metres (5½ yards); it formed thus a volume of more than 40,000 cubic metres (53,000 cubic yards) so compact, that the water up the river, though raised 2 feet [0.6 meters] above the water down the river did not fall a millimeter in twenty-four hours. This deposit constituted a veritable glacier, on which we could walk without the least danger. When I succeeded in making a cutting in it to establish a current which would take it away, it became detached in considerable masses which floated in the water like icebergs."<sup>271</sup>

In 1865 during the period between 5 February and 6 May, a severe drought engulfed Hupeh (now Hubei province) in central *China* at Ch'i-shui. Then during the period between 25 April and 24 May, floods struck Hupeh province at Kung-an. During the period between 8 August and 8 November, a drought engulfed Hupeh province at Ma-ch'êng. During the period between 8 November 1865 and 8 August 1866, a drought engulfed Kao-hsing [Kaohsing].<sup>153</sup>

*Also refer to the section 1864 A.D. – 1866 A.D. for information on the drought in Australia during that timeframe. Also refer to the section 1865 A.D. – 1866 A.D. for information on the drought and famine in Bangladesh and India during that timeframe.*

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**Winter of 1865 / 1866 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1865 occurred on 5 November. Some snow.<sup>116</sup>

The winter of 1865-66 in Bradford County, Pennsylvania in the *United States* was open with little snow, and not enough at any time for sleighing. On January 8<sup>th</sup>, temperatures dropped to -18° F [-28° C].<sup>178</sup>

In the *United States* during the winter of 1865-66, the temperature at Lewisburg, Pennsylvania fell to -23° F in December. The temperature at New York City, New York fell to -7° F on 8 January 1866. At the Brooklyn Navy Yard and on Bedford Avenue, Brooklyn, on the same day, temperatures of -12° F and -15° F, respectively, were recorded. The temperature in Providence, Rhode Island fell to -17° F in January. The temperature in Philadelphia, Pennsylvania fell to -9° F in January. The temperature at Paterson, New Jersey fell to -13° F in January. The temperature at Fort Delaware (located on Pea Patch Island in the Delaware River) fell to -5° F in January. The temperature at Spiceland, Indiana fell to -21° F in February.<sup>113, 126</sup>

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**1866 A.D.** In *England* on the 6<sup>th</sup> through the 11<sup>th</sup> of January, there were severe gales; many vessels and lives lost.<sup>57</sup>

Severe gales; many vessels and lives lost on 6-11 January 1866, [especially off Torbay in Devon in southern *England*].<sup>90</sup>

On 28 February 1866, the high waters on the Susquehanna River in Pennsylvania in the *United States* took out a portion of the river dam at Towanda. During 12-19 July, the temperature reached 100° F [38° C] in the shade.<sup>178</sup>

On 10 May 1866, a terrific westerly gale strikes the settlement in the remote island *Tristan da Cunha*. It destroys two houses, crops, plantation and livestock.<sup>105</sup>

On 7 June 1866, a strong cloudburst struck Northfield, Massachusetts in the *United States*. [From Temple and Sheldon's History of Northfield.]<sup>138</sup>

On 12 July 1866, there was a great storm in New South Wales, *Australia*.<sup>103</sup>

On 26 September 1866, there were great inundations in *France*.<sup>47, 90</sup>

In September 1866 in *France*, there was most extensive damage from floods.<sup>92</sup>

On 30 September to 3 October 1866, a hurricane struck the *Turk Islands*, the *Bahamas* and offshore in South Carolina in the *United States*, causing more than 383 deaths.<sup>141</sup>

On 16-17 November 1866, there were great floods in the north of *England*. As a result, there was immense damage in Yorkshire, Lancashire, and Derbyshire. Farms were destroyed, mines flooded, and mills thrown down. Railways were stopped. There was much suffering at Leeds, where around 20 people drowned, and in Manchester, Preston, Wakefield, and other towns.<sup>90</sup>

In *England* in November, there were great floods in the north, especially in Yorkshire, Lancashire, and Derbyshire; farms destroyed, mills thrown down, railways stopped, and mines flooded. The towns of Leeds, Manchester, Preston, and Wakefield suffered much.<sup>47, 92</sup>

In the *Bahamas* at Nassau [on the island of] New Providence on the 1<sup>st</sup> and 2<sup>nd</sup> of October, there was a great hurricane. Above 600 houses and many churches and other buildings thrown down; between 60 and 70 persons killed, and a great many ships dismantled.<sup>57, 90</sup>

During the period between 8 November 1865 and 8 August 1866, a drought engulfed Kao-hsing [Kaohsing]. In 1866 during the period between 6 May and 8 August, floods struck Hupeh (now Hubei province) in central *China* at Ch'ung-yang, Hsien-ning and Kung-an [possible misprint, "Hsien-hsüan"] and Kiangsi (now Jiangxi province) in southern *China* at Tê-an. During the period between 6 May and 8

August, a drought engulfed Hupeh province at Wuchang and Chekiang (now Zhejiang province) on the east coast of *China* at Chiang-shan. During the period between 9 October and 6 November, floods struck Kiangsi province at Ch'ing-chiang [uncertain name, "Lin-chiang"] and Hupeh province at Wuchang. During the period between 9 October and 6 November, a drought engulfed Hupeh province at Hanyang and Ch'ung-yang.<sup>153</sup>

*Also refer to the section 1864 A.D. – 1866 A.D. for information on the drought in Australia during that timeframe. Also refer to the section 1865 A.D. – 1866 A.D. for information on the drought and famine in Bangladesh and India during that timeframe.*

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**Winter of 1866 / 1867 A.D.** The *Baltic Sea* froze.<sup>37</sup>

During the winter of 1866-67, the *Baltic Sea* was completely covered with ice.<sup>68</sup>

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1866 occurred on 22 & 23 November. Two days' snowstorm.<sup>116</sup>

The winter of 1866-67 in Bradford County, Pennsylvania in the *United States* commenced on 16 December with a heavy snowfall. On the 16<sup>th</sup>, snow fell incessantly all day to the depth of more than a foot [30 cm]. A strong wind piled the snow in drifts, which were almost impassable. It was very cold until the middle of February. On May 8<sup>th</sup>, snow fell to the depth of several inches on the hills, and 10 inches [25 cm] deep at Barclay. During the month of May, it rained 23 days.<sup>178</sup>

In the *United States* during the winter of 1866-67, the temperature at Fort Buford (near Williston, North Dakota) fell to -40° F in March.<sup>113</sup>

On 9 May 1867, a late-in-the-season snowstorm at Idaho Springs, Colorado in the *United States* deposited snow to a depth of thirty-eight inches.<sup>113</sup>

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**1867 A.D.** In January 1867, the temperature at Adelaide, *Australia* was 113.5° F (45.3° C) in the shade.<sup>103</sup>

On 3 March 1867, a cyclone struck Townsville and Bowen in Queensland, *Australia*. These towns were wrecked.<sup>99</sup>

On 2-3 March 1867, a cyclone struck Queensland, *Australia*. Townsville and Bowen were wrecked.<sup>101</sup>

In May 1867, there were several destructive hailstorms in various parts of *England*.<sup>93</sup>

In May 1867, after heavy rains, the Susquehanna River in Pennsylvania in the *United States* flooded. Bridges over the smaller streams were destroyed but the larger bridges were secured. All communications was suspended for two or three days. May had 23 rainy days.<sup>178</sup>

In June 1867, there was an extreme flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 63.2 feet (19.26 meters) above the water mark at Windsor. Up and down the Nepean-Hawkesbury valley were telltale signs bearing a blue line, which indicated the level reached by these legendary record floods of 1867 (the highest ever recorded in the 190 years of record keeping for this river system). This was when Sydney's northern beaches, from Long Reef to Barrenjoey, were littered with flood debris including houses, furniture, dead animals & farm produce. At least six people died in the floods.<sup>99, 109</sup>

In June 1867 in New South Wales, *Australia*, there was a flood, the highest flood in the memory of any of the white inhabitants.<sup>103</sup>

In June 1867, the Hunter River in New South Wales, *Australia*, flooded and the river reached a height of 30 feet above the high water mark.<sup>103</sup>

On 23 June 1867, there were disastrous floods in the Murrumbidgee and Murray rivers in New South Wales and Victoria, *Australia*. For the Murray River, this flood was the 4<sup>th</sup> highest at Albury and 2<sup>nd</sup> highest at Echuca ever recorded.<sup>99</sup>

On 29 July 1867, there was a terrific gale. Three pilot boats were upset and eight lives lost outside Sydney Heads, *Australia*.<sup>103</sup>

On 3 August 1867, a hurricane struck the east coast of the *United States*. There were 2 deaths [on land?] and all perished on a brig except for the captain.<sup>141</sup>

On 1-3 October 1867, a hurricane struck the east coast of Texas in the *United States*. Many lives were lost.<sup>141</sup>

On 29 October 1867, a hurricane struck St. Thomas in the *Virgin Islands* and *Puerto Rico* causing greater than 811 deaths.<sup>141</sup>

In the *West Indies* on the 29<sup>th</sup> of October, there was a dreadful hurricane off St. Thomas. The Royal mail steamers “Rhine” and “Wye” entirely wrecked. The “Conway” and “Derwent” and above fifty other vessels driven ashore and about 1,000 persons lost their lives.<sup>57</sup>

In Calcutta, *India* on the 1<sup>st</sup> of November, there was a cyclone. About 30,000 native huts swept away by the tidal wave; but only about 1,000 lives lost.<sup>57</sup>

On 1 November 1867, a cyclone struck Calcutta, *India*. About 30,000 small houses unroofed. Much small shipping was injured. The crops in the Lower Bengal [*India*] destroyed. About 90,000 persons drowned. About 75,000 died of cholera.<sup>94</sup>

In 1867, a terrible cyclone, followed by strong tidal waves, burst upon the seaboard of Bengal [today this is *Bangladesh* and the state of West Bengal in *India*] and caused not only the destruction of all crops but also a large number of human lives and heads of cattle.<sup>179</sup>

In *England* on the 2<sup>nd</sup> through the 4<sup>th</sup> of December, there was a destructive gale.<sup>57</sup>

Severe gales [in *Great Britain*]; many vessels and lives lost on 2-4 December 1867.<sup>90</sup>

In the famine years of 1867-68 in *Finland* about 8% of the population died of hunger and epidemics.<sup>151</sup>

In 1867, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 5 April and 3 May, floods struck Hupeh (now Hubei province) in central *China* at Lo-t’ien.

— During the period between 2 June and 1 July, floods struck Hupeh province at Chiang-ling and Hsing-shan.

— During the period between 29 August and 27 September, floods struck Hupeh province at I-ch’êng, Hsiang-yang, Ku-ch’êng, Chung-hsiang and Ch’ien-chiang; Kiangsi (now Jiangxi province) in southern *China* at Tê-an; and Shensi (now Shaanxi province) in central *China* at Chên-pa and Mien. At

Ch'ien-chiang, the dikes were damaged.

— During the period between 28 September and 26 October, the Yellow River flooded and floods struck Shantung (now Shandong province) on the east coast of *China* at Lin-i. [Lin-i is located at longitude 116.52° East and latitude 37.13° North.]

In 1867, a drought engulfed several regions of *China* including:<sup>153</sup>

— During the period between 6 May and 8 August, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ang-p'ing and Yü-t'ien; Shantung (now Shandong province) on the east coast of *China* at Tê; and Hupeh (now Hubei province) in central *China* at Huang-p'o and Ching-mên.

— During the period between 8 August and 8 November, a drought engulfed Chahar province (now eastern *Inner Mongolia*) at Huai-lai; Hopei province at Hsing-t'ai; and Hupeh province at Huang-kang and Wuchang.

In the years 1867-69 in *China*, droughts in the north were severely felt, though not sufficiently intense to cause famine, while the valley of the Yangtze was flooded to such a degree as to cause a local scarcity.<sup>165</sup>

**Winter of 1867 / 1868 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1867 occurred in November. It snowed 4 inches deep.<sup>116</sup>

The winter of 1867-68 in Bradford County, Pennsylvania in the *United States* was long and cold with deep snow banks. On the hills, there was continuous good sleighing from early December until the middle of April. On 12 December 1867, there was a snowstorm, one of the most extensive and violent ever known at this season of the year. It appeared to extend over the whole country. On 16 December, thermometers registered from -10° F to -30° F [-23° C to -34° C] at various localities. On 17 January 1868, there was a snowfall of 18 inches [46 cm]. On 7 February, temperatures dropped to the range of -22° F to -25° F [-30° C to -32° C]. On 7 April 1868, there was a late snowfall of several inches.<sup>178</sup>

In the *United States* during the winter of 1867-68, the temperature at Lewisburg, Pennsylvania fell to -23° F in December. The temperature at Camp Bidwell (near Chico, California) fell to -18° F in January and February. The temperature at Saint Paul, Minnesota fell to -39° F in January. The temperature at Guttenberg, Iowa fell to -37° F in February. The temperature at Brookside, Iowa fell to -35° F in February. The temperature at Randolph, Vermont fell to -31° F in February.<sup>113</sup>

### **1868 A.D. – 1870 A.D. India and Afghanistan. Famine**

In *India* during 1868-70, there was a famine and scarcity in a considerable number of northwest provinces, including Delhi, Meerut, etc. This was occasioned by failure of the harvest of 1868, following upon the inferior crop of 1867.<sup>57</sup>

In 1868-70, there was a famine in the Northwest Provinces, Punjab and Rajputana [now Rajasthan state] in *India*.<sup>156</sup>

In 1868-69 in Rajpootana [Rājasthān in northwestern *India*], there was a famine. About 1,500,000 perished.<sup>90</sup>

A famine struck Bundelkhand [now the states of Uttar Pradesh and Madhya Pradesh in central *India*] in 1868. At Chhindwara, the autumn harvest partly failed while the spring crops were poor owing to the absence of cold weather rain. Some distress was felt in Sausar Tehsil.<sup>180</sup>

The scarcity in the Panjab, *Afghanistan* during the year 1869 led to a famine. This famine began with the failure of the 1868 harvest. During the early months of 1868, so much rain fell that it affected the crops. The summer was exceedingly hot, and during July and August so little rain fell that it was of no



material benefit to the crops. The grass was burnt up and the cattle began to die in great numbers. Cattle usually fed on fodder called chari [joiodr stems]. But owing to the drought, this fodder had become hard and indigestible and produced severe inflammation of the bowels. This caused great mortality of cattle in some districts. In the districts south of the Satlej River and in the state of Rajputana, *India*; the wells and tanks dried up and water was impossible to procure. Villages were deserted and people flocked northward, driving their cattle to the banks of the Panjab Rivers, where they hoped to obtain sufficient grass to preserve their lives. By the beginning of October in the Panjab, the kharif crop had entirely failed and the grasses had withered away. The tanks dried up, and the wells became brackish and unserviceable. People abandoned their villages and joined the crowd of refugees from Rajputana to seek food and pasture elsewhere. During the last few days of January and the first ten days of February 1869, rain fell in considerable quantities in the Panjab. In March, so much rain fell in some districts that it injured the crops. In June, rain fell in the districts north of the Satlej River, but to the south, where it was urgently needed, there was little to none. The grass withered away. Locusts appeared in great numbers. Sickness caused by insufficient and bad food added to the distress. During July, rain fell but the weather was excessively hot, and the fierce winds like a blast furnace quickly dried up the moisture. The condition of the Panjab became critical in the extreme. But on 4-5 September, heavy rains fell, which literally saved the Panjab.<sup>187</sup>

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**1868 A.D.** In *England* on the 22<sup>nd</sup> and 31<sup>st</sup> of January and the 1<sup>st</sup> of February, there were severe gales and destruction of shipping.<sup>57</sup>

Severe gales [in *Great Britain*]; many vessels and lives lost on 22 & 31 January and 1 February 1868.<sup>90</sup>

On 27 April 1868 in *England*, there was a very severe hailstorm. There were 8 other hailstorms more or less severe during the year.<sup>93</sup>

During 1-16 July 1868, the temperature in Bradford County, Pennsylvania in the *United States* ran 16 days in succession from 90° F to 103° F [32° C to 39° C]. In 1868 in Bradford County and a large section of country, black and grey squirrels swarmed the woods, wheat fields and barns. They could be found everywhere. In some places fields of grain were literally destroyed by them. Hunters would kill all they could carry in a few hours. The squirrels disappeared as strangely as they had come, and since then there have been no remarkable visitations by them. In pioneer times, plagues of squirrels struck every seven or eight years, at irregular intervals during the summer. A great army of black and grey squirrels invaded the wilderness from the northwest; a host that no man could number. They traveled east in search of food. Crows and squirrels became such a menace to the crops of the farmer that an Act was passed March 4th, 1807, giving a bounty of 3 cents for each crow scalp and 1½ cents for each squirrel scalp. These scalps were traded in lieu of money for taxes, if delivered to the Treasurer before the 1<sup>st</sup> day of November of each year. In 1811 black squirrels were very numerous; again in the fall of 1842 they swarmed through the wilderness in myriads.<sup>178</sup>

On 21 July 1868, the temperature in the shade at Camden-Square in London, *England* reached a peak of 93.3° F (34.1° C).<sup>97</sup>

In Baltimore, Maryland in the *United States* on 24 July, there was great damage to the city by flood. Many lives lost.<sup>47, 92</sup>

In 1868 a severe drought struck the region near Kalamazoo, Michigan in the *United States*.<sup>114</sup>

In New South Wales, *Australia*, there was a severe drought was in 1868, which was most felt in the Lachlan and Murrumbidgee Rivers.<sup>103</sup>

During 1868-69 in *Australia*, there was a drought in northern Victoria.<sup>101</sup>

In the famine years of 1867-68 in *Finland* about 8% of the population died of hunger and epidemics.<sup>151</sup>

In 1868 during the period between 5 February and 6 May, a drought engulfed Kansu (now Gansu province) in northwest *China* at Lanchow. During the period between 8 November 1868 and 5 February 1869, a drought engulfed Shantung (now Shandong province) on the east coast of *China* at Ling.<sup>153</sup>

In the years 1867-69 in *China*, droughts in the north were severely felt, though not sufficiently intense to cause famine, while the valley of the Yangtze was flooded to such a degree as to cause a local scarcity.<sup>165</sup>

*Also refer to the section 1868 A.D. – 1870 A.D. for information on the famine in India and Afghanistan during that timeframe.*

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**Winter of 1868 / 1869 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1868 occurred on 17 October. It snowed some hours.<sup>116</sup>

The winter of 1868-69 in Bradford County, Pennsylvania in the *United States* was mild with much fine sleighing. On 7 December, there was a heavy snowstorm with wind, making good sleighing. On 11 January 1869, there was a snowfall of 8 inches [20 cm].<sup>178</sup>

In the *United States* during the winter of 1868-69, the temperature at Glendale, Nebraska fell to -30° F in December. The temperature in Lunenburg, Vermont fell to -30° F in December. The temperature at Fort Abercrombie, North Dakota, fell to -40° F in February and March.<sup>113</sup>

At Christmas, 1868, and again at Christmas, 1870, there were two of the severest frosts that had been known in Florida in the *United States* since 1835. At each of these dates many young buds were ruined, many young seedlings frozen to the ground and much fruit destroyed.<sup>115</sup>

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**1869 A.D.** In *Ireland* on 30 January 1869, there were great floods in Cork, Dublin, and other places.<sup>47, 90, 92</sup>

On 19 May 1869 in *England*, there was a hailstorm, the effects of which extended over parts of 8 counties.<sup>93</sup>

On 15 June 1869 in *England*, there was a hailstorm, which extended over portions of 14 counties.<sup>93</sup>

On 8 September 1869, a hurricane struck New England in the *United States*. There was one death in Massachusetts. All the crew except for one man perished on the schooner *Helen Eliza* in Maine.<sup>141</sup>

On 8 September 1869, a violent gale struck New England in the *United States*. The storm path was very narrow, only 50 miles [80 kilometers] wide. It passed over Narragansett Bay, Rhode Island and Buzzard Bay, Massachusetts in a northerly direction, then Boston, then Cape Ann where it followed the shoreline into the coast of Maine. The winds were hurricane force. The rain came down in sheets. There was great damage done at both land and sea.<sup>199</sup>

— At Boston, Massachusetts, the famous Coliseum building was wrecked with its great organ and big drum. The spire of the Hanover Street Methodist Church was blown down. In Chelsea, Massachusetts, a tenement block was entirely blown down. In Lynn, the spire of the First Baptist Church, which was 160 feet [49 meters] high, came crashing down on the west wing of the church. In Marblehead Neck, a house was blown down. At Peabody, a large building, 200 feet [61 meters] long, was blown over and several other houses were either blown down or damaged. At Beverly, two houses and several other buildings

were blown down. At Hamilton, the wind destroyed a great barn, which was 100 feet [30 meters] long. — Many vessels dragged their anchors in the harbor. Several vessels were driven ashore at Marblehead, Massachusetts and at Kennebunk, Boothbay, Portland and Orr's island in Maine. Wrecks strewn the shoreline at Gloucester, Massachusetts. The schooner *Helen Eliza* struck Peak's Island, Maine, and was wrecked. Only one crewmember survived.

In *England* on the 11<sup>th</sup> and 12<sup>th</sup> of September, there were great storms and loss of shipping.<sup>57</sup>

Severe gales [in *Great Britain*]; many vessels and lives lost on 11-12 September 1869.<sup>90</sup>

On 4 October 1869, a hurricane struck New York and Maine in the *United States* and the coastal region of New Brunswick, *Canada* causing 37 deaths.<sup>141</sup> [The Saxby Gale was the name given to a tropical cyclone which struck eastern Canada's Bay of Fundy region on the night of 4/5 October 1869.]

In October 1869, there were the worst floods on record at Northfield, Massachusetts in the *United States*, particularly in the Connecticut River. [Quoted from a local diary kept by A.D. Elmer, Sr., and refers especially to Northfield, as equally heavy floods have occurred in the lower Connecticut.]<sup>138</sup>

In 1869 there were heavy floods in Queensland, *Australia*.<sup>103</sup>

In 1869 during the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Ch'ing.<sup>153</sup>

In the years 1867-69 in *China*, droughts in the north were severely felt, though not sufficiently intense to cause famine, while the valley of the Yangtze was flooded to such a degree as to cause a local scarcity.<sup>165</sup>

*Also refer to the section 1868 A.D. – 1870 A.D. for information on the famine in India and Afghanistan during that timeframe.*

**Winter of 1869 / 1870 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1869 occurred on 27-30 October. It snowed some hours each day.<sup>116</sup>

The winter of 1869-70 in Bradford County, Pennsylvania in the *United States* produced a heavy snowfall on 18 December. The winter was open and mild. Most of January and February produced spring like weather, although 15 inches [38 cm] of snow fell on 8 February, and 2 feet [0.6 m] fell on 15 & 16 March.<sup>178</sup>

The winter of 1869-70 in New England in the *United States* was mild. The weather was mild during the first two months of winter but then the weather turned stormy. Spring was late and cold.<sup>199</sup>

### **1870 A.D. – 1872 A.D. Iran. Famine**

There was a great famine in *Persia* during 1870-71. Over a wide area of the country almost no rain fell during the winter of 1869/70 and in the following year only the western and southern provinces receive rain. Many areas did not receive a single drop of rain during this two-year period. In the region that is presently *Iran*, the areas of Khurasan, Isfahan [Esfahān], Yazd and Fars were hit particularly hard. The Zayandeh-rud [Zayanderud River] dried up. The drought caused food prices to rise dramatically. In Kashan, the price of wheat rose to twenty times the normal price.<sup>89</sup> [*Persia* is now *Iran*. Khurasan is located in northwestern *Iran*. Isfahan and Yazd are in central *Iran*. Fars is in southwestern *Iran*. Zayandeh-rud is the largest river on the central plateau of *Iran*. Kashan is in north-central *Iran*.]

In *Persia* during 1871-72, there was a severe famine.<sup>57, 90, 91</sup>

One of the most terrible famines raged in *Persia* in 1870-72. The distress and starvation was greatly increased through the hideous rapacity and stupidity of the authorities. About 1,500,000 (nearly one-fourth of the entire population) perished. A traveler reported that a few years later, while traveling through large towns and cities, that they were almost entirely depopulated. And misery reigned supreme among many of the survivors.<sup>155</sup>

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**1870 A.D.** During 30 January to 20 February 1870, a cyclone struck Queensland, *Australia*. Townsville and Bowen were badly damaged. Fallen trees block the main road, Finders Street, in Townsville. Several ships were destroyed. Clermont was flooded.<sup>101</sup>

On 30 January 1870, a cyclone struck Bowen in Queensland, *Australia*. The cyclone caused heavy damage and flooding in Bowen and the district. Many houses were damaged by winds. Flying debris killed one man. Clermont had a 5-foot (1.5 meter) flood, which carried away many houses and drowned residents. At Peak Downs and Lilyvale, nine people were drowned. A total of 14 people died in the floods. Approximately 10,000 sheep were lost.<sup>99</sup>

On 20 February 1870, a cyclone struck Townsville in Queensland, *Australia*. The cyclone caused very heavy damage to the town affecting almost every house. Two ships were destroyed.<sup>99</sup>

On 21 February 1870, there was a great cyclone at Townsville in Queensland, *Australia*.<sup>103</sup>

In 1870 in *Australia*, there were many floods. New South Wales, Victoria and Tasmania experienced heavy flooding. In South Australia, the Murray River reached record river heights. The Avon and Swan Rivers in Western Australia experienced severe floods.<sup>101</sup>

On 5 March 1870, a cyclone struck Maryborough in Queensland, *Australia*. The cyclone damaged many buildings and leveled weaker homes at Maryborough. The wharf was inundated and damaged. Communications were cut off. The storm caused heavy flooding in the region. Many houses were flooded and four at Gympie washed away. One person drowned.<sup>99</sup>

On 17 April 1870, at Knoxville, Tennessee in the *United States*, the weather produced a cold, cloudy day, with snow.<sup>130</sup>

In April 1870, there was a moderate flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 45 feet (13.72 meters) above the water mark at Windsor.<sup>99, 109</sup>

In 1870, the Murrumbidgee River flooded five times in New South Wales, *Australia*. On 27 April the river rose to 38 feet above the high water mark at Gundagai and 35 feet at Wagga Wagga. On 14 May the river height reached 32 feet at Gundagai and 32 feet 6 inches at Wagga Wagga. On 24 May the river height reached 28 feet 6 inches at Gundagai and 28 feet at Wagga Wagga. On 4 June the river height reached 28 feet 6 inches at Gundagai and 28 feet at Wagga Wagga. On 30 October the river height reached 30 feet 4 inches at Gundagai and 31 feet at Wagga Wagga.<sup>103</sup>

In 1870 in New South Wales, *Australia*, at Palmer's Farm of 100 acres; 50 acres were washed away and the confluence of the Hawkesbury and the Grose rivers were entirely changed.<sup>103</sup>

On 15 June 1870, one of the most destructive floods ever known struck Sugar Run Creek in Wilmot Township in Bradford County, Pennsylvania in the *United States*. Hardly a bridge or milldam was left standing over the whole length of the creek. Farms were deluged, crops destroyed, buildings undermined and roads washed away.<sup>178</sup>

On 16 and 17 June 1870 in *England*, there were severe storms of short duration, but great destructiveness, on each of these days.<sup>93</sup>

On 30 July 1870, a storm [hurricane] struck Mobile, Alabama in the *United States*. This was the earliest hurricane on record at Mobile; the [storm surge] high-water mark was about the same as that of 1860 hurricane.<sup>117</sup>

In July and August 1870, there were major record setting floods in New South Wales, Victoria and South Australia regions of *Australia*. The floods included the highest known flood levels in the Murray River. The record flood heights at Mildura and Echuca and other centers downstream of Yarrowonga caused heavy crop losses and damage to buildings and homes. The Ovens River produced the highest flood level ever recorded at Wangaratta. The Goulburn River produced the 3<sup>rd</sup> highest flood level ever recorded at Shepparton. The Campasope River produced the 3<sup>rd</sup> highest flood level ever recorded at Rochester and Echuca.<sup>99</sup>

On 9 September 1870, there were great floods in Victoria, *Australia*.<sup>103</sup>

In October 1870, there were great floods in *Western Australia*.<sup>103</sup>

On 7-8 October 1870, a great Atlantic hurricane struck *Cuba* causing approximately 2,000 deaths.<sup>107</sup>

On 7-8 October 1870, a hurricane struck *Cuba*. [Various accounts lists the number of deaths as 2000, 1000, >800 and 136.]<sup>141</sup>

On 20 October 1870, a hurricane struck offshore central Florida and Virginia in the *United States* causing more than 52 deaths.<sup>141</sup>

On 6 November 1870, there was a great storm at Sydney, *Australia*; attended with loss of life.<sup>103</sup>

In Rome, *Italy* in December, there were considerable floods, causing great distress.<sup>47, 92</sup>

On 28-29 December 1870, inundation at Rome, *Italy* causing great distress, which was relieved by the king.<sup>90</sup>

In 1870 during the period between 5 February and 6 May, a drought engulfed Hopei (now Hebei province) in northern *China* at Hsin-yüeh and Shantung (now Shandong province) on the east coast of *China* at Huang. Then during the period between 29 June and 27 July, floods struck along the Hu-t'ö River in Hopei province and in Hupeh (now Hubei province) in central *China* at I-ch'êng, Chih-chiang, Kung-an, Tzū-kuei and Huang-kang. At Chih-chiang, almost all the houses were damaged by the floodwaters. During the period between 8 August and 8 November, floods struck Shensi (now Shaanxi province) in central *China* at Tso-shui and Hupeh province at Ao-ch'êng and Huang-p'ö.<sup>153</sup>

*Also refer to the section 1868 A.D. – 1870 A.D. for information on the famine in India and Afghanistan during that timeframe.*

*Also refer to the section 1870 A.D. – 1872 A.D. for information on the drought and famine in Iran during that timeframe.*

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**Winter of 1870 / 1871 A.D.** The *Baltic Sea* froze.<sup>37</sup>

During the winter of 1870-71, the *Baltic Sea* was completely covered with ice.<sup>68</sup>

The winter of 1870-71 will always be remembered as that during which the siege of Paris, *France* was carried on, and the last scenes of the Franco-Prussian war took place. The winter was severe because of the extreme cold in December and January (notwithstanding the mild weather of February), and also because of the fatal influence, which the cold exercised upon the public health at the close of the war with *Germany*. "The great equatorial current [the winds which blow over the prolongation of the Gulf Stream] which generally extends to *Norway*, stopped this year at *Spain* and *Portugal*, the prevailing wind being from the north. On the 5<sup>th</sup> of December, there was a temperature of 5.0° F (-15° C) degrees and on the 8<sup>th</sup>, at Montpellier [*France*] the thermometer stood at 17.6° F (-8.0° C). A second period of cold set in on the 22<sup>nd</sup> of December, lasting until the 5<sup>th</sup> of January. In Paris, the Seine [River] was blocked with ice, and seemed likely to become frozen over. On the 24<sup>th</sup> [of December] there were 21.6 degrees of frost (10.4° F, -12° C); and at Montpellier on the 31<sup>st</sup>, 28.8 degrees (3.2° F, -16° C). It is well known that many of the outposts around Paris, and several of the wounded that had been lying for fifteen hours upon the field were found frozen to death. From the 9<sup>th</sup> to the 15<sup>th</sup> of January a third period of cold set in, the thermometer marking 17.6° F (-8.0° C) at Paris, and 8.6° F (-13.0° C) at Montpellier. The most curious fact was that the cold was greater in the south than in the north of *France*. At Brussels, the lowest temperature was 11.1° F (-11.6° C) in December and 8.2° F (-13.2° C) in January. There were forty days of frost at Montpellier [*France*], forty-two at Paris [*France*], and forty-seven at Brussels [*Belgium*] during these two months." In *Northern Europe*, this was also a very hard winter, though the cold set in at a different time than that for *France*. There were forty days of frost at Copenhagen, *Denmark*. On February 12 the temperature was -5.0° F (-20.6° C) in Copenhagen. In Périgueux in southwestern *France* the temperature fell to -9.4° F (-23.0° C) and at Moulins, *France* the temperature fell to -13.0° F (-25.0° C).<sup>70</sup>

The winter of 1870-71 in Bradford County, Pennsylvania in the *United States* was open and mild with little snow. Farmers plowed their fields during the greater part of January and all of February. On 6 February, temperatures dropped to -6° F [-21° C]. During the first week in March, people sat in their homes without fires and with their doors and windows open.<sup>178</sup>

At Christmas, 1868, and again at Christmas, 1870, there were two of the severest frosts that had been known in Florida in the *United States* since 1835. At each of these dates many young buds were ruined, many young seedlings frozen to the ground and much fruit destroyed.<sup>115</sup>

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**1871 A.D.** In *England*, there were extensive floods.<sup>47, 92</sup>

In Prome, Burmah (Pyay, *Burma*), there were great floods.<sup>47, 92</sup>

In 1871, a flood on the Gumti River wrecked 4,000 homes at Jaunpur in the state of Uttar Pradesh, *India* and another 9,000 in villages along the river.<sup>181</sup>

On 22 & 23 April 1871, there was "frost at night" at Knoxville, Tennessee in the *United States*.<sup>130</sup>

From April 17 to August 18, 1871, there were nineteen severe hailstorms that visited different parts of *England* between these dates. There were two storms in April, one in May, four in June, nine in July, and three in August. The most destructive hailstorms were in July.<sup>93</sup>

In July 1871, there was a great storm in Tasmania, *Australia*.<sup>103</sup>

On 6 July 1871, a heavy shower accompanied by wind and lightning, passed over Granville, LeRoy and Franklin, Pennsylvania in the *United States*. In its course fences were prostrated, fruit trees uprooted and acres of timber laid low. In August, the water level on the Susquehanna River was extremely low.<sup>178</sup>



In the *West Indies* on the 21<sup>st</sup> of August, a hurricane desolated Antigua, St. Kitts, and other islands; many buildings destroyed.<sup>57</sup>

A cyclone desolated Antigua, St. Kitts, and other isles; religious and manufacturing buildings destroyed, and thousands made homeless on 21 August 1871.<sup>90</sup>

On 21 August 1871, a hurricane struck the *Virgin Islands* causing 27 deaths.<sup>141</sup>

On 21 August 1871, a hurricane struck St. Kitts in the *West Indies*.<sup>144</sup>

In September 1871, there were great floods in *New Zealand*.<sup>103</sup>

In 1871 during the period between 5 February and 6 May, a severe drought engulfed Hopei (now Hebei province) in northern *China* at Pao-ting. Crops were damaged. Then during the period between 6 May and 8 August, floods struck Hopei province at Wu-ch'ing and P'ing-ku. During the period between 8 August and 8 November, floods struck Hupeh (now Hubei province) in central *China* at Kung-an and along the Ssü River in Shantung (now Shandong province) on the east coast of *China* where the dikes were damaged.<sup>153</sup>

In 1871, at Chihli, Shingking and the other northern provinces in *China* suffered from an excess of rain, while Chêhkiang and partially Kiangsu were deprived of their ordinary rainfall. The monsoon at Shanghai generally breaks up about the end of August and cooler weather and variable winds mark the beginning of September. In 1871 the summer monsoon had apparently broken up, and the residents were looking forward to ordinary autumnal weather. On the 4<sup>th</sup> of September the southerly monsoon again set in with a remarkable rise in temperature, the average by day being 86° F. Increasing during the week from the 16<sup>th</sup> to the 22<sup>nd</sup> to 91° F. The enormous quantities of water carried north by this unusual phenomenon were deposited in a belt from 150 to 200 miles wide, and which was traced from Shantung by Peking, Siuen-hwa-foo, Tai-yuen-foo to the valley of the upper Han and the north and west of Szech'wan, in the latter district lasting for six days and causing a local famine. The length of this belt of rainfall must thus have been at least 1,500 miles.<sup>165</sup>

On 2-3 October 1871, a hurricane struck the east coast of Texas in the *United States*. There were 2 deaths [on land?] plus a steamer foundered and all hands were lost with the exception of one man.<sup>141</sup>

In 1871, a prolonged and widespread drought and high temperature turned the Upper Midwest of the *United States* into a tinderbox. And then on October 8, a furious storm with extreme gale force winds roared through the Midwest setting off a series of firestorms.<sup>159, 160, 161, 162, 163, 164</sup>

On the evening of October 8, 1871 the worst recorded forest fire in North American history raged through Northeastern Wisconsin and Upper Michigan, destroying millions of dollars worth of property and timberland, and taking between 1,200 and 2,400 lives. The firestorm destroying between 1.2 to 1.5 million acres of forest. This fire later became known as the Great Peshtigo Fire because of the devastation it brought to Peshtigo, Wisconsin. The damage was estimated at \$169 million from this massive forest fire. [In present currency, that would be equivalent to \$3 billion in damages based on the Consumer Price Index (CPI) inflation rates.]

On Sunday evening of October 8, a fire started in Chicago, Illinois and quickly spread throughout the entire city. It burned for two days and devastated the entire central business district of Chicago. The fire killed at least 300 people, destroyed 3.3 square miles of buildings, made 90,000 people homeless and caused \$222 million of damage. [In present currency, that would be equivalent to \$4 billion in damages based on the Consumer Price Index (CPI) inflation rates.]

On October 8 & 9, a firestorm destroyed Holland, Michigan. One life was lost, and 300 families were made homeless. Destroyed were 210 dwellings, 75 stores/shops/offices, 15 manufacturing factories, 5 churches, 3 hotels, 45 miscellaneous buildings, 5 docks and warehouses, one tugboat. Property damage was estimated at \$900,000. [In present currency, that would be equivalent to \$16 million in damages based on the Consumer Price Index (CPI) inflation rates.] “The entire territory covered by the fire was mowed as clean as with a reaper; there was not a fencepost or sidewalk plank and hardly a stump of a shade tree left.”

On October 8, a firestorm, a sea of flame, destroyed Manistee, Michigan. The fire caused an estimated \$1 million in damages, a large portion of the population were left homeless, and many of the lumber mills in which the men were employed totally obliterated. [In present currency, that would be equivalent to \$18 million in damages based on the Consumer Price Index (CPI) inflation rates.] “Buildings, foundations, fences, sidewalks, trees, shrubbery – everything – was mowed close to the surface of the earth, and grass burned out by the roots.”

On October 8, the Great Michigan Fire swept from one side of the state of Michigan to the other side, from Lake Michigan to Lake Huron. This date was remembered afterwards as “The Day Michigan Burned”. Holland was reduced to ashes, Manistee nearly consumed, Glen Haven destroyed. The Saginaw Valley and territory northwest as far as the Au Sable River were fire swept. The fires reached the “Thumb” region of Michigan. Port Huron, Sand Beach, White Rock and Forestville completely destroyed and two thirds of the population of Huron and Sanilac County were left homeless. The fire burned 2 million acres between Lake Michigan and Lake Huron. Rough estimates place the death toll as greater than 500 people.

On October 12, a fire in Windsor, Ontario, *Canada* [near Detroit, Michigan] consumed much of downtown, destroying over 100 buildings.

*Also refer to the section 1870 A.D. – 1872 A.D. for information on the drought and famine in Iran during that timeframe.*

**Winter of 1871 / 1872 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1871 occurred on 10 November. Rain, hail, and snow.<sup>116</sup>

The winter of 1871-72 in Bradford County, Pennsylvania in the *United States* was comparatively mild. The coldest weather was in March and the coldest day of the season, 4 March, when thermometers registered -12° F [-24° C]. Short intervals of good sleighing followed the snowfalls of 3 February and 15 April. Ice in the Susquehanna River broke up and passed out on 5 April. The winter was memorable for a severe and protracted drought. Springs, wells and creeks went dry. Many people were compelled to melt ice to get water for ordinary purposes. Livestock had to be driven long distances for water, or supplied from water drawn in barrels.<sup>178</sup>

In the *United States* during the winter of 1871-72, the temperature at Camp Baker, Montana fell to -53° F (-47.2° C) in December. The temperature at Madison Barracks (Sackets Harbor, New York) fell to -44° F (-42.2° C) in December. The temperature at Fort Ellis (Bozeman, Montana) dropped to -53° F (-47.2° C) in January and February.<sup>113</sup>

**1872 A.D.** In *England* on the 24<sup>th</sup> of January, the barometer very low, great storm; much damage.<sup>57, 90</sup>

In *India* on the 1<sup>st</sup> of May, there was a destructive cyclone at Madras [Chennai]; ships lost.<sup>57, 90</sup>

In June 1872, a fierce gale struck *Inaccessible Island*, the second largest island in the remote Tristan Group. The storm causes a whaleboat to be washed off the beach and wrecked. As a result, the

inhabitants, the two Stoltenhoff brothers, lose their ability to move about the islands, which by August 10 caused their stores of provisions to run short.<sup>105</sup> [Inaccessible Island is located southwest of Tristan da Cunha in the south Atlantic Ocean.]

In *England*, after several days' intense heat, violent storms broke out producing deluges of rain in the midland and southern counties. These occurred on the 24<sup>th</sup> – 26<sup>th</sup> of June. Other storms struck in July and August. Violent gales occurred on the 8<sup>th</sup> of December.<sup>57</sup>

On 11 June 1872, there were great floods in Tasmania, *Australia*.<sup>103</sup>

On 24-26 June 1872, after several days' intense heat, violent storms, and deluges of rain in midland and southern counties [of *England*]; several persons killed.<sup>90</sup>

Between April 18 and September 4, 1872, there were 54 hailstorms in *England*. Some of the storms were of a very destructive character.<sup>93</sup>

The summer of 1872 in Bradford County, Pennsylvania in the *United States* was remembered for numerous electrical storms during which many buildings were struck by lightning and burned.<sup>178</sup>

The storms throughout *Europe* during summer were intense and violent.<sup>57</sup>

On 11 July 1872, one of the hailstorms that visited the Eastern part of Essex, *England* inflicted damage on the grain crops to the extent of over £10,000. A public subscription was started at Colchester.<sup>93</sup>

In July 1872 in *England*, the River Medlock overflowed its banks and caused great destruction of property.<sup>47, 92</sup>

On 10 August 1872, there was a heavy snowstorm within 30 miles of Sydney, *Australia*.<sup>103</sup>

In *Italy* in October, there were great floods in the north; the Po River and other rivers overflowed; thousands of people unhoused. Mantua, Ferrara, etc. suffered much.<sup>47, 92</sup>

During the latter part of October 1872, there was a great inundation from the mountains in northern *Italy*. The Po and other rivers overflow. Thousands of people lost their homes. Mantua, Ferrara, and nearby cities suffered much damage.<sup>47, 90</sup>

On 8 December 1872, a violent gale [in *Great Britain*]; much destruction (wind, greatest velocity 57 miles an hour).<sup>90</sup>

On 16 December 1872, near Bathurst in New South Wales, *Australia*, the town of Kelso was partly submerged during a flood.<sup>103</sup>

On 21 December 1872, there were heavy floods at Inverell in New South Wales, *Australia*.<sup>103</sup>

In *India*, there were great floods in Khandeish and Nassick (Bombay Presidency). These floods were mainly attributable to the denudation of the hills of their forest trees.<sup>47</sup> [Khandeish (Khandesh) is located in central *India*. Nassick (Nashik) is located in north-central *India*.]

In 1872 during the period between 5 February and 8 August, a drought engulfed Kansu (now Gansu province) in northwest *China* at Lanchow. Then during the period between 8 April and 6 May, floods struck Hupeh (now Hubei province) in central *China* at Kung-an and Chih-chiang. During the period

between 6 July and 3 August, floods struck along the Hu-t'ò River in Hopei (now Hebei province) in northern *China* and in Kiangsu (now Jiangsu province) on the east coast of *China* at Kao-ch'un, Yangchow and Lin-ch'ü.<sup>153</sup>

*Also refer to the section 1870 A.D. – 1872 A.D. for information on the drought and famine in Iran during that timeframe.*

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**Winter of 1872 / 1873 A.D.** On 7 September 1872, snow fell in Detroit, Michigan in the *United States*.<sup>135</sup>

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1872 occurred on 29 November. Snow, hail, and thunder.<sup>116</sup>

During the winter of 1872-73 in Bradford County, Pennsylvania in the *United States* the first snow fell on 19 December. On 17 January, ice in the Susquehanna River broke up and passed out. On 30 January the temperature fell to -26° F [-32° C]. On 27 March, the snow was so deep in the woods that [maple] sugar makers were unable to gather sap. On 21 & 22 April, snow fell to the depth of nearly two feet [0.6 m]. On 3 May, it snowed on the highlands.<sup>178</sup>

The blizzard of 7-10 January 1873 was very severe and violent in the Dakotas in the *United States*.<sup>121</sup>

In the *United States* during the winter of 1872-73, the temperature at Fort Townsend, Washington fell to -22° F in December. The temperature at Shelbyville, Indiana fell to -27° F on January 29. The temperature dropped to -30° F at Logansport, Indiana in January. The temperature dropped to -22.9° F at Saint Louis, Missouri in January. The temperature at Rock Island Arsenal, Illinois fell to -29° F in January. The temperature at La Crosse, Wisconsin fell to -43° F in January and -23° F in March. The temperature at Milwaukee, Wisconsin fell to -21° F in January. The temperature at Escanaba, Michigan fell to -28° F in January. The temperature at Rochester, New York fell to -13° F in January. The temperature at Omaha, Nebraska fell to -21° F in January. The temperature at Fort Garland, Colorado fell to -40° F in January. The temperature at Fort McHenry (at Baltimore, Maryland) fell to -15° F in January. The temperature at Carlisle Barracks (Carlisle, Pennsylvania) fell to -28° F in January. The temperature at Fort Brady (at Sault Sainte Marie, Michigan) fell to -42° F in January. The temperature at Fort Davis, Texas fell to -15° F in January. The temperature at Atlanta, Georgia fell to 3° F in January. The temperature at Leavenworth, Kansas fell to -29° F in January. The temperature at Dodge City, Kansas fell to -20° F in January. The temperature at New London and New Haven, Connecticut fell to -14° F in January. The temperature at Fort Fetterman (near Douglas, Wyoming) fell to -40° F in February. The temperature at Saint Paul, Minnesota fell to -22.5° F in March. The temperature at Breckenridge, Minnesota fell to -32° F in March.<sup>113, 126</sup>

The storm of 13-16 April 1873 was one of the most severe that ever occurred in South Dakota in the *United States*. It was generally known as the "Custer Blizzard," because General Custer, United States Army, was encamped at that time at Yankton, South Dakota. General A. W. Greely, in his volume, *American Weather*, says of this storm: "The wind blew at Yankton, South Dakota, from 13<sup>th</sup> to 16<sup>th</sup>, inclusive, for a continuous period of nearly one hundred hours, at an average velocity of 39 miles per hour, and on April 15 the velocity for the entire twenty-four hours was over 52 miles per hour. This hurricane-like wind was accompanied by fine drifting snow, which was like sand, and so filled the air that one could not see a dozen yards. The Seventh Regiment, United States Cavalry, was encamped at Yankton at the time, and for more than forty-eight hours officers and men alike were obliged to seek shelter in the houses of the citizens."<sup>137</sup>

“The frost which scourged all the vineyards in *France* during the nights of 24<sup>th</sup>, 25<sup>th</sup>, and 26<sup>th</sup> of April, when also snow and hail fell at intervals and often in abundance, has proved most fatal in Champagne.”  
“On the authority of the most trustworthy accounts from all quarters, it may fairly be reckoned that at present a proportion equal to two-thirds of the Champagne crop has been annihilated.”<sup>47</sup>

In *France* in 1873, there was a severe frost; great damage done to the vineyards.<sup>93</sup>

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**1873 A.D.** On 14 January 1873, there were great flood of the Condamine River in Queensland, *Australia*. At the same time there were disastrous floods at Normanton.<sup>103</sup>

In February 1873, there were floods in Sydney and Hawkesbury Valley, New South Wales, *Australia*. The water level was recorded at 41.5 feet (12.66 meters) above the water mark at Windsor. Sydney flooded. Water was 5 feet (1.5 meters) in Pitt Street. There was severe damage to buildings and one person drowned.<sup>99, 109</sup>

On 1 June 1873, there were heavy floods at Cooma in New South Wales, *Australia*.<sup>103</sup>

In *Scotland* on the 22<sup>nd</sup> and 23<sup>rd</sup> of July, there was an awful storm; much loss of life and property.<sup>57, 90</sup>

From April to September 1873, there were 14 more-or-less serious hailstorms in *England*, extending their damage into 16 different counties.<sup>93</sup>

In *France*, the losses in 1873 from hailstorms were estimated at £2,372,971. [In today's currency, that would be the equivalent of £156,000,000 or \$254,000,000 U.S. dollars using the retail price index.]<sup>93</sup>

The hurricane of 14-27 August 1873 was one of the most destructive storms that ever visited the Atlantic coast of the *United States*. It recurved between the island of Bermuda and Cape Hatteras, North Carolina and its center at no time touched the coastline. Twelve hundred and twenty-three vessels were known to have been destroyed, and two hundred and twenty-three human lives were definitely reported as lost.<sup>120</sup>

A severe storm [hurricane] struck North America in August 1873, which caused the loss of probably 600 lives and over 1,000 vessels, involving losses aggregating \$3,500,000, and seriously crippled the fishing interests of the *United States* and *Canada*. [In present currency, that would be equivalent to \$63 million in damages based on the Consumer Price Index (CPI) inflation rates.] This storm first appeared at Saint Thomas, *Virgin Islands* on the 18<sup>th</sup> and *Bermuda* on the 21<sup>st</sup>.<sup>121</sup>

On 24-27 August 1873, a hurricane struck Nova Scotia, *Canada* and the western *Atlantic Ocean*. [Various accounts list the number of deaths as >600, 600, 223, and 128.]<sup>141</sup>

On 26 September to 9 October 1873, a hurricane struck *Cuba* and the southwest *Atlantic Ocean* causing at least 26 deaths. [Twenty-six deaths from ship *Maisi*; in addition, "...numerous disasters were caused by it at sea...", according to *Monthly Weather Review*, possibly including 16 deaths in loss of schooner *Maine*. The *New York Times* reported one survivor of English brig *Gamay* (possibly foundered in same storm) picked up on 9 October in southwestern Atlantic Ocean.]<sup>141</sup>

*Russia* suffered from a major famine in 1873.<sup>96</sup>

On 3-8 October 1873, a severe cyclone, first located south of western *Cuba*, recurved over the eastern Gulf; passed over Florida on the 6<sup>th</sup>, and continued its course northeastward off the Atlantic coast of the *United States*. Numerous disasters were caused at sea, and the settlement of Punta Rassa, Florida was entirely destroyed, a hurricane velocity of ninety miles per hour being recorded at that place. Damage

was also caused at Lake City, Saint Augustine, and Jacksonville, Florida, and at Charleston, South Carolina.<sup>120</sup>

On 19-20 October 1873, a hurricane struck the western *Atlantic Ocean*. The schooner *Enterprise* was feared lost in the storm.<sup>141</sup>

A storm developed over north Georgia in the *United States* on 16 November 1873. It passed off the North Carolina coast on the 17<sup>th</sup>, and over the Bay of Fundy into the Gulf of Saint Lawrence in *Canada* during the 18<sup>th</sup>, attended by fierce gales and fearful seas. At Norfolk, Virginia, the barometer fell to 28.86 inches (733 millimeters) on the 17<sup>th</sup>. In Chesapeake Bay the storm was extremely severe. At Cape May, New Jersey, the barometer fell to 28.76 inches (730 millimeters), and the gales off the coast were reported the severest in years. On the 18<sup>th</sup> the barometer fell to 28.72 inches (729 millimeters) at New Haven, Connecticut. At Wood's Hole, Massachusetts, the barometer fell to 28.60 inches (726 millimeters). At Boston, Massachusetts the barometer fell to 28.61 inches (727 millimeters). At Portland, Maine the barometer fell to 28.49 inches (724 millimeters). [According to the barometric pressure, this storm would have been rated at least a Category 3 hurricane as it passed this location.] The storm was also very severe over the Canadian Maritime Provinces, and was attended throughout by heavy rain or snow.<sup>119</sup>

In *England* on the 16<sup>th</sup> of December, there were great storms in Lancashire and Yorkshire.<sup>57, 90</sup>

In 1873 during the period between 26 May and 24 June, a drought engulfed Hupeh (now Hubei province) in central *China* at Kung-an and Chih-chiang. Then during the period between 25 June and 23 July, floods struck Hupeh province at Kung-an. During the period between 8 August and 8 November, floods struck Kiangsu (now Jiangsu province) on the east coast of *China* at Lin-ch'ü and Kao-ch'un; Hopei (now Hebei province) in northern *China* at Ch'ing; and Hupeh province at Ch'ien-chiang.<sup>153</sup>

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### 1873 A.D. – 1875 A.D. Bangladesh, India and Asia Minor. Famine

In *Asia Minor* a famine broke out in the province of Angora and Iconia (now Ankara and Konya in *Turkey*) in 1873, and continued for two years, causing thousands to die of hunger.<sup>155</sup>

In *India* in 1874 in Bengal [*India* and *Bangladesh*], there was a famine arising from drought. The government took early measures and at a cost of 6,500,000*l.* organized a system of relief. About 1,000,000 tons of rice were carried into the distressed districts; and about 100,000 remained after the relief was concluded.<sup>91</sup> “During the three successive years the weather in Bengal had been abnormal. In 1871 the rain was excessive, but the crops were good. In 1872 the rain was deficient, but although extraordinarily scanty, it was happily distributed both in time and place, and the crops were good in Bengal, and not bad in Behar. The year 1873 was again dry, almost beyond precedent, and what rain there was, was unfortunately distributed. South of the Ganges [River] it was excessive; but in North Behar, and almost the whole of Bengal, the rain was below the average. Coupled with deficient rainfall, the monsoon of 1873 was abnormally hot . . . . In January 1874, it was reported that the frost and west winds were drying up the crops in Patna [in eastern *India*]. The famine reached its culminating point in April and May.”<sup>57</sup>

In 1873 in *India*, there was a severe drought in Behar and parts of Northern Bengal [*India* and *Bangladesh*].<sup>47</sup>

There was a great famine in the Gorakhpur Division in the eastern part of the state of Uttar Pradesh, *India* in 1873-74. When compared to a normal year (1872), the incident of mortality rose 70% during this famine. The Banda District and other regions of *India* were also affected.<sup>185</sup>

During the great famine of 1873-74 in *India*, frost was reported to cause some damage to the crops in



Behar [now Bihar in northern *India*].<sup>179</sup> The famine affected the districts in Bengal [today this is *Bangladesh* and the state of West Bengal in *India*] and Bihar and to a lesser extent the Benares division.<sup>181</sup>

In 1873-74, *Bengal* [now *India* and *Bangladesh*] was threatened with famine. The government had organized an excellent system of food distribution, and was thus able by means of railways and dawk routes [dawk is a system of mail delivery by relays of bearers or horses stationed at intervals along a route], to feed the 15 million needy people and greatly lessen the loss of life.<sup>155</sup>

In Bengal [*India* and *Bangladesh*] in 1874, there was a famine caused by a drought.<sup>90</sup>

In 1873, there was a famine in Bengal [Bengal today is West Bengal in *India* and East Bengal in *Bangladesh*].<sup>156</sup>

In *Asia Minor* during 1874-75, there was a severe famine.<sup>57, 90</sup> Great efforts made by *Turkey* to alleviate. Also subscriptions raised in *England*. Deaths up to July 1874 were 150,000.<sup>57, 91</sup>

**Winter of 1873 / 1874 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1873 occurred on 12 November. Hard storm. On November 18, there was another snowstorm. Winter weather and good sleighing.<sup>116</sup>

The winter of 1873-74 in Bradford County, Pennsylvania in the *United States* was open and mild. Snow fell on October 6<sup>th</sup> covering the hills and surrounding country. There was a run of sleighing the last two weeks in November. The beginning of January was as mild and balmy as in May. On 26 February, snow fell to the depth of several inches. March came in warm which continued until the 19<sup>th</sup>, when a heavy rain fell and was immediately followed by a snowstorm and some good sleighing. The heaviest snowfall of the season was on April 9<sup>th</sup>, being 10 inches [25 cm] deep. April continued unusually cold and no farming was done until after the 8<sup>th</sup> of May.<sup>178</sup>

April 1874 was abnormally cold in the *United States*. Vegetation everywhere was reported from ten to twenty days behind normal at the end of April.<sup>129</sup>

In Maine, the average temperature was the lowest recorded in 38 years.

In Vermont, the average temperature was the lowest recorded in 24 years.

In Massachusetts, the average temperature was the lowest recorded in 34 years.

In New York, the average temperature was the lowest recorded in 25 years.

In Pennsylvania, the average temperature was the lowest recorded in 20 years.

In New Jersey, the average temperature was the lowest recorded in 9 years.

In Connecticut, the average temperature was the lowest recorded in 20 years.

In Maryland, the average temperature was the lowest recorded in 10 years.

In Indiana, the average temperature was the lowest recorded in 10 years.

In Illinois, the average temperature was the lowest recorded in 23 years.

In Kansas, the average temperature was the lowest recorded in 10 years.

April 1874 also produced significant snowfall during the month:

The snowfall in Maine varied from 15 to 41 inches.

The snowfall in New Hampshire varied from 30 to 43 inches.

The snowfall in Vermont varied from 33 to 56 inches.

The snowfall in Massachusetts varied from 11 to ? inches.

The snowfall in Connecticut varied from 12 to 22 inches.

The snowfall in New York varied from 10 to 50 inches.

The snowfall in Pennsylvania varied from 4 to 38 inches.

The snowfall in Ohio varied from 2 to 16 inches.

The snowfall in Indiana varied from 2 to 4 inches.

The snowfall in Illinois varied from 5 to 11 inches.

In Colorado 20 inches of snow, and in New Mexico 15 inches of snow fell in a single storm on the 20<sup>th</sup> of April. The total fall in Colorado appears to have varied between 18 and 33 according to the locality of the stations, being entirely without precedent since the settlement of the State in 1857, and producing great destruction among the herds of cattle and sheep, etc.<sup>129</sup>

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**1874 A.D.** In January 1874, the Hunter River in New South Wales, *Australia*, flooded and the river reached a height of 33 feet 9 inches above the high water mark.<sup>103</sup>

On 8 February 1874, there was a destructive hurricane at Auckland, *New Zealand*.<sup>103</sup>

In London, *England* in March, there was great damage on the banks of the River Thames from a very high tide.<sup>47, 92</sup>

On 20 March 1874, floods on banks of the River Thames in England caused by a very high tide.<sup>90</sup>

During April 1874, severe floods were reported from all the tributaries of the Mississippi River, and resulted in disastrous overflow throughout Mississippi, Louisiana and Arkansas in the *United States*. The usual spring flood had, during the latter part of March, caused considerable damage to the levees near New Orleans, which were being repaired when the extraordinary rains of April began throughout Louisiana. The most severe levy breaks occurred at Hickey's, Hushpuckana, the Grand Levee or Morganza, McCullum's, Waterproof, Bonnet Carré, Belle Chasse and Greenwood. Through these crevasses and general overflow of the banks of the Mississippi River, the whole valley of the river was devastated to such an extent that it is estimated that the loss is equivalent to one-sixth of the annual farm produce of the region.<sup>129</sup>

In the *United States* in April, there was a great flood in the Mississippi valley, mainly in Louisiana. About 250,000 acres (101,000 hectares) of cotton, 100,000 acres (40,000 hectares) of corn, and 500,000 acres (202,000 hectares) of sugar were submerged. New Orleans was in considerable danger for a time, part of the levees, which protect that city being broken down. About 25,000 persons were wholly or partially ruined.<sup>47, 92</sup>

On 16 May 1874, the reservoir in Mill River Valley, near Northampton, Massachusetts in the *United States* burst. Several villages destroyed and about 140 lives lost.<sup>47, 90, 92</sup>

On 30 May 1874, there was a great gale at Auckland, *New Zealand*.<sup>103</sup>

On 30 June 1874, the temperature in Bradford County, Pennsylvania in the *United States* reached 101° F [38° C].<sup>178</sup>

On 4 July 1874 in Bergen County, New Jersey in the *United States*, there was a hailstorm. While the inhabitants of the village of Westwood were celebrating the "nation's birthday," a sudden darkness came over the scene of festivity, and the village was wrapped in a mysterious gloom. Before the holidaymakers had time to disperse, down came the hailstorm on their heads. Hailstones, 2½ inches in diameter, and as hard and heavy as cobble stones, rattled down in a furious shower from the sky. Hens and chickens were killed in large numbers, and the bodies of cows and horses, stunned by the descending volley, lay prostrate in every direction. One young lady was frightfully lacerated on the wrist and arm by one of the hailstones, and was conveyed home insensible with great difficulty by her friends and relatives. A large building in the village was almost demolished, every pane of glass was broken, and the hailstones broke through the roof as though they had been cannon balls. The storm covered an area of about 25 miles, leaving desolation like that of a battlefield. Every tree was stripped of its fruit, grain fields of rye and

corn were destroyed, and all hopes of hay this season utterly extinguished. The shower continued 30 minutes, and in this short time affected damage to the extent of many thousand dollars. The hailstones on an average were the size of turkey's eggs, and of every conceivable shape, with sharp corners and edges, which cut like knives. The thunder and lightning were incessant.<sup>93</sup>

In London, *England* on the 11<sup>th</sup> of July, there was an awful storm; lightning set buildings on fire; lives lost, railways flooded.<sup>57</sup>

On 11 July 1874, an awful storm struck northeastern London, *England*. Several persons were killed, churches and buildings were fired and, railways flooded.<sup>90</sup>

On 28 October 1838; 11 July 1874; 11 April 1878, and 12 December 1883, storms struck London, *England*, which destroyed from twenty to thirty lives in each case, and from \$1 to \$3 million (U.S.) dollars in property damage. [In present currency, that would be equivalent to \$27-\$81 million dollars in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>197</sup>

In Nevada in the *United States* on July 24<sup>th</sup>, there was a great rainfall and waterspouts. About thirty lives lost.<sup>47</sup> [Generally speaking a waterspout is a tornado or lesser whirlwind occurring over water. This might be an unusual event for desert-like Nevada. The New York Times of 30 September 1866 describes a similar event in Nevada calling it a waterspout. This event was in fact a very strong cloudburst producing a massive flash flood, a wall of water sweeping through the canyon floor.]

On 24 July 1874, Eureka, Nevada in the *United States* suffered an inundation through rain and a waterspout. Between 20 and 30 people perished.<sup>90,92</sup>

The most violent rains are the cloudbursts of the mountainous and arid regions of the west in the *United States*. These storms are not confined to any particular state or region but may occur in mountainous localities throughout the entire territory bounded by the British possessions on the north [Canada], the Mexican border on the south, the foothills of the Rockies on the east and the Sierras on the west. In the true cloudburst the rain seems to pour down rather than fall in drops, and, as a rule, the downpour of water covers an extremely small area. It often happens that the downpour occurs over rather narrow basins or on mountain slopes whose outlets are canyons or gorges leading to a valley or plain below. In these cases almost the entire amount of water quickly finds its way into the drainage channel, and, as a result, a wave of water rushes down the outlet with considerable velocity and in sufficient volume to destroy everything in its path. Such a flood wave almost swept away the town of Eureka, Nevada, in 1874, and caused the loss of 15 lives. A far greater disaster occurred in Bear Creek Canyon, Colorado, in July 1896. Thirty lives were lost and property valued at more than \$100,000 was destroyed. [In present currency, that would be equivalent to \$2.6 million in damages based on the Consumer Price Index (CPI) inflation rates.] The amount of rain that falls in one of these torrential downpours has never been ascertained. A cloudburst passed over the edge of the little town of Palmetto, Nevada, in August 1890. A rain gauge that was not exposed to the full intensity of the storm caught 8.80 inches of water in an hour. In August 1891, two storms passed over Campo, California, within a few minutes of each other. The second storm was a veritable cloudburst. The observer succeeded in measuring the rainfall of the first shower and a portion of the second. Eleven and a half inches were measured within an hour. The rain gauge and support were carried away by the torrent of water in the second storm and the full record was not obtained.<sup>137</sup>

On 26 July 1874, in Pittsburg and Alleghany, in western Pennsylvania in the *United States*; storm of rain caused the rivers to overflow; about 220 persons drowned.<sup>90</sup>

In Pittsburg and Alleghany County, Pennsylvania in the *United States* on July 26<sup>th</sup>, there was a great rainstorm; and about 220 persons drowned.<sup>47, 92</sup>

From May 8 to September 2 1874, there were 24 storms in *England*. The most severe being on 24 June, 24 July, and 10 August. The hail damage extended over 20 counties.<sup>93</sup>

In Hong Kong, *China* on the 22<sup>nd</sup> of September, there was a great typhoon at Macau.<sup>57</sup>

On 22 September 1874, a typhoon caused much destruction at Macao [Macau], Hong Kong, and vicinity in *China*.<sup>90</sup>

On 22 September 1874, a typhoon struck Macau and Hong Kong, *China* and several cities in *India*. The typhoon killed 10,000 people and wrecked between 40,000 and 60,000 houses.<sup>197</sup>

On 31 October - 2 November 1874, a hurricane struck *Jamaica*.<sup>124</sup>

On 19 November 1874 in *Scotland*, there was a severe hailstorm. Almost without warning a cloudbank descended over the streets, transforming the light of a fair November day into night-like gloom. One or two vivid flashes of lightning, succeeded by loud peals of thunder, were quickly followed by a storm of hail, which, though its duration was less than 5 minutes, was sufficiently heavy to cover the ground to a depth of an inch and a half. The hailstones were remarkably large, many of them apparently being fragments of ice. Others were as large as marbles, and descended in places with such force as to break panes of glass. For five minutes, the village of Holytown was enveloped in midnight darkness, and the people set a crying, thinking that Doomsday had arrived. In other Lanarkshire towns, there were brief periods of darkness.<sup>93</sup>

In *England*, there were violent gales, with destruction of life and property on the 21<sup>st</sup> October; 29<sup>th</sup> November; 7<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup> and 11<sup>th</sup> of December.<sup>57, 90</sup>

In *France*, the losses from hailstorms were very serious in 1874.<sup>93</sup>

In *France*, the losses in 1874 from hailstorms were estimated at £6,063,130. [In today's currency, that would be the equivalent of £417,000,000 or \$678,000,000 U.S. dollars using the retail price index.]<sup>93</sup>

In 1874 during the period between 16 April and 15 May, a drought engulfed Hupeh (now Hubei province) in central *China* at Chiang-ling, Kung-an and Chih-chiang. Then during the period between 14 June and 13 July, floods struck Hupeh province at Kung-an. During the period between 8 August and 8 November, floods struck Shensi (now Shaanxi province) in central *China* at Kan-ch'üan and Tso-shui; Hupeh province at Ch'ien-chiang; and Chekiang (now Zhejiang province) on the east coast of *China* at Hsüan-p'ing. At Hsüan-p'ing, over 80 house-sections were damaged by the floodwaters and over 20 persons were drowned. Also during the period between 8 August and 8 November, a drought engulfed Hupeh province at Chün.<sup>153</sup>

*Also refer to the section 1873 A.D. – 1875 A.D. for information on the drought and famine in Bangladesh, India and Asia Minor during that timeframe.*

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**Winter of 1874 / 1875 A.D.** In *England*, there was a very severe frost in December 1874.<sup>47, 90, 93</sup>

On 1-3 January 1875, severe snowstorms struck *Scotland*. Several lives were lost.<sup>57, 90</sup>

On 12 March 1875, a severe snowstorm struck southern *England*. There was destruction of life and property. Telegraph wires were broken.<sup>90</sup>

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1874 occurred on 20 November. It snowed considerably.<sup>116</sup>

The winter of 1874-75 in Bradford County, Pennsylvania in the *United States* was preceded by a summer-like fall and ploughs were kept running until the 10<sup>th</sup> of December. Then there was a general freeze-up. On January 10<sup>th</sup>, temperatures dropped to the range of -12° F to -16° F [-24° C to -27° C]. January was bitterly cold as was February until the 22<sup>nd</sup>, when warm weather succeeded. On February 9<sup>th</sup>, temperatures dropped to -18° F [-28° C]. On February 13<sup>th</sup>, temperatures dropped to -23° F [-31° C] at Rome. The ice in the Susquehanna River at Towanda broke up and passed out on February 27<sup>th</sup>. The heaviest snowfall of the season was March 7<sup>th</sup>, being a foot [30 cm] deep at Towanda and two feet [0.6 m] at Barclay. Sleighing was good on the hills until March 27<sup>th</sup>. On April 13<sup>th</sup>, there was a heavy snowfall, followed by several days of very cold weather.<sup>178</sup>

In the *United States* during the winter of 1874-75, the temperature at Chicago, Illinois fell to -20° F in 1875. The temperature at Fort Benton, Montana fell to -58° F in January. The temperature at Virginia City, Montana (a ghost town 20 miles west of Yellowstone National Park) fell to -44° F in January. The temperature at Denver, Colorado fell to -29° F in January. The temperature dropped to -25° F at Milwaukee, Wisconsin in January and -22° F in February. The temperature dropped to -40° F at Embarras, Wisconsin in January. The temperature at Saint Louis, Missouri fell to -16° F in January. The temperature dropped to -10° F at Louisville, Kentucky in January. The temperature dropped to -10° F at Mount Auburn, Ohio, a suburb of Cincinnati in January. The temperature at Pittsburg, Pennsylvania fell to -12° F in January. The temperature at Philadelphia, Pennsylvania fell to -5° F in January. The temperature at Fort Lapwai (near Lewiston, Idaho) dropped to -32° F in January. The temperature at Coalville, Utah dropped to -30° F in January. The temperature at Fort Colville (near Colville, Washington) dropped to -33° F in January. The temperature at Portland, Oregon fell to 3° F in January. The temperature at Cheyenne, Wyoming dropped to -38° F in January. The temperature dropped to -8° F at Nashville, Tennessee on January 3<sup>rd</sup> & 9<sup>th</sup>. The temperature dropped to 10° F at Vicksburg, Mississippi on January 6<sup>th</sup>. The temperature at Morgantown, West Virginia dropped to -6° F in January and -10° F in February. The temperature dropped to -6° F at New York City, New York on January 10<sup>th</sup>. The temperature at Barnegat City, New Jersey fell to -10° F in January. The temperature at Mount Washington, New Hampshire fell to -46° F in January. The temperature dropped to -38° F at Grand Rapids, Michigan on February 9<sup>th</sup>. The temperature at Fort Pembina, North Dakota fell to -45° F in February. The temperature at Belvidere, Illinois fell to -31.5° F in February. The temperature at Saint Paul, Minnesota fell to -32° F in February. The temperature at Dubuque, Iowa fell to -31° F in February. The temperature at Pike's Peak, Colorado fell to -37.0° F in February and -29° F in March. The temperature at Fort Brady (at Sault Sainte Marie, Michigan) fell to -55° F in February and -32° F in March. The temperature at Escanaba, Michigan fell to -32° F in February. The temperature at Detroit, Michigan fell to -20° F in February. The temperature at Fort McPherson (near North Platte, Nebraska) fell to -24° F in February. The temperature at Albany, New York fell to -18° F in February. The temperature at Buffalo, New York fell to -13° F in February. The temperature at Erie, Pennsylvania fell to -16° F in February. The temperature at La Crosse, Wisconsin fell to -34° F in February.<sup>113, 126</sup>

April 1875 was known for the extraordinary cold weather in the *United States*. The lateness of the spring, the prevalence of severe frosts and the injury to vegetation were the most obvious features of April's weather. A record of April frosts, kept in Florence, Alabama, from 1849 to 1853, and from 1853 to the present year (1875) in Knoxville, Tennessee, gives the following data:

April 16, 1849, at Florence, Alabama, "severe frosts, and vegetation supposed to be all killed."



April 16, 1850, "disastrous frosts, which killed vegetation, and even young oak trees, from Tennessee to the Gulf."

April 19, 1852, snow in the morning at Florence, Alabama.

April 17, 1870, at Knoxville, Tennessee, cold, cloudy day, with snow.

April 22<sup>nd</sup> and 23<sup>rd</sup>, 1871, "frost at night." At Knoxville, Tennessee.

April 23, 1875, frost was reported at Knoxville, Tennessee. At Norfolk, [Virginia] on the 17<sup>th</sup>, there was a heavy frost, which was reported as very disastrous to peas, strawberries and peaches. On the 18<sup>th</sup> and 19<sup>th</sup>, another heavy frost (Thermometer 27°F.) fell at Norfolk, nearly destroying the pears, plums and cherries; also ruining the early vegetables and strawberries. At Nashville, Tennessee, on the 17<sup>th</sup>, the thermometer fell to 25.5° F., forming ice about one-eighth of an inch thick, seriously injuring vegetation and killing many fruit trees. There was frost at Leavenworth, Kansas, on the 16<sup>th</sup>, and snow at Lynchburg, Virginia, on the 17<sup>th</sup>, and freezing weather nearly all day at Lynchburg on the 18<sup>th</sup>, causing a great loss of all varieties of early fruits and early wheat. Frost occurred at Wytheville, Virginia, on the 22<sup>nd</sup>, 23<sup>rd</sup> and 24<sup>th</sup>; at Charleston, South Carolina, on the 19<sup>th</sup>, (heavy); at Aiken, South Carolina, on the 17<sup>th</sup> and 18<sup>th</sup>; at Mobile, [Alabama] on the 3<sup>rd</sup>; heavy frost at Savannah, Georgia, on the 18<sup>th</sup> and 19<sup>th</sup>, with ice nearly half an inch thick on tranquil pools in the countryside. At Asheville and Mount Pleasant, North Carolina, the frosts on the 17<sup>th</sup> and 18<sup>th</sup> killed the peach and cherry crops and injured the apples. Light frost was deposited at Augusta, Georgia, and Wilsonville, Alabama, on the 17<sup>th</sup> and 19<sup>th</sup>. On the interior lakes of New York, and in the Adirondacks, it is reported ice remained two to three feet thick as late as April 15<sup>th</sup>. Frost was also reported at Brookhaven, Mississippi, on the 24<sup>th</sup>, (latest known); light frost on the 18<sup>th</sup> at Mayport, Florida, and on the 24<sup>th</sup>, at Troy, Alabama; at St. Marks, Florida, on the 18<sup>th</sup>, and on the 19<sup>th</sup>, at Wellborn, Florida. At Fallston, Maryland, water pipes buried three feet underground that were frozen in the winter, were first sufficiently thawed to admit flow of water on the 3<sup>rd</sup> of April. At Nichols, New York, the ground was not free from frost till the end of April. At Kenton, Ohio, and Hector, New York, frost disappeared from the soil on the 10<sup>th</sup>. At Fall River, Massachusetts, water pipes frozen February 12<sup>th</sup> remained frozen until after the 20<sup>th</sup> of April. The rivers and lakes in the *United States* were very late in opening to navigation in 1875.<sup>130</sup>

In April 1875, there were unusually large quantities of drift ice and enormous icebergs off the Atlantic coasts of the *United States*.<sup>130</sup>

**1875 A.D.** On 20 January 1875, the record setting temperature at Melbourne, *Australia*, reached 110.4° F (43.6° C).<sup>103</sup>

On 24 February 1875, a cyclone struck off the coast of Home Hill in Queensland, *Australia*. During this severe cyclone, the steamer *Gothenberg* ran onto the Great Barrier Reef during a storm & sank almost immediately. One hundred and three passengers and crew were drowned. Only 20 survived eventually safely made their way to Bowen on the mainland. During the search for gold rumored to be in the ship, divers found victims still in the cabins where they had been trapped.<sup>99</sup>

In February and March 1875, there were heavy floods in Queensland, *Australia*.<sup>103</sup>

In 1875, *China* experienced flooding during 8 March - 5 April. At Kiangsu (now Jiangsu province) on the east coast of *China* at Ch'ing-p'u had over 50% of its area flooded. Shantung (now Shandong province) on the east coast of *China* at Yü-t'ai also had over 50% of its area flooded. Hupeh (now Hubei province) in central *China* at Ch'ien-chiang also experienced flooding during this time.<sup>153</sup>

On 25 April 1875, there was a heavy flood of Fitzroy River in Queensland, *Australia*.<sup>103</sup>

On 2 May 1875, there was a heavy gale in Sydney, *Australia* from the eastward, with rain.<sup>103</sup>



On 6 May 1875, there was a remarkable waterspout observed near Inverell (an inland town of New South Wales, *Australia*).<sup>103</sup>

On 10 May 1875, there were destructive floods in *South Australia*.<sup>103</sup>

On 9 June 1875, there was a heavy flood of the Campaspe River in Victoria, *Australia*.<sup>103</sup>

In *France* in June, there were tremendous floods in the south; at Toulouse, Verdun, Bordeaux, etc. many villages swept away; in the whole 6,900 houses destroyed. About 1,000 lives lost. The loss, mainly occasioned by the rising of the Garonne River was estimated at from 12,000,000*l.* to 15,000,000*l.* Public subscriptions opened in *England*.<sup>47, 92</sup> [In present currency, that would be equivalent to 1-1.2 billion pounds in damages based on the retail inflation price index.]

In June 1875, a large part of Toulouse, *France* was destroyed by the rising of the Garonne River. About 1,000 lives lost and much property destroyed.<sup>90</sup>

On 11 June 1875 in *England*, there was a hailstorm in Surrey, Buckinghamshire, and other areas. About midday, a very severe thunderstorm, with heavy rain and hail struck. In a short time the hail covered the ground to about an inch deep, causing great destruction amongst the tender foliage. In the woods, the lime trees looked as if they had been riddled with grapeshot, and in the kitchen garden the leaves of the trees upon the walls facing the blast were completely riddled. Lettuce and celery looked as if a flock of sheep had been pasturing amongst them, they were so cut up; and peas fit for pulling looked as if they were well hammered. The farmers' field beans and young turnips suffered severely. A great amount of damage was done in the neighborhoods of Dorking and High Wycombe.<sup>93</sup>

In *Hungary* in June, there were disastrous floods near Budapest; great loss of life and property.<sup>47, 92</sup>

In Budapest, *Hungary* on the 26<sup>th</sup> of June, there were destructive storms; about 200 persons killed.<sup>57, 90, 197</sup>

On 28 June 1875, there were heavy storms on the coast of New South Wales, *Australia*.<sup>103</sup>

On 7 and 8 July 1875 in *Switzerland*, there was a great hailstorm in the Val de Travers, Geneva, and elsewhere. The following account from the Journal de Geneve relates to the storm of the 8th only—that from which the city suffered most. This storm appears to have begun in the Department of Ain [in eastern *France* bordering *Switzerland* on western shores of Lake Geneva], and thence it took an eastwardly course up the valley of the Rhone to Geneva. Reaching the city, it then spread over a wider area, and directed its course towards Savoy. At Geneva, as midnight came on, the heat was suffocating, and not a breath of wind swept over the surface of the streets; but, higher up, light objects on the roofs of the houses began to be whirled about and carried off as by a tempest. At the same time a dull, rumbling sound, resembling neither wind nor thunder, announced the approach of the storm, and at midnight exactly, it burst over the city in all its fury. An avalanche of enormous, hailstones, with no trace of rain, was precipitated from the clouds, and shot against opposing objects by a tempest of wind from the southwest. In a moment the street lamps were extinguished, and in a brief interval incredible damage was inflicted, the glass and tiles of houses were smashed to powder, trees stripped of their bark on the side facing the west, and crops of every sort were in many places all but destroyed. The smallest of the hailstones were the size of hazelnuts; many were as large as walnuts and chestnuts, and some even as large as a hen's egg. Some of the hailstones measured four inches in diameter, and six hours after they fell weighed upwards of 11 ounces (300 grams). For the most part the hailstones were of a flat or lenticular form, with a central nucleus of 0.16 to 0.40 inch in diameter, enveloped in several concentric layers of ice, generally from 6 to 8, alternately transparent and opaque. The electrical phenomena were very remarkable; the flashes of lightning succeeded each other with such rapidity, from midnight until a few minutes after 1 A.M., that a

mean of from 2 to 3 were counted each second, or from 8000 to 10,000 per hour. Electrical phosphorescence was very intense before and during the hail. The ground, animals, and prominent objects, as well as the hailstones, were strongly phosphorescent. Immediately after the hail, ozone was largely developed, the smell being so perceptible as to be compared by nearly all observers to that of garlic. The incessant electrical discharges passed from cloud to cloud, over a central point from which the hail fell, but thunder was very rarely heard.<sup>93</sup>

In *Hungary* in July, another storm broke over Budapest; great damage. Public subscription opened.<sup>47, 92</sup>

In *Geneva, Switzerland* on the 7<sup>th</sup> and 8<sup>th</sup> of July, there was a violent hailstorm; great destruction of glass and crops.<sup>57</sup>

In the *United Kingdom* in July, there were great floods in the midland and eastern counties, West of *England, Wales* and in *Eastern Scotland*.<sup>47, 92</sup>

On 15-16 July 1875, heavy rains caused inundations in west of *England* and *Wales*. The floods caused destruction and loss of life at Newport and Monmouth.<sup>90</sup> [Newport is in Shropshire, *England* bordering *Wales*.]

In July 1875 in *Silesia* [now mainly *Poland*], torrents of rain caused great damage.<sup>92</sup>

Between May 19 and August 16, 1875, there were many hailstorms in *England*. The most destructive storms were in July.<sup>93</sup>

In *France*, the losses in 1875 from hailstorms were estimated at £3,673,768. [In today's currency, that would be the equivalent of £257,000,000 or \$418,000,000 U.S. dollars using the retail price index.]<sup>93</sup>

In August 1875 in west-central *Germany*, a waterspout burst near the town of Kirn; a number of persons drowned; much property destroyed.<sup>47, 92</sup>

In August 1875 in the *United States*, there were great floods in the Central States; in Central Illinois and in the Ohio and Mississippi Valleys; also in *Arkansas*.<sup>47, 92</sup>

In August 1875 in *Burma*, there were heavy floods, exceeding those of 1871.<sup>47, 92</sup>

In *India* in August, there were disastrous floods in the northwest provinces; great loss of life and destruction of property.<sup>47, 92</sup>

In *France* in September, again there were great floods in the south of *France*, at Montpelier etc. Vineyards damaged.<sup>47, 92</sup>

In east-central *Switzerland* in September, there were great floods in Canton Glarus.<sup>47, 92</sup>

In *Holland* [now *the Netherlands*] in September, there were great floods.<sup>47, 92</sup>

In the *West Indies* on 9 September, at the island of St. Vincent, 19 inches of rain fell in twelve hours.<sup>47</sup>

In the *West Indies* on 9 September, the Isle of St. Vincent swept by a hurricane of unusual severity. Much damage.<sup>57</sup>

On 15 September 1875, a hurricane struck Indianola, Texas in the *United States*, nearly wiping it off the

face of the earth. Approximately 126 lives were lost and \$1,000,000 of property damage was sustained. [In present currency, that would be equivalent to \$27 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>197</sup>

In Texas in the *United States* in September, there was a great flood in Indianola, nine-tenths of the houses destroyed and much other damage. Public subscription through the *United States*.<sup>47, 92</sup> [Indianola, Texas is a ghost town today. It once was a county seat. In 1875, the city had a population of 5,000, but on September 15 of that year, a powerful hurricane struck, killing between 150 and 300 and almost entirely destroying the town. Indianola was rebuilt, only to be wiped out on August 19, 1886, by another intense hurricane, which was followed by a fire.]

On 15-18 September 1875, a storm struck on the coast of Galveston, Texas in the *United States* and other places. Many people were injured and villages were washed away by the sea. There was great loss of life.<sup>90</sup>

In Texas in the *United States* on the 15<sup>th</sup> – 18<sup>th</sup> of September, a great storm struck Galveston and Indianola, and other places; houses and villages washed away, and great loss of life.<sup>57</sup>

On 15 September 1875, Indianola, Texas in the *United States* was nearly destroyed by a storm wave from the Gulf, which caused a loss of 176 lives and over \$1,000,000 worth of property.<sup>124</sup> [In present currency, that would be equivalent to \$20 million in damages based on the Consumer Price Index (CPI) inflation rates.]

The storm [hurricane] of 15 September 1875, caused a loss of one hundred and seventy six lives, and three-fourths of the town of Indianola, Texas in the *United States* was swept away.<sup>120</sup>

On 16-17 September 1875, a hurricane struck *Cuba* and Texas in the *United States*. The total deaths may be as high as 800. [Snow (1952) has 150 deaths at Indianola, Texas with the remainder elsewhere in Texas. However, quite a few lives lost in Cuba according to Appendix of Gutierrez-Lanza in Sarasola (1928).]<sup>141</sup>

On 22-24 September 1875, a great storm struck in Ahmedabad, *India* inundating the area. About 20,000 were left homeless.<sup>90</sup>

In *England* on September 28, there were whirlwinds in the Isle of Wight which caused great destruction; also hurricane in Oxfordshire.<sup>57</sup>

On 28 September 1875, Charleston, South Carolina in the *United States* was struck by a severe gale.<sup>124</sup>

In *England* in October, there were great floods in the Midland Counties, also in the northwestern counties at Dawlish.<sup>47, 92</sup>

On 17-23 October 1875 and again on 13-16 November 1875, an inundation in the midland and western counties of *England*, especially near Nottingham caused destruction and loss of life.<sup>90</sup>

In Venice, *Italy* in October, there was a considerable flood; the *Adriatic* driven in by a gale.<sup>47, 92</sup>

On 24 December 1875, a cyclone struck Exmouth Gulf in *Western Australia*. The cyclone hovered in the area for 13 days. The storm caused the death of 69 people. Most of these fatalities were from ships at sea in the region.<sup>99</sup>

In 1875 in *Australia*, there were several floods. The Sturt and Para Rivers flooded in South Australia. Northern Tasmania experienced floods. There were floods along the coast of New South Wales and the tablelands. Southeast Queensland also experienced floods.<sup>101</sup>

*Also refer to the section 1873 A.D. – 1875 A.D. for information on the drought and famine in Bangladesh, India and Asia Minor during that timeframe.*

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**Winter of 1875 / 1876 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1875 occurred on 19 November. It snowed some hours.<sup>116</sup>

The winter of 1875-76 in Bradford County, Pennsylvania in the *United States* was warm with light snows and rains. 1 January 1876 broke all heat records for the first day of the year. The farmers did most of their spring plowing in January and February and most oats were sown by the first of March. The summer of 1876 was warm and the year was an exceedingly fruitful one.<sup>178</sup>

In January 1876, the steamship *City of Limerick* passed through the center of a violent hurricane. The barometer went down to 28.00 inches. The winds ceased from 10:30 p.m. on January 27<sup>th</sup> to 2:30 a.m. on January 28<sup>th</sup> [as it passed through the eye of the hurricane] at latitude 47 ¾° North, longitude 40° W. [The barometric pressure would indicate this was a Category 3 hurricane on that date.]<sup>140</sup>

In the *United States* during the winter of 1875-76, the temperature at Eastport, Maine fell to -20° F in December. The temperature at Portland, Maine fell to -12° F in December. The temperature at Boston, Massachusetts fell to -11° F in December. The temperature at Springfield, Massachusetts fell to -10° F in December. The temperature at Albany, New York fell to -17° F in December. The temperature at Rochester, New York fell to -8° F in December. The temperature at Newport, Rhode Island fell to -3° F in December. The temperature at Fort Benton, Montana fell to -42° F in March.<sup>113, 126</sup>

In February 1876, the minimum temperatures in the *United States* were: Yankton, South Dakota -18° F; St. Paul, Minnesota -22° F; Pike's Peak, Colorado -17° F; Pembina, North Dakota -48° F; Omaha, Nebraska -19° F; Alpena, Michigan -11° F; Burlington, Vermont -12° F; Breckenridge, Minnesota -28° F; Duluth, Minnesota -28° F; Eastport, Maine -20° F; Escanaba, Michigan -12° F; Fort Sully, South Dakota -28° F; Marquette, Michigan -16° F; Milwaukee, Wisconsin -10° F; North Platte, Nebraska -14° F; Malone, New York -16° F; and Mount Washington, New Hampshire -42° F.<sup>140</sup>

In February 1876, ice in rivers and harbors in the *United States*: at Falls River, Massachusetts, the Mount Hope Bay was frozen over on the 25<sup>th</sup>; at Traverse City, Michigan, the Grand Traverse Bay was frozen on the 22<sup>nd</sup>; at Kensico, New York [village flooded to create the Kensico Reservoir in 1893], the pond ice was 6 inches thick on the 28<sup>th</sup>; at North Shippen, Pennsylvania, the pond ice was 5 inches thick on the 6<sup>th</sup>; at West Charlotte, Vermont, Lake Champlain was completely frozen and crossed by skaters on the 4<sup>th</sup> and crossed by horsemen on the 12<sup>th</sup>; at Bloomfield, Wisconsin, the ice in Geneva Lake was 12½ inches thick; at Philadelphia, Pennsylvania, the ice in the Schuylkill River was 5 inches thick on the 6<sup>th</sup>; at Duluth, Minnesota, Lake Superior was frozen the entire month.<sup>140</sup>

One of the coldest temperatures recorded on the North American Continent was by the British Arctic Expedition of 1875-76, where the temperature of -73.8° F (-58.8° C) was recorded in March 1876 at Floeberg Beach, *Canada*.<sup>125</sup> [Floeberg Beach is on the northeast coast of Ellesmere Island, the most northerly of *Canada's* Arctic islands.]

On 12 March 1876, snowstorms were reported from Nevada to Montana in the *United States*. These storms were unusually heavy and terrific in the Sierra Nevada Mountains, and completely blockaded railroads. They extended eastward over Colorado and The Dakotas during the 13<sup>th</sup>.<sup>140</sup>

On 1 April 1876, the snowstorm that struck Denver, Colorado in the *United States* was considered the severest in the previous eight years. On 4-5 April, a heavy snowstorm struck New England. At the close of April, the snow in the forest of Massachusetts was 1-foot deep.<sup>140</sup>

### 1876 A.D. - 1879 A.D. Worldwide Drought and Famine

This period produced many great droughts covering the globe. In addition to *China*, this great drought and heat wave was also felt in *India, Australia, South Africa, Morocco, French Indo-China, the Dutch East Indies, Turkey, the United States and Canada.*<sup>47</sup>

#### China

The deadliest drought in recorded history occurred in *China* over the 4 years period from 1876 to 1879. Rivers were so dry that most crops and livestock died. There was no food production in a 390 thousand square mile (1-million square kilometer) area of nine provinces. The drought led to the death of an estimated nine million people.<sup>50</sup>

During the years 1874-1875, there had been a marked deficiency of moisture, a want which was further intensified in 1876, and which ultimately ended in rendering absolutely sterile the seed sown by the farmers. The results were disastrous in the extreme. With such imperfect means of communication as the Chinese possessed at that time, it was impossible to supply the deficiencies of one district by the excess of others with sufficient speed to prevent the occurrence of famine. Over four provinces of Chihli, Shansi, Honan, and Kansu (now called Hebei, Shanxi, Henan, and Gansu provinces), a dire scarcity prevailed, and though every effort was made, both by foreigners and natives, to bring aid to the starving people, upwards of nine million perished before succeeding crops supplied food for the survivors.<sup>154</sup>

In 1875-1878 four provinces in northern *China*, the district known as the "Garden of China," suffered a failure of crops owing to lack of rain, in an area about the size of France; 9,000,000 people perished.<sup>84</sup>

In 1875, during the period of 6 May – 8 November, Hopei (now Hebei province) in northern *China* at Ch'ing experienced drought conditions.<sup>153</sup>

In 1876, several regions of *China* experienced droughts.<sup>153</sup>

— During the period of 5 February – 6 May, Hopei (now Hebei province) in northern *China* at Wang-tu, Li, Luan and Lin-yü experienced drought conditions.

— During the period of 23 May – 21 June, Shantung (now Shandong province) on the east coast of *China* at Fei-ch'êng experienced drought conditions.

— During the period of 18 September – 16 October, Hopei (now Hebei province) in northern *China* at Kao-ch'êng experienced drought conditions.

“Lord Derby received a report drawn up by Mr. Mayers, Chinese Secretary of the Legation at Peking [now Beijing], upon the distress which the drought of the last two years has caused in the northern and central provinces of *China*. This famine, it seems, has been most severely felt in the district furthest from the coast. With the exception of Chefoo [now Yantai], and in a lesser degree, Tien-tain [now Tianjin], no foreign settlement has come directly into contact with the misery which has been described as existing in the interior, nor are any immediate traces of it visible in the neighborhood of the capital. The apparent cause was disturbance in the usually unfailing regularity of the summer monsoons. The spring and summer of 1876 were marked in the southern maritime provinces, Kwangtung [Guangdong] and Fuhkien [Fujian], and in a less degree also along the coast as far north as Ningpo [Ningbo], by an excessive rainfall, causing in the two provinces above named disastrous floods and much destruction of crops. In the north, on the contrary, from the Yangtze [River] to the neighborhood of Peking [Beijing] and thence eastward to the borders of Corea [Korea], an unusual drought was experienced.”<sup>57</sup> [Chefoo and Tien-tain

are in northeastern *China* bordering the Yellow Sea. Kwangtung and Fuhkien are provinces on the southeast coast of *China*. Ningpo is a seaport city on east-central coast of *China*. The Yangtsze to the neighborhood of Peking can be interpreted as the Yangtsze [or Yangtze, Yangzi or Cháng Jiāng] River that drains into the China Sea at Shanghai, so in other words from Shanghai to Beijing.]

In 1877, several regions of *China* experienced droughts.<sup>153</sup>

During the period of 13 May – 10 June, the following areas were affected:

— Kiangsu (now Jiangsu province) on the east coast of *China* at Wu-chin experienced drought conditions.

— Shantung (now Shandong province) on the east coast of *China* at Chan-hua and Ning-yang experienced drought conditions.

— Hopei (now Hebei province) in northern *China* at Nan-yüeh and T'ang-shan experienced drought conditions

During the period of 6 May – 8 November, the following area was affected:

— Hupeh (now Hubei province) in central *China* at Ying-shan experienced severe drought conditions.

Six-million out of the population of 56 million in northern *China* starved to death in 1877.<sup>96</sup>

There is in *China* no mountain range of sufficient altitude or importance to determine the northern limit of the summer monsoon. During the year 1877, the monsoon could scarcely reach the valley of the Yangtsze; and in consequence central and southern *China* was drenched with excessive rain, while not a drop fell in the parched and famine stricken provinces of Chihli and Shansi.<sup>165</sup>

In *North China* during 1877-78 there was a great famine. In a telegram dated 26 January 1878 says: “Appalling famine raging throughout four provinces *North China*. Nine million people reported destitute. Children daily sold in markets for [raising means to procure] food. Foreign Relief Committee appeal to *England* and *America* for assistance.” The total population of the districts affected was 70 million. Mr. Fredk. H. Balfour, of Shanghai said: “The people’s faces are black with hunger: they are dying by thousands upon thousands. Women and girls and boys are openly offered for sale to any chance wayfarer. When I left the country, a respectable married woman could be easily bought for six dollars, and a little girl for two. In cases, however, where it was found impossible to dispose of their children, parents have been known to kill them sooner than witness their prolonged sufferings, in many instances throwing themselves afterward down wells, or committing suicide by arsenic.”<sup>57</sup>

In the northern provinces of *China* in Shensi, Shansi and Honan containing a population of 56 million, a famine broke out in 1877. The famine was caused by the continued failure of crops and lasted several years. In their desperation, the lower classes resorted to the most barbaric measures, butchering and selling their children for meat, and organizing bands for plunder and ravage. It is estimated that between four and six million perished.<sup>155</sup>

Further papers on this famine were presented to Parliament on 2 July 1878: The number of souls for whom relief is required is said to be between 3 and 4 million. One point brought out is the enormous cost of transporting supplies to the province of Shansi [Shanxi], where a mountain range has to be crossed and a distance of some hundreds of miles to be traversed by carts. Mr. Mayers says the reported cost of transporting these supplies to Shansi would be about 4 taels per picul, or say 12*l.* sterling per ton. Mr. Hugh Fraser sends from Peking, 18<sup>th</sup> January, the translation of a memorial addressed to the throne by Yen King-Ming, “Special High Commissioner for the Superintendence of the Arrangements for Famine Relief in Shansi. The commissioner dwells upon the painful scenes he has witnessed at every stage of his journey, in the course of which his chair has continually been surrounded by crowds of the famine-stricken population imploring relief, to whom he has administered comfort in soothing words, assuring them of the Imperial sympathy. The roads are lined with corpses in such numbers as to distance all



efforts for their interment, while women and children, starving and in rage, know not where to look for the means of keeping body and soul together. The memorialist, his heart wrung with despairing pity, cannot but ask why has a calamity so awful as this been visited upon the people. He can only ascribe it to his own failure in the due discharge of his duty, and he feels that his shortcoming admits of no excuse. In reply, the Grand Council has received a rescript expressing profound sympathy with the sufferings of the people as reported in this memorial, and directing that all that is possible for their relief be done, in consultation with the governor of the province.”<sup>57</sup> [Shansi is an inland northeastern province of *China*.]

In 1877-78, the famine was very severe in northern *China*. 9,500,000 said to have perished.<sup>90</sup>

In 1878, several regions of *China* experienced droughts.<sup>153</sup>

During the period of 5 February – 6 May, the following areas were affected:

— Shantung (now Shandong province) on the east coast of *China* at Tung-p’ing experienced drought conditions.

— Shensi (now Shaanxi province) in central *China* at San-yüan experienced drought conditions

During the period of 30 July – 27 August, the following areas were affected:

— Hopei (now Hebei province) in northern *China* at Nei-ch’iu, Ching-ching, Peiping, T’ang-shan, P’ing-hsiang, and Lin-yü experienced drought conditions.

During the period of 28 August – 25 September, the following area was affected:

— Hupeh (now Hubei province) in central *China* at Ching-shan experienced drought conditions.

#### **Korea**

In 1877, a famine continues in *Corea* [*North Korea* and *South Korea*].<sup>106</sup>

#### **Turkey**

In 1876, *Turkey* experienced a severe drought that caused the loss of crops and animals and the migration of farmers to other areas. The drought caused the loss of more than 200,000 people because of famine and disease epidemics.<sup>53</sup>

#### **Egypt**

In *Egypt* in 1877, it had become clear that *Egypt* was headed towards a drought. The Nile River had remained stationary for four days at a level of fourteen feet below the three-year average. This points to the possibility of a calamity of appalling magnitude. Most people are aware that from the earliest times of which any historical record exists the Nile River has annually overflowed its banks at this period of the year, bringing down with it from the mountains of Abyssinia a mass of alluvium in solution containing 48% alumen, 18% of carbonate of lime, 4% of carbonate of magnesia, 4% of silica, 6% of oxide of iron and 9% of carbon. As the inundation overspreads the Delta of the river, these fertilizing agents are precipitated, and in the months of October and November, the husbandmen [farmers] begin sowing their grain and green crops. The ordinary rise at Cairo, *Egypt* is from twenty-five to twenty-seven feet. If it exceeds this, it becomes a devastating flood, but if it attains a rise of eighteen or twenty feet, it forebodes a season of sterility. For what was true 1800 years ago, when Pliny wrote his *Natural History*, is equally true today. “When the water” he says “rises to only 12 cubits, the country experiences the horrors of famine; when it attains 13 hunger is still the result; a rise of 14 cubits is productive of gladness; a rise of 15 sets all anxieties at rest; while an increase of 16 is productive of unbounded transports of joy.” At present the rise is 3 cubits below Pliny’s minimum. At the same time, the fact that the Nile has not risen during the past 3 days is a very ominous sign. If the customary overflow should not take place, the food supply of upwards of 4 million people will be cut off for the ensuing year.<sup>106</sup>

In *Egypt* in 1877, the rainfall was short and the Nile River was low. There was great scarcity.<sup>57</sup>

#### **India and Bangladesh**

In October 1876, a terrible cyclone, followed by strong tidal waves, burst upon the seaboard of Bengal [today this is *Bangladesh* and the state of West Bengal in *India*] and caused not only the destruction of all crops but also a large number of human lives and heads of cattle.<sup>179</sup>

In 1876-77 in Chhindwara, *India*, the autumn crops were damaged by excessive rain and heavy floods. The rainfall of the year was 49.88 inches.<sup>180</sup>

In 1877 in *India*, a severe drought was reported in Madras [Chennai], Mysore, and parts of Bombay.<sup>47</sup>

In 1877 in Bombay, Madras, and Mysore, *India*, there was a famine and about 500,000 perished.<sup>90</sup>

On 15 September 1877, the *Tasmanian Mail* [Australian Newspaper] reports, there is a protracted famine in southern *India*. The population is expected to be dependent on imported food until January. Rice, for example is scarce in Calcutta and in Burma, the supplies are exhausted. On the 29<sup>th</sup> of September, they wrote that the famine is now raging in India. The famine is being accompanied by much fearful suffering and loss of life. The attention of the whole world is being drawn to it. Many countries are sending relief. On 21 September the famine at Madras continues but prospects are getting brighter because partial rains have fallen. On the 3<sup>rd</sup> of November, they wrote that the famine in *India* has passed through the worst stage. On the 10<sup>th</sup> of November, they wrote that there had been 750,000 deaths by famine in *India*.<sup>106</sup>

In *India*, the famine of 1876-78, was the most wide spread and the most prolonged that India has yet known. The drought commenced in Mysore by the failure of the monsoon in 1875. Over the entire Deccan, from Poona to Bangalore, the southwest monsoon failed to bring its usual rainfall in the summer of 1876. The autumn northeast monsoon of 1876 was very weak in the southeastern districts of the Madras [Chennai]. The main food crop, therefore, entirely perished throughout an immense tract of country. This shortage was compounded by the fact that the harvest of the previous year had also been short. As a result, prices quickly rose to famine rates. The summer monsoon of 1877 proved a failure; some relief occurred in October of 1877 by the autumn monsoon; but all anxiety was not removed until the arrival of a normal rainfall in June 1878. Meanwhile the wave of drought had reached northern India, where it found the stocks of grain greatly depleted to offset the famine demand in the south. Bengal [*India* and *Bangladesh*], Assam, the Northwest Provinces, the Punjab, Rájputána, and the Central Provinces alike suffered from drought through all the summer of 1877, and from its consequences well into the following year.<sup>54</sup> [Assam is located in northeastern *India*. Rájputána was the pre-1949 name of the present-day Indian state of Rājasthān, in northwestern *India*.]

In *India* in 1877 there was a drought in the Madras Presidency. This was one of the most extended famines on record. The cost to the government of *India*, in remedial measures and loss of revenue is estimated at 10,000,000*l*. The actual amount of mortality occasioned is difficult to determine, the estimates vary so much. Cholera prevailed in some of the famine districts, and added greatly to the number of deaths. The Mansion House Relief Fund, instituted by the lord mayor (Sir Thomas White) exceeded half million sterling. "The season of 1874 was generally good, but in parts it was unfavorable. In 1875 the season was in many places unpropitious. In 1876 the southwest monsoon, or summer rains, were deficient throughout the greater part of the Madras Presidency, and in the Bombay district of Poona [Pune]. In the northern portions only of the Madras Presidency . . . was the rainfall ordinarily propitious. The northeast monsoon, or autumn rains, failed still more disastrously. In October the whole of the nine districts of the Bombay Deccan were threatened with a serious famine, nearly all the monsoon crops having perished, and there having been no later rains to admit of sowing the rabi [spring crop] . . . The spring and summer rains again failed in 1877 . . . and added to this, the rainfall was short almost all over northern *India*."<sup>57</sup> [The Bombay Deccan was a group of former princely states in western *India*. They were incorporated into Bombay state in 1948 and are now part of Gujarat and Maharashtra states.]

A famine in southern *India* in 1876-1878 resulted in 5,200,000 people starving to death in the British territory alone.<sup>84</sup>

There was a great famine in the Gorakhpur Division in the eastern part of the state of Uttar Pradesh of *India* in 1877-78. When compared to a normal year (1872), the incident of mortality rose 73% during this famine. Also affected were the districts of Rae Bareilly, Banda, Jalaun and Pratapgarh; the Agra Division; the cities of Gurgaon, Bhurtore and Amethi, and other regions of *India*.<sup>185</sup>

In 1877-78 in Chhindwara, *India*, heavy downpours in December were followed by a frost in January. This caused rust on the wheat crop and destroyed the linseed. This year was called *Jhiri ki sal* or Rust Year.<sup>180</sup>

In 1877-78, a drought affected the western parts of the North-Western Provinces of *India*.<sup>181</sup>

In 1879 in Cashmere [now Kashmir in northwestern *India*], there was severe famine.<sup>57, 90</sup>

In the southern part of *India*, a famine broke out in 1876 in the Deccan, including the Bombay and Madras presidencies, containing a population of 23 million. The year produced only one-sixteenth of an average harvest, but the facilities for transportation were more favorable than at any other place, and the local government, aided by liberal contributions from without, and were able to cope fairly well with the famine. Nevertheless, at the end of the famine in 1878, it is estimated that about 6.3 million individuals had succumbed to the ravages of the famine and the attendant disorders, although about \$50 million [\$1.1 billion in present currency] had been spent for the support of the people.<sup>155</sup>

In the autumn of 1879 in Bulandshahr in the state of Uttar Pradesh, *India*, there was an unusually heavy rainfall, following several years of drought. As a consequence, a terrible epidemic followed that literally decimated the population of that district. The crops were left uncut in the fields. The shops remained closed in the bazaars. There was no traffic on the main roads and no business in the marketplaces. When the floodwaters of the great rivers receded, the sands were piled high with corpses. In most towns and villages, there was not a single house in which at least one person had died. In many, entire families had perished – parents, grandparents and children. Whole streets were deserted.<sup>181</sup>

### **Australia**

The summer of 1876-77 in *Australia* was dry. In August 1877, the drought in New South Wales, *Australia*, continues in the northern and western districts. The drought produced heavy livestock losses in the north. There was dry weather for the last two summers. The rainless winter was followed by a third dry summer. In Queensland, the drought is continuing and there are public prayers for rain.<sup>106</sup>

On 4 December 1877 in Sydney, *Australia*, because of a lack of water on the Darling River almost all the stations are shearing in the grease. [The sheep can be washed prior to shearing the wool, but otherwise unwashed fleece shearing is referred to as “shearing in the grease”.]<sup>106</sup>

In 1877 and 1878, *Australia* reported “The intensity of the late drought in Australia may be judged, perhaps, by the simple calculation made by the inspector of livestock, that in New South Wales alone 4 million sheep were lost last year from the effects of the dry weather. This estimate is generally admitted not to indicate the full extent of the losses, as it omits to take account of the last six weeks of the drought, which extended into the middle of February of this year, during which time the effects of the lack of rain were daily intensifying in increasing ratio. At least another million must be added to those figures to account for the losses of this year and for the loss suffered by small holders and others who were for various reasons omitted from the returns. Thus we have 5 million sheep, valued at 2,500,000 pounds at least, destroyed, directly or indirectly, through the lack of pasturage consequent on the drought. In 1876

the Australian Colonies possessed between them over 45 million sheep, of which 20 million belonged to New South Wales. There is reason to believe that in Victoria and South Australia the effects of the drought were quite as disastrous as in New South Wales, while in Queensland they were doubly severe. It is not, therefore, too much to estimate that at least the same proportion of the flocks elsewhere were destroyed as in New South Wales, and that in Australia alone, omitting Tasmania and New Zealand, 9 million sheep perished in a single summer. If we extend our view to Cape Colony, which, with the whole of *South Africa*, endured a similar calamity, we shall find that over 10 million sheep must have succumbed to the drought of 1877-78, or nearly one-third of the number of sheep supported by the whole of the United Kingdom.”<sup>47</sup>

During the drought of 1877-78 in *Australia*, another account speaks of the expected failure of the grain crops, and adds, “The kangaroos and wallaby proved so numerous that they alone consumed all that was left green. Water was carted in many cases from 10 to 12 miles (16 to 19 kilometers).”<sup>47</sup>

In 1877, all the colonies of *Australia* experience a drought. Western Australia and western Victoria were the worst hit areas. In Western Australia the swamps dried up and the native trees died.<sup>101</sup>

The temperature at Coonamble in New South Wales, *Australia* on 27 November 1877 was 112° F (44.4° C) in the shade.<sup>106</sup>

In New South Wales, *Australia* in 1878, there was a drought.<sup>103</sup>

On 18 January 1878, the temperature at Brewarrina in New South Wales, *Australia* rose to 124° F (51.1° C) in the shade.<sup>103</sup>

On 21 February 1878 at Rockhampton in Queensland, *Australia*, there were four sudden deaths caused by the great heat.<sup>103</sup>

### **New Zealand**

In November 1877, it was reported that there was a great destruction of retail goods at Dunedin, *New Zealand* owing to the want of water for the streets and there are continuing clouds of dust. It was proposed that seawater be lifted from the sea for the purpose of putting down the dust on the streets. On 5 December 1877 in Dunedin, there was a hot wind blowing. Water was very scarce and was selling for 5 pence a bucket.<sup>106</sup> [Dunedin is on the South Island of *New Zealand* in the southeastern side.]

### **South Africa**

During 1877, *South Africa* experienced drought conditions.<sup>167</sup>

— At Colesberg, “No rain of material advantage have fallen during a period of seventeen months. We have had no drought since 1829 equal in duration and intensity to the one which we now hope is drawing to a close.”

— At Murraysburg, “The almost unprecedented drought, ... has caused very severe losses to flock masters and agriculturalists. Dams which have never been known to fail have been dry during the greater part of the year.”

— At Humansdorp, “The year 1877 has been the most unfavourable one that this district has experienced for many years past. The Gamtoos River, which usually carries a large body of water, is now perfectly dry.”

— At Uitenhage, “The Sunday River, which flows the length of the district... has been for a considerable time so low that irrigation has been impossible.”

— At Bedford, “Losses in cattle and small stock were very numerous owing to the protracted drought.”

In 1878 at Cape Colony, intelligence from the interior of Cape Colony [then a British Colony in the southern region of now *South Africa*] and the Orange Free State [then an independent Boer republic in northern region of now *South Africa*] represents the country as having suffered most severely from the effects of the prolonged drought. Galekas and Gaikas (African tribes) combined are declared to be

incapable of their worst of inflicting a tenth part of the injury on the country, which has been caused by the lack of rain. Not only are the cattle and horses described as becoming daily more attenuated, and dying from the want of food and water, but human beings have succumbed to starvation, and numbers of farmers have “trekked” – deserted their lands and homes in search of food for themselves and their flocks. The failure of the crops threatened, at last advices, a disastrous famine unless rain speedily fell in abundance. New the coast the drought gave signs of breaking two months ago, but in the interior the roads are like iron, dams were dried up, springs were failing, and not a cloud was to be seen in the sky. Of the fruit crops the grapes alone had been saved. Such a state of affairs has not been known since 1862, when a disastrous but less extensive drought occurred. The necessity for works for storing water and for irrigation purposes has been more than ever impressed on the colonists by the serious check, which is thus placed on all commercial enterprises throughout the country. The Act passed last year for encouraging irrigation works will tend to the gradual relief, by artificial means, of the natural drawbacks of the country which, in this respect, resembles India or Egypt, being dependent on the periodical rains, and consequent floods, for the production of its wonderfully fertile soil.<sup>47</sup>

### Morocco

In *Morocco* in 1877, the drought from the preceding season produced a famine.<sup>57</sup>

In 1878, advices from the *Barbary Coast* of North Africa received in May received at Gibraltar give a gloomy picture of the state of affairs in the town of Casablanca, owing to the drought. Starvation is staring the native tribes of Bedouins in the interior in the face. Their fields are completely parched, and they are in great distress for want of employment. Gaining their subsistence by tilling the ground and gathering in the crops whenever chance offered, these poor Bedouins, who vied with each other in assisting their brethren of the Riff coast last year, are now as badly, in not worse, off than they were. The want of the rain, which would enable them to raise fodder, causes the holders of cattle to bring them into the town to be disposed of as best they can at any sacrifice. On the 10<sup>th</sup>, bullocks were being offered at \$4 and \$5 each and sheep at 8 rvn. and on the 15<sup>th</sup>, thirty cows were sold for the paltry sum of six pesetas each, and the sheep at 5 rvn. Many head of cattle in a lean condition remained unsold for want of buyers, though offered at half the above price. Grain is reported to be very scarce, and the little that is to be seen in the market is very dear. Rice and flour are being imported from *England* and *France*, but up to the present in small quantities. The province of Mogador is in a frightful state of misery owing to the want of rain. People, especially the Hebrews, flock into the town seeking the necessities of life from the charitable. At Tangiers some late showers have done much good by refreshing the fields for the benefit of the cattle.<sup>47</sup> [Casablanca and the province of Mogador are located in western *Morocco*. Tangiers is in northern *Morocco*.]

In *Morocco* in 1878, a correspondent of the *Jewish World*, residing at Mogador, and carrying on business in that city as a merchant, writes: “I regret to say that from want of rain the southern part of Morocco, comprising the provinces of Soos, Haha, Antuga, and the Morocco districts, is suffering from famine, every description of food being exceedingly scarce, and the pauper population of Mogador, always disproportionately large, forming about one-third of its entire inhabitants, is being rapidly increased by numerous famished Jewish and Moorish families from the adjacent districts. It is a fearful sight to see some of them – mere living skeletons. The Jews are behaving well, and have collected large sums and distributes them; they have now agreed to pay a tax of 3½ *d.* on every package of food and grain imported, and the money is being distributed weekly among the Jewish poor. The Moors, poor creatures, get no assistance from the Government, and little or nothing from their co-religionists; they are mainly dependent upon the charity they receive from the Jews and a few Christians. Unless the Government quickly does something to assist the sufferers, I fear that the limited resources of the merchants here will necessarily fail under the continual drain, and render them unable to assist the increasing number of poverty-stricken people. There is no kind of business now doing, except in articles of food, and consequently the working classes have nothing to do. They are selling their clothes and furniture to



obtain food, and when these have gone the amount of destitution will be increased. I fear, unless relief comes from the Government here, or from some charitably disposed persons, that I shall have to relate the most distressing accounts. Already some cases of actual starvation have occurred among the Moors. If you could see the terrible scenes of misery – poor starving mothers, breaking and pounding up bones they find in the streets, and giving them to their famished children – it would make your heart ache. Raise a few pounds if you can, and if you can do so lay it out in rice at the wholesale brokers, and have it shipped by the steamers leaving *England*.”<sup>57</sup>

### **Brazil**

In *Brazil* in South America in 1877, there was a great drought in northern provinces, and upwards of 200,000 of the population exposed to famine.<sup>57</sup>

In 1877, a scarcity of rain exposed 200,000 people in the northern provinces of *Brazil* to suffering.<sup>84</sup>

### **United States**

The maximum temperatures in the *United States* in June 1876 were: 96° F at Breckenridge and Washington D.C.; 97° F at Charleston, Denver, Kitty Hawk, Memphis, Tybee Island, Vicksburg and Yankton; 98° F at Augusta, Mobile, St. Marks; 99° F at Corsicana, Jacksonville, Montgomery, Savannah and Wilmington; 100° F at Dodge City and Norfolk; 101° F at North Platte; 111° F at Fort Sully; 115° F at several stations in Arizona.<sup>140</sup>

The maximum temperatures in the *United States* in July 1876 were: Baltimore, Cape Henry, New York City and Washington D.C., 99° F; Bismarck, Denison, Lynchburg, Philadelphia, Sandy Hook and Tybee Island, 100° F; Denver, Jacksonville, Montgomery and Pittsburgh, 101° F; North Platte and Norfolk, 103° F; Corsicana, 105° F; Dodge City, 108° F.<sup>140</sup>

In July 1876, throughout the *United States* east of the Rocky Mountains, the heat in many places became so intense as to produce fatal results, to cause the suspension of business, and an increase of the death rates of many of the large cities to the highest percentage.<sup>140</sup>

In August 1876 there were severe droughts in many regions of the *United States* including Florida, Illinois, Maine, New Hampshire, Vermont, New York, New Jersey, Pennsylvania, Tennessee, Virginia and Texas. At Standish, Maine, the drought was very severe, streams were dry and wells low. In St. Lawrence County, New York, the farmers were feeding grain to cattle to prevent starvation. At the end of the month at Wappingers Falls, New York, there was not enough water in the streams to run the factories. At Tioga, Pennsylvania, it was the driest period in 80 years. Because of the excessive summer heat and the lack of rainfall that resulted in droughts, several forest fires raged throughout the country. There were forest fires on the 5<sup>th</sup>, at New Brunswick, New Jersey; 8<sup>th</sup> to 12<sup>th</sup> at Carson City, Nevada; 16<sup>th</sup> on Campobello Island, Canada at the easternmost tip of the United States; 17<sup>th</sup> and 18<sup>th</sup> at Shelburne, New Hampshire; 22<sup>nd</sup> to 31<sup>st</sup> at Auburn, New Hampshire; 24<sup>th</sup> to 31<sup>st</sup> at Blooming Grove, Pennsylvania; 25<sup>th</sup> at North Hammond, New York; 27<sup>th</sup> to 31<sup>st</sup> at Fishkill Mountains, New York; 28<sup>th</sup> in the mountains near Pond Eddy, Pennsylvania vast amount of timber destroyed; around Honesdale, Pennsylvania, woods burning fiercely; in Clinton township, Pennsylvania, men fighting the fire; the Moosic Mountains, Pennsylvania, ablaze for miles, a vast amount of timber destroyed, but one rain in this section since July 4<sup>th</sup>; in the mountains in Essex County, New York; in the Highlands, opposite Newburg, and near West Point, immense surface burned over; 31<sup>st</sup> at Mt. Desert, Maine, fires raging in woods; Pike's County, Pennsylvania, fires raging with great violence, valuable timber destroyed; St. Lawrence County, New York, large quantities of timber, hay and grain destroyed, and some cattle burned; near Boonton, New Jersey, several thousand acres of bog meadows on fire for a number of days; near North Conway, New Hampshire, large quantities of valuable timber destroyed in mountains.<sup>140</sup>



During October 1876, the drought continued in many parts of the *United States*, including Maine, Massachusetts, Mississippi, New Hampshire, New York, Vermont, West Virginia, Texas and Utah. At Corsicana, Texas, the drought continued and along with grasshoppers destroyed the stock ranges, and in some parts of the country people were hauling water 10 to 12 miles. No wheat planted, ground too hard to plough. In Massachusetts, Watuppa Lake was 58¾ inches below the high water mark, probably the lowest since 1857.<sup>140</sup>

In July 1877 in California in the *United States*, the wheat planting season was an unpropitious one, very few districts in the State having been favored with sufficient moisture to enable the farmers to get their crops properly in the ground. While in many, the most extensive number of fields, did not have enough rainfall all through the winter to allow the field to be plowed at all. Even in the most favored districts the amount of rainfall was barely sufficient to make the crop, and in these only the best-cultivated fields gave a full yield.<sup>106</sup>

The year 1877 was a very dry year due to a lack of winter rains in California in the *United States*. In Santa Barbara County, hay sold for \$40 per ton. Many farmers lost their entire herd of sheep.<sup>200</sup>

In July 1878 in the *United States*, for eleven days past the weather in the Mississippi Valley and in the North-Western States has been exceedingly hot, the temperature averaging from 90° F to 102° F (32° C to 39° C) in the shade, in some places reaching even 110° F (43° C). In St. Louis, Missouri during this period 1,500 persons have been affected by the heat, of whom 150 have died. Most kinds of public work and business generally were suspended during the first half of the present week or done at night. The letter-carrier service was also interrupted during the middle of the day. In many parts of Southern Missouri and Kansas the harvesting has been done by moonlight. At Fort Dodge, Iowa, the thermometer last Tuesday, at sunset, registered 101° F (38° C) and in Milwaukee, Wisconsin on Wednesday it ranged from 90° F to 100° F (32° C to 38° C) in the shade. One hundred and three cases of sunstroke were reported in Chicago, Illinois on Wednesday, of which thirty-one resulted in death. The same day, throughout the Province of Ontario, in *Canada*, the thermometer ranged from 90° F to 103° F (32° C to 39° C) in the shade. The heat wave moved slowly eastward, and at Wheeling, West Virginia, the thermometer showed 101° F (38° C) in the shade. On Thursday, in the cities on the Atlantic coast, the temperature ranged from 88° F to 98° F (31° C to 37° C) in the shade. A cool wave from the north setting in after the torrid one reached Chicago, Illinois on Thursday morning.<sup>47</sup>

On 19 April 1879, the most severe drought in 30 years struck Dallas, Texas in the *United States*. On many plantations, the wheat was not more than one foot high and is heading out. There were fears of a famine in corn and oats. The high and dry winds that prevailed for three weeks was still blowing, with no moisture in the air and not a cloud to be seen in the heavens. The drought covers all that portion of Texas lying upon a line of Denison and San Antonio, including every county west of it, and an average of two tiers east. In some portions of this territory people are hauling water for drinking purposes a distance of from three to six miles.<sup>131</sup>

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**1876 A.D.** On 28 January 1876, there was a destructive hailstorm in Tasmania, *Australia*.<sup>103</sup>

In February 1876, tornadoes or energetic storms with destructive gust of wind were reported on the 13<sup>th</sup> near Friendsville, Illinois; 14<sup>th</sup> at Buffalo, New York; 27<sup>th</sup> St. Charles, Missouri, Princeton & St. Meinrad, Indiana in the *United States*.<sup>140</sup>

In March 1876, tornadoes were reported at Hazel Green, Wisconsin, and Hassard, Missouri, on the 10<sup>th</sup>; near Larned, Kansas on the 5<sup>th</sup>; South Hartford, New York in the *United States* on the 21<sup>st</sup>.<sup>140</sup>

On 21 March 1876, a cyclone struck Townsville in Queensland, *Australia*. The cyclone caused damage

on land and 17 deaths at sea when the *Banshee* sank off Hinchinbrook Island.<sup>99</sup>

In *France* and Holland [now *the Netherlands*] in March, there was severe inundations.<sup>47, 90, 92</sup>

In *China*, there were great floods in the northern provinces.<sup>47</sup>

In 1876, several regions of *China* experienced flooding including:<sup>153</sup>

— During the period between 23 May and 21 June, floods struck Kiangsi (now Jiangxi province) in southern *China* at Nan-ch'ang, Ch'ing-chiang, Lin-ch'uan, P'o-yang, Nan-k'ang, Kiukiang, and Chi-an; and Hupeh (now Hubei province) in central *China* at Ch'ien-chiang.

— During the period between 21 July and 18 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ing-t'ien and Hsüan-p'ing.

— During the period between 18 September and 16 October, floods struck Hopei (now Hebei province) in northern *China* at Hsing-t'ai.

In April 1876, a tornado in Iowa in the *United States* began in Wright County on the 11<sup>th</sup>, traversed through Franklin County and last heard of in Clayton county, 150 miles to the east of its origin. A second tornado occurred near Louisville Kentucky on the 14<sup>th</sup>. A tornado struck near Barnegat, New Jersey on the 16<sup>th</sup> and near Dodge City, Kansas on the 26<sup>th</sup>.<sup>140</sup>

On 6 May 1876, tornadoes struck Kansas, Illinois and Indiana in the *United States*. At Leavenworth, Kansas, a severe whirlwind passed over the city destroying three buildings and unroofing 10 others. In Indiana, a tornado formed at White River about two miles from the north line of Marion County. It traveled about 20 miles. Farmhouses and barns were destroyed. Cattle and sheep were taken up and whirled through the pipe. The tornado was shaped like an hourglass. A tornado struck Chicago, Illinois. It demolished a fog-bell tower. About \$250,000 in damages was done to property in and about the city. [In present currency, that would be equivalent to \$5 million in damages based on the Consumer Price Index (CPI) inflation rates.] At Carbondale, Illinois, a tornado struck the city destroying houses, uprooting trees and demolishing an *Illinois Central Railroad* depot. A few miles to the north at Neoga, a locomotive and railroad cars were blown from the tracks. The tornado also struck Anna, Illinois damaging buildings and trees.<sup>140</sup>

In June 1876, a very severe tornado struck Dodge City, Kansas in the *United States* on the 7<sup>th</sup>. A tornado struck Paris, Kentucky on the 23<sup>rd</sup>; another tornado struck Portage, Pennsylvania on the 24<sup>th</sup>. On the 25<sup>th</sup> a tornado passed just east of Lenoir, North Carolina where several houses were blown down. On the 25<sup>th</sup> a tornado or waterspout passed through Kingsbury, Hartford and Hebron, New York; the width of the storm track was about 200 yards, its duration at any point was 17 or 18 minutes. During the storm heavy hailstones fell, of which 15% were one inch in diameter. At the same time with the preceding storm, a more violent one passed in nearly the same direction, 40 or 50 miles to the north, passing into Vermont near Rutland. On the 26<sup>th</sup>, near Pueblo and Hard Scrabble canon, Colorado, a very severe storm was reported, having a track about two miles wide; hailstones, to the depth of 18 inches, were lying on the ground the next day; it was noted that clouds had been collecting for two days previously, and that shortly before the storm they were seen to be rising from the neighborhood of Pike's Peak in huge black masses.<sup>140</sup>

On 16 June 1876, unusually heavy rainfall occurred in South Carolina and Georgia in the *United States*. At Gainesville, Georgia and an area 100 miles to the east and to the south, the floods caused \$1 million in damages [\$20 million in today's dollars] and the loss of 8 lives.<sup>140</sup>

On 4 July 1876, a tornado struck Spiceland, Indiana in the *United States*, blowing down trees. Also on July 4<sup>th</sup>, destructive tornadoes struck Iowa. Tornadoes struck Lee, Davis, Van Buren, Clark, Lucas,

Appanoose, Harrison, Delaware, Jones, Linn and Cedar counties in Iowa and caused great loss of life and serious injury to crops. The storm was particularly severe at Dubuque, and at Rockdale, Iowa, where thirty-nine persons were drowned by a flood in the small stream upon which the village is located. A whirlwind with a storm of grasshoppers was observed on Pike's Peak, Colorado on the 11<sup>th</sup>. On the 13<sup>th</sup>, tornadoes struck Nottaway and Norfolk, Virginia.<sup>140</sup>

In July and August 1876, the hailstorms in *England* were few in number, but very severe. Damage to crops to the extent of more than £10,000 was occasioned in one section of Shropshire.<sup>93</sup>

On 18 August 1876, a storm in Paris, *France* produced a very unusual form of ball lightning called "bead flashes". "Towards seven in the morning at the moment when the storm began to descent on Paris, one flash remarkable amongst the others discharged itself from the cloud to the ground, describing a curve like an elongated 'S', and remained visible during an appreciable time, forming a string of brilliant beads scattered along a very thin luminous thread."<sup>271</sup>

In *France*, the losses in 1876 from hailstorms were estimated at £1,867,222. [In today's currency, that would be the equivalent of £130,000,000 or \$211,000,000 U.S. dollars using the retail price index.]<sup>93</sup> On 22 July 1876 in the Clarence River district in New South Wales, *Australia*, there were devastating floods and loss of life. The damage done at Grafton alone was estimated at £50,000.<sup>103</sup>

On 10 September 1876, the heaviest gales on record occurred on the *Australian* coast. On Sunday night the wind obtained the remarkable velocity of 135 miles per hour. The ship, the *Dandenong*, was lost at sea in this gale. The *S.S. City of Melbourne* on passage to Melbourne, Australia was caught in this gale off Jervis Bay, and racehorses to the value of £20,000 were lost.<sup>103</sup>

In September 1876 one of the worst gales in *Australia's* history occurred in Jarvis Bay off the coast of New South Wales. The steamer *Dandenong* was wrecked when her propeller shaft broke and she began to leak badly. Preparations were made to transfer the passengers and crew to the barque *Albert William*. Some lives were lost when lifeboats were swamped by huge seas but a few reached safety, leaving about 30 on the doomed vessel. By first light the *Dandenong* had gone. At the same time, a few kilometers away, the *S.S. City of Melbourne* with passengers and cargo including 11 horses, fought to survive. Although 8 horses were lost and the ship was badly damaged, she managed to survive.<sup>99</sup>

In September 1876, a hurricane passed near *Antigua* and *St. Kitts* on the 12<sup>th</sup>, *St. Thomas* and *Puerto Rico* on the 13<sup>th</sup>. The destruction of crops and buildings was reported as very great at these islands. On the 14<sup>th</sup> it passed near Santiago de Cuba, *Cuba* and on the 15<sup>th</sup> on the Bahamas Banks, *Bahamas*. The observer at Hampton, Virginia in the *United States*, reported lowest barometer (29.10 reduced to Signal Service standard) occurred at 1:20 p.m. on the 17<sup>th</sup>; at Washington, D.C. the records of the central office showed that the lowest barometer was 29.15 about 4:35 p.m. during a period of calm, which lasted from 4:50 to 5:50 p.m. The hurricane on the 16<sup>th</sup> and 17<sup>th</sup> caused unusually high water along the Atlantic coast.<sup>140</sup>

On 12 September 1876, a hurricane struck *St. Kitts* in the *West Indies*.<sup>144</sup>

On 13-17 September 1876, a hurricane struck *Puerto Rico* and North Carolina in the *United States*. Nineteen deaths were reported [in *Puerto Rico*], but historians suspect the Spanish Government withheld actual damage and death toll data. Two drowned in Onslow County, North Carolina and from Okracoke to Rocky Mount, reports were gathered of killed and injured citizens.<sup>141</sup>

On 13 September 1876, a waterspout was observed near New River, North Carolina in the *United States*. A strange phenomenon was observed originating from the apex of a cumulostratus cloud, very near the

beach. The base of the cloud was apparently about two hundred feet above the surface of the sea; a rushing noise and gyratory motion at the base of the cloud attended the phenomenon at its first appearance, and soon the cloud projected downward, lashing the sea in a furious manner; a deafening roaring of the water was heard, and in a few moments a completely-formed water-spout appeared; the column of water rose to the height of about forty feet, having a diameter of about twenty feet at its base. The waterspout now moved northward towards the beach, and twenty minutes after its formation the cloud rose and the column of water fell obliquely, in the direction of its course, on the beach, cutting a trench in the sand, ten feet in depth and twenty-five feet in width, throughout the entire length of the column.<sup>140</sup>

On 3-4 October 1876, a cyclone passed over Central America, with great destruction of property and loss of life, especially at Anagua [Antigua, *Guatemala*] and Blewfields [Bluefields, *Nicaragua*].<sup>140</sup>

On 17 October 1876, a hurricane was observed in the Caribbean Sea, south of Cuba and in the vicinity of the *Cayman Islands*. On the 18<sup>th</sup> it struck the western half of *Cuba*. On the 19<sup>th</sup>, it was over the southern portion of Florida in the *United States*. On the 23<sup>rd</sup>, it was over *Bermuda*.<sup>140</sup>

On 19-21 October 1876, a storm [hurricane] was first encountered by vessels in the Caribbean Sea south of *Cuba*. At Havana, Cuba, the barometer reached its minimum, about 28.70 inches (729 millimeters), at 11:45 a.m. on the 19<sup>th</sup>. The storm passed directly over Havana, and slightly to the east of Key West, Florida in the *United States*, where the lowest barometer, 28.73 inches (730 millimeters), was noted at 8 p.m. on the 19<sup>th</sup>. The highest force of wind at Key West was eighty-eight miles per hour at 8:45 p.m. on the 19<sup>th</sup>. The storm moved off the east-central coast of Florida on the morning of the 20<sup>th</sup>, and thence passed northeastward.<sup>120</sup>

During the night of 31 October 1876, a cyclone passed over the districts of Soonderbonds [Sundarbans] and Backergunje [Brackerganj], and the mouths of the Ganges and Bramapootra [Brahmaputra] rivers, east of Calcutta, British *India*, producing an immense tidal wave. Late accounts said 120,000 persons perished.<sup>140</sup> [The Sundarbans is in the Bay of Bengal, in northeastern Bengal [*India*] and west Bengal [*Bangladesh*]. The Sundarbans is the largest single block of tidal halophytic mangrove forest in the world. Backergunje [Brackerganj or Bakerganj] is located in southern *Bangladesh*.]

In Bengal, India [*India* and *Bangladesh*] on October 31, there was a great cyclone. A tidal wave, extending, it was estimated, over 3,000 square miles (7,800 square kilometers), being in many places more than 20 feet (6 meters) deep. The loss of life was estimated at 215,000, while the destruction of property was incalculable.<sup>57</sup>

On 31 October 1876, a storm wave, 10 to 50 feet high, swept the eastern edge of the Ganges delta, destroying over 100,000 lives.<sup>124</sup>

Destructive cyclone, in southeast Bengal [now *Bangladesh*] on 31 October 1876. Calcutta, *India* barely escaped. About 215,000 persons perished.<sup>90</sup>

In 1876, a powerful cyclone struck Backerganj, *Bangladesh* causing 200,000 deaths.<sup>98</sup>

In October 1876 in Bengal [*India* and *Bangladesh*], there was a great inundation of tidal wave caused by a hurricane. Estimates of loss of life as high as 200,000; loss of property immense.<sup>92</sup>

In *Wales* in October, there was great damage in South Wales from overflow of River Ebbw. Collieries [coal mines and associated buildings] damaged.<sup>47, 92</sup>

In *India* (now in *Bangladesh*) on November 7, the district of Baharganj (the delta thrown out by the united waters of the Ganges) desolated by a cyclone.<sup>57</sup>

In *Scotland* in November, there were great floods in Perth and Forfar. Caledonian Railway much injured.<sup>47, 92</sup>

Severe storms near [*Great Britain*] caused great loss of shipping on 11-13 November 1876; 2-3 and 22-23 December 1876; and 2 January 1877.<sup>90</sup>

In December, there were floods generally throughout *England*.<sup>47, 92</sup>

During 25-31 December 1876, severe floods struck *England* caused by heavy rains.<sup>90</sup>

In *Turkey* in December, there was a deluge of rain round Adrianople; 1,000 houses said to be swept away; and other serious damage.<sup>47, 92</sup> [Adrianople is now Edirne located in northwestern *Turkey*.]

In *Spain* and *Portugal* in December, there were great floods in Andalusia, and especially in Seville. Also in southern Portugal.<sup>47, 92</sup>

[Although this item does not fall under the category weather, I have included this material within brackets because of its unique nature. It appears that a large asteroid or comet fragment passed very near Earth on 21 December 1876 and broke apart over the *United States* forming a string of pearls as it passed across the sky: “The great meteor of the evening of the 21<sup>st</sup> was one of the most remarkable that has lately been recorded in the United States; reports concerning it have been received from about 120 stations. From a brief study of these it becomes apparent that the meteor entered the earth's atmosphere somewhere over or west of Kansas or Nebraska, its true course was nearly due east, and it was last seen over the State of New York. Its visible track, as projected upon the earth, is therefore over a thousand miles long. The times of its appearance and disappearance, as noted by the observers, are extremely discordant. The average of about 45 observations, pretty uniformly distributed along its course, gives 9 hours 26 minutes as the Washington [D.C.] mean time, which may, therefore, represent the moment when it was at the middle of its visible path. No definite conclusion can be satisfactorily arrived at, with reference to its actual velocity in miles, from a comparison of the records of distant observers; but the observations of the individual observers, taken by themselves, give velocities relative to the earth's surface of between 1 and 5 miles per second, or 2 to 5 miles [per second] relative to the earth's centre, and as the meteor was overtaking the earth in its annual orbit, its velocity in space relative to the sun was 20 to 25 miles [per second], its movement being, towards a point in Lat. 20°, Long. 35°, with reference to the plane of ecliptic. When first seen the meteor appeared to be as large as the moon, but much brighter. In passing over Indiana its main body divided into two portions, and one of these subsequently broke into a hundred fragments, which at first kept together in one cluster, but gradually fell behind each other, forming a long train in single-file and as such passed over Ohio into New York. The brightness of the meteor was everywhere described as far surpassing bright moonlight. No reliable accounts speak of any noise heard during the visibility of the meteor, but in from two to five minutes after its passage a shock resembling thunder was heard, which in the majority of cases was described as tremendous, shaking the ground and the houses, and was especially alarming to those who, on account of the prevailing cloudiness, were unable to see the preceding meteor. The uniform character of the sound heard at all stations shows that it was not due to any violent explosion, (properly so-called,) but was a peculiar acoustic phenomena, depending on the fact that that portion of the line described by the meteor when nearest to any observer, became, as it were instantaneously along a length of several miles, the origin of a series of simultaneous sounds which, although in themselves comparatively feeble, were concentrated into a violent sound when they reached the observer's ear. No records have come to hand of the finding of any fragments of this meteor, nor is it likely that any of any size fell to the earth, as the main body evidently passed out of the atmosphere when over New York, and the smaller fragments or sparks that were seen to fly off were rapidly burned up and disappeared in its train.”]<sup>140</sup>

*Also refer to the section 1876 A.D. – 1879 A.D. for information on the worldwide drought and famine during that timeframe.*



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**Winter of 1876 / 1877 A.D.** During the winter of 1876-77, the *Baltic Sea* was completely covered with ice.<sup>68</sup>

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1876 occurred on 15 October. It snowed all day; 4 or 5 inches deep.<sup>116</sup>

During the winter of 1876-77 in Bradford County, Pennsylvania in the *United States*, there was a long run of good sleighing on the highlands lasting from the end of November until the first of April. The deepest snowfall was on 6 January with a fall of 12 inches [30 cm]. A snowstorm, which began on 12 March lasted 36 hours, but the snowfall was light. The coldest days of this winter occurred on the morning of 9 January when the temperature fell to -20° F [-29° C] and on 18 March when temperatures dropped to -15° F [-26° C].<sup>178</sup>

Frost occurred in the Gulf States in the *United States* during much of December 1876. The first period of cold from the 1<sup>st</sup> to the 6<sup>th</sup> at Punta Rassa, Florida, scarcely anything escaped being injured by the cold. Large quantities of fish of all sizes and kinds, were killed by the cold water, and cast up on the beach daily.<sup>140</sup> [Punta Rassa today is a ghost town. It is located on State Road 867 just before crossing the bridge for Sanibel Island on the south side of the Caloosahatchee River.]

In December 1876 many rivers and lakes in the *United States* were frozen over. The Mississippi River at Davenport, Iowa was frozen over on the 4<sup>th</sup> when men crossed the river on foot. By the 10<sup>th</sup> teams [of horses and wagons] crossed the frozen river. At St. Louis, Missouri the Mississippi River was frozen over on the 11<sup>th</sup>. At La Crosse, Wisconsin the ice on the Mississippi River averaged 19 inches in thickness, and some ice was cut 31 inches thick, on the 31<sup>st</sup>. At Pittsburg, Pennsylvania and at Cincinnati, Ohio, the Ohio River was frozen over on the 10<sup>th</sup>. At Logansport, Indiana, the Wabash and Eel rivers were frozen over. At Alpena, Michigan on the 8<sup>th</sup>, the Thunder Bay River and harbor were frozen over. At Monticello, Iowa, the Maynoketa River [Maquoketa River] was frozen over on the 2<sup>nd</sup>. At Shelburne, New Hampshire, the Androscoggin River crossed by pedestrians on the 3<sup>rd</sup> and by teams on the 10<sup>th</sup>. At Trenton, New Jersey on the 4<sup>th</sup>, the Delaware River was frozen over. At Decatur, Illinois on the 8<sup>th</sup>, the Sangamon River was frozen over. At Philadelphia, Pennsylvania on the 9<sup>th</sup>, the Schuylkill and Delaware rivers were frozen over. At Morgantown, West Virginia, the Monongahela River was frozen over. At Bloomfield, Wisconsin, Geneva Lake was frozen over. At Washington, D.C., the Potomac River was closed [due to the ice] on the 12<sup>th</sup>. At Salem, New Jersey, the Salem Creek was closed on the 15<sup>th</sup> when the ice was 10 inches thick. At Asheville, North Carolina on the 18<sup>th</sup>, the French Broad River was crossed on ice by cattle, &c, for several days about this date. This was the first time that this had ever occurred within the knowledge of the observer. On the 19<sup>th</sup>, at Fall River, Massachusetts, the Taunton River and Narragansett Bay were frozen over. On December 25<sup>th</sup> at Standish, Maine, Sebago Lake was frozen. This lake has not been known to freeze with the water so low since 1838.<sup>140</sup>

The following were the lowest temperatures observed in January 1877 in the *United States*:<sup>112</sup>

Pembina, Dakota Territory	(-53° F, -47.2° C)
Fort Ripley, Minnesota	(-41° F, -40.6° C)
Mount Washington, New Hampshire	(-36° F, -37.8° C)
Orono, Maine	(-32° F, -35.6° C)
Coalville, Utah	(-30° F, -34.4° C)
Independence, Iowa	(-28° F, -33.3° C)
Duluth, Minnesota	(-27° F, -32.8° C)
Woodstock, Vermont	(-27° F, -32.8° C)
Neillsville, Wisconsin	(-27° F, -32.8° C)
Malone, New York	(-25° F, -31.7° C)
Westerville, Ohio	(-24° F, -31.1° C)



Contoocookville, New Hampshire	(-23° F, -30.6° C)
Spiceland, Indiana	(-22° F, -30.0° C)
Fort Sanders, Wyoming Territory	(-22° F, -30.0° C)
DeSota, Nebraska	(-22° F, -30.0° C)
Riley, Illinois	(-21° F, -29.4° C)
Kenton, Ohio	(-21° F, -29.4° C)
Laconia, Indiana	(-21° F, -29.4° C)
Tioga, Pennsylvania	(-20° F, -28.9° C)
Austin, Tennessee	(-20° F, -28.9° C)
Yankton, Dakota Territory	(-19° F, -28.3° C)
Fort Lyon, Colorado	(-19° F, -28.3° C)
Corning, Missouri	(-18° F, -27.8° C)
Embarrass, Wisconsin	(-17° F, -27.2° C)
Murphy, North Carolina	(-16° F, -26.7° C)
Burlington, Vermont	(-16° F, -26.7° C)
Omaha, Nebraska	(-16° F, -26.7° C)
Billerica, Massachusetts	(-15° F, -26.1° C)
Alpena, Michigan	(-14° F, -25.6° C)
Council Grove, Kansas	(-14° F, -25.6° C)
Cheyenne, Wyoming Territory	(-14° F, -25.6° C)
Nicholasville, Kentucky	(-12° F, -24.4° C)
Cornish, Maine	(-11° F, -23.9° C)
Wet Glaz, Missouri	(-11° F, -23.9° C)
Woodstock, Maryland	(-10° F, -23.3° C)
Keokuk, Iowa	( -9° F, -22.8° C)
Louisville, Kentucky	( -9° F, -22.8° C)
South Pueblo, Colorado	( -9° F, -22.8° C)
Snowville, Virginia	( -8° F, -22.2° C)
Salem, West Virginia	( -8° F, -22.2° C)
Memphis, Tennessee	( -6° F, -21.1° C)
Lansing, Michigan	( -6° F, -21.1° C)
Colebrook, Connecticut	( -6° F, -21.1° C)
Hudson, New York	( -5° F, -20.6° C)
Sedgwick, Kansas	( -4° F, -20.0° C)
Salem, New Jersey	( -4° F, -20.0° C)
Milford, Delaware	( -4° F, -20.0° C)
Fort McHenry, Maryland	( -3° F, -19.4° C)
Washington, D.C.	( -3° F, -19.4° C)
Weston, West Virginia	( -2° F, -18.9° C)
Dover, Delaware	( 0° F, -17.8° C)
Anna, Illinois	( 0° F, -17.8° C)
Spartansburg, South Carolina	( 0° F, -17.8° C)
Fort Gibson, Indian Territory	( 0° F, -17.8° C)
Fort Union, New Mexico	( 0° F, -17.8° C)
Camp McDermitt, Nevada	( 0° F, -17.8° C)
Mount Ida, Arkansas	( 1° F, -17.2° C)
Carson City, Nevada	( 1° F, -17.2° C)
Boston, Massachusetts	( 2° F, -16.7° C)
Brownsville, Pennsylvania	( 2° F, -16.7° C)
Atco, New Jersey	( 3° F, -16.1° C)
Salt Lake City, Utah	( 3° F, -16.1° C)
Atlanta, Georgia	( 4° F, -15.6° C)
Chepachet, Rhode Island	( 4° F, -15.6° C)
New Haven, Connecticut	( 4° F, -15.6° C)
Weldon, North Carolina	( 6° F, -14.4° C)
Santa Fe, New Mexico	( 6° F, -14.4° C)

Newport, Rhode Island	( 7° F, -13.9° C)
Mesquite, Texas	( 8° F, -13.3° C)
Monticello, Arkansas	( 10° F, -12.2° C)
Carlowville, Alabama	( 13° F, -10.6° C)
Fort McKavett, Texas	( 14° F, -10.0° C)
Fort Sill, Indian Territory	( 14° F, -10.0° C)
Norfolk, Virginia	( 16° F, -8.9° C)
Montgomery, Alabama	( 16° F, -8.9° C)
Vicksburg, Mississippi	( 16° F, -8.9° C)
Aiken, South Carolina	( 17° F, -8.3° C)
Baton Rouge, Louisiana	( 18° F, -7.8° C)
Milton, Florida	( 20° F, -6.7° C)
Salinas City, California	( 21° F, -6.1° C)
Lake Charles, Louisiana	( 23° F, -5.0° C)
St. Marys, Georgia	( 26° F, -3.3° C)
Brookhaven, Mississippi	( 26° F, -3.3° C)
Portland, Oregon	( 27° F, -2.8° C)
El Monte, California	( 34° F, 1.1° C)
Key West, Florida	( 50° F, 10.0° C)

In the *United States* during the winter of 1876-77, the temperature dropped to -10° F at Mount Auburn, Ohio, a suburb of Cincinnati in December. The temperature at Kenton, Ohio fell to -20° F in December. The temperature at Fort Lyon (now Las Animas, Colorado) fell to -30° F in December. The temperature at Dubuque, Iowa fell to -19° F in December. The temperature at Fort Wallace (near Wallace, Kansas) fell to -24° F in December. The temperature at Dodge City, Kansas fell to -15° F in December. The temperature at Billerica, Massachusetts fell to -20° F in December. The temperature at Shelbyville, Indiana fell to -26° F on January 9<sup>th</sup>. The temperature at Coalville, Utah dropped to -30° F in January. The temperature at Pembina, North Dakota fell to -53° F in January. The temperature at Lenoir, North Carolina fell to -16° F in January. The temperature at Lynchburg, Virginia fell to -4° F in January. The temperature at Helvetia, West Virginia fell to -14° F in January.<sup>113, 126</sup>

The depth that rivers, streams, lakes and ponds froze in January 1877 in the *United States*:<sup>112</sup>

- \* At Decatur, Alabama, ice on Tennessee River 2 inches thick on January 2<sup>nd</sup> – 4<sup>th</sup>, navigation suspended 3 days.
- \* At Albemarle, North Carolina, the Pedee River had ice in eddies 4 inches thick on January 15<sup>th</sup>.
- \* At Lenoir, North Carolina, in ponds and streams were frozen 3 to 8 inches.
- \* At Snowville, Virginia, ice 18 inches thick.
- \* At Salem, New Jersey, creek remains firm on January 31<sup>st</sup>, had been 15 to 18 inches thick.
- \* At Philadelphia, Pennsylvania, ice on the Schuylkill River reported 34 inches thick on January 25<sup>th</sup>.
- \* At Wappinger's Falls, New York, pond ice reported 30 inches thick on January 6<sup>th</sup> and 36 inches on 31<sup>st</sup>.
- \* At Malone, New York, Pond ice 30 inches thick on January 13<sup>th</sup>.
- \* At Morgantown, West Virginia, ice 8 to 15 inches thick on January 13<sup>th</sup>.
- \* At Wooster, Ohio, ice 24 inches thick.
- \* At Afton, Iowa, pond ice 14 inches thick on January 25<sup>th</sup>.
- \* At Keokuk, Iowa, river ice 20 to 30 inches thick on January 13<sup>th</sup>.
- \* At Independence, Iowa, river ice 21 inches thick.
- \* At Leavenworth, Kansas, ice 15 inches thick on January 8<sup>th</sup>.
- \* At Omaha, Nebraska, ice 24 inches thick on January 31<sup>st</sup>.
- \* At Plattsmouth, Nebraska, ice 24 to 30 inches thick on January 13<sup>th</sup>.
- \* At La Crosse, Wisconsin, river ice 13 inches thick on January 31<sup>st</sup>.
- \* At Breckenridge, Minnesota, ice on the Red River of the North 40 inches thick, and on the Bois des Sioux 43 inches thick on January 31<sup>st</sup>.

The depth that the ground was frozen in January 1877 in the *United States*:<sup>112</sup>

- \* At Brookhaven, Mississippi, the ground was frozen to a depth of 5 inches on January 1<sup>st</sup>.

- \* At Alta Vista, Virginia, the ground was frozen 7 inches deep on January 6<sup>th</sup>.
- \* At Danville, Kentucky, the ground was frozen 1 foot on January 9<sup>th</sup>.
- \* At College Hill (near Cincinnati), Ohio, the ground was frozen 3½ feet on January 13<sup>th</sup>.
- \* At Freehold, New Jersey, the ground was frozen 14 inches on January 29<sup>th</sup>.
- \* At Breckenridge, Minnesota, the ground was frozen 6 feet, 4 inches on January 30<sup>th</sup>.
- \* At Dover, Delaware, ground was frozen 30 inches at the close of month.
- \* At Tabor, Iowa, the ground was frozen 4 feet.
- \* At Independence, Iowa, the ground was frozen 18 inches.
- \* At Creswell, Kansas, the ground was frozen 1 foot.
- \* At Sedgewick, Kansas, the ground was frozen 10 inches.
- \* At Fallston, Maryland, the ground was frozen 7 inches.
- \* At Somerset, Massachusetts, the ground was frozen 14 inches.
- \* At Wooster, Ohio, the ground was frozen 1 foot.
- \* At North Lewisburg, Ohio, the ground was frozen 16 inches.
- \* At Ardenia, New York, owing to the heavy covering of snow, the frost had penetrated the ground to only a depth of 8 inches.
- \* At Westboro, Massachusetts, the ground under the snow was reported free of frost.

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**1877 A.D.** In London and *England* generally in January, there was great damage done in the southern districts of London by high tide combined with floods; also in Thames Valley generally. Destruction estimated at over 200,000*l*. A subscription opened by Lord Mayor for relief of poorer sufferers. Large sums raised. In the eastern, midland and southwestern counties great floods.<sup>47 92</sup>

On 1 January 1877, an inundation greatly injured the piers at Folkestone, Dover, and Hastings in *England*.<sup>90</sup>

On 18 February 1877, a terrible hurricane occurred at the Lacepede Islands, *Australia*.<sup>103</sup> [These islands are off the northwest coast of Western Australia.]

During March and October 1877, there were hailstorms in *England*. The hailstorms commenced very early in the year— these were designated "Lambing Storms." On the 29th of March, a most severe storm visited the northern districts of the metropolis, effecting great destruction of glass. The hailstorms continued to an unusually late period of the year.<sup>93</sup>

On 3 May 1877 at Mason, Texas in the *United States*, there was a terrific and destructive storm that produced hail as large as a man's hand, crushing crops and killing thousands of sheep.<sup>112</sup>

On the 16<sup>th</sup> to 19<sup>th</sup> of May 1877, a very heavy "Kona" storm and rain passed over the *Sandwich Islands* [now *Hawaiian Islands*]. At Honolulu, *Hawaii*, the storm produced heavy snowfall on the mountains and a large waterspout. The "Kona" is a strong northerly wind, interrupting the regular northeast trade, and usually preceding a hurricane.<sup>112</sup>

On 18 May 1877, a storm in the *United States*, produced 3 inch diameter hailstones at Webster, Massachusetts; 4 inch diameter hail at Oxford, Massachusetts, and 5 inch diameter hail in Bennington Virginia.<sup>112</sup>

On 27 May 1877 at 22 miles north of Mason, Texas in the *United States*, 3 to 4 inch diameter hail crashed through the roofs.<sup>112</sup>

The following maximum temperatures were observed during the summer from June-September 1877 in the *United States*:<sup>112</sup>

96° F, (35.6° C) at Boerne, Texas; Cheyenne, Wyoming; Keokuk, Iowa; La Crosse, Wisconsin; Lynchburg, Virginia; Memphis, Tennessee; Nashville, Tennessee; New Orleans, Louisiana; Pittsburgh, Pennsylvania; and Yankton, South Dakota; Leavenworth, Kansas; Fort Hayes, Kansas; Hennepin, Illinois; and Castroville, Texas.

97° F, (36.1° C) at Salinas City, California; Galveston, Texas; Saint Louis, Missouri; and Wilmington, North Carolina.

98° F, (36.7° C) at Salt Lake City, Utah; Fort Gibson, Indian Territory; Smithville; and Washington D.C.

99° F, (37.2° C) at Fort Richardson, Texas; Camp Sheridan, Nebraska; Vicksburg, Mississippi; Shreveport, Louisiana; Fort Sill, Indian Territory; Norfolk, Virginia; Omaha, Nebraska; St. Marks, Florida; Tybee Island, Georgia; and Denver, Colorado.

100° F, (37.8° C) at Mobile, Alabama; Charleston, South Carolina; Florence, California; Indianola, Iowa; Jacksboro, Concho, Texas; Independence, Iowa; Augusta, Georgia; Jacksonville, Florida; Mason, Georgia; and Savannah, Georgia.

101° F, (38.3° C) at Dodge City, Kansas; and Atlanta, Georgia.

102° F, (38.9° C) at Campo, California; Tucson, Arizona; Denison, Texas; Montgomery, Alabama; Baton Rouge, Louisiana; Chepachet, Gilmer, Texas; Clarksville, Texas; Melissa, Texas; Eagle Pass, Texas; Fort Griffin, Texas; Fort Clark, Texas and Fort Rice, North Dakota.

103° F, (39.4° C) at Sacramento, California; Corsicana, Texas; Fort McKavett, Texas; and Visalia, California.

104° F, (40.0° C) at Camp Verde, Arizona; Laredo, Texas; Winnemucca, Nevada; Phoenix, Arizona; Uvalde, Texas; Mesquite, Texas; and New Ulm, Texas.

105° F, (40.6° C) at Fort Lyon, Colorado.

106° F, (41.1° C) at Red Bluff, California; Brackettville, Texas; and Boise City, Idaho.

107° F, (41.7° C) at North Platte, Nebraska.

108° F, (42.2° C) at Fresno, California; Wickenburg, Arizona; San Antonio, Texas; and Fort McPherson, Nebraska.

109° F, (42.8° C) at Fort Sully, South Dakota; and Rio Grande, Texas.

111° to 122° F, (43.9° to 50.0° C) at Spring Valley, California.

112° F, (44.4° C) at Los Angeles, California; Maricopa Wells, Arizona; Fort Yuma, California; and Cajon Rancho, California.

114° F, (45.6° C) at Yuma, Arizona

116° F, (46.7° C) at Stanwix Station, Arizona.

From a paper by Mr. G.J. Symons, F.M.S., “On the Climate of the Various British Colonies”

Annual Climatological Data for the Principal British Colonies:<sup>112</sup>

<u>Name of Colony and Station</u>	<u>Absolute Maximum</u>	<u>Absolute Minimum</u>	<u>Average Rainfall</u>
London	95.0° F	5.0° F	25 inches
St. Helena, Longwood	77.6° F	52.0° F	40 inches
Cape of Good Hope	97.4° F	37.7° F	24 inches
Natal	97.8° F	29.0° F	30 inches
Mauritius	90.0° F	62.8° F	56 inches
Bengal, Calcutta	106.0° F	52.7° F	66 inches
Bombay	93.5° F	58.0° F	71 inches
Madras	110.0° F	57.6° F	48 inches
Ceylon	95.0° F	68.3° F	76 inches
Straits-Settlements	93.0° F	65.0° F	95 inches
Queensland, Brisbane	108.0° F	34.5° F	51 inches
New South Wales, Sydney	107.0° F	36.0° F	50 inches
Victoria, Melbourne	111.2° F	27.0° F	26 inches
South Australia, Adelaide	113.5° F	34.2° F	21 inches
Tasmania, Hobart Town	105.0° F	29.0° F	23 inches
New Zealand, Wellington	83.0° F	30.0° F	47 inches
British Guiana	89.0° F	68.0° F	94 inches
Barbadoes	85.0° F	64.0° F	67 inches
British Honduras, Belize	88.0° F	58.0° F	71 inches
Bermuda	95.0° F	46.0° F	48 inches

Canada, Newfoundland	92.5° F	- 21.0° F	55 inches
Canada, Toronto	99.2° F	- 26.5° F	36 inches
Canada, Manitoba	95.0° F	- 43.1° F	22 inches
Canada, British Columbia	100.0° F	- 29.0° F	---

[Longwood is on the island of St. Helena in the South Atlantic Ocean. The Cape of Good Hope is in the southern region of South Africa. Natal is in the northeastern region of South Africa. Mauritius is an island in the west Indian Ocean. Calcutta is now Kolkata in northeastern India. Bombay is now Mumbai in northwestern India. Madras is now Chennai in southeastern India. Ceylon is now Sri Lanka. Straits-Settlements is now Singapore and Malaysia. Brisbane is on the east-central coast of Australia. Sydney and Melbourne are on the southeastern coast of Australia. Adelaide is on the south-central coast of Australia. Hobart Town is on the southeastern coast of Tasmania, Australia. Wellington is in the southern region of the South Island in New Zealand. British Guiana is in northern South America. Barbadoes (Barbados) is a Caribbean island in the West Indies. British Honduras is now Belize in Central America. Bermuda is a Caribbean island in the West Indies. Newfoundland is in northeastern Canada. Toronto is in southern Canada. Manitoba is in central Canada. British Columbia is in western Canada.]

During the middle of June 1877, floods on the banks of the River Thames in *England* did much damage throughout the country.<sup>90</sup>

On 24 June 1877, a tornado and waterspout passed 2½ miles north of Fort Lyon (Las Animas), Colorado in the *United States*. The tornado formed and touched down pulling up a vast column of dust, and then suddenly a waterspout formed in the center of the whirl. It passed across the prairie with a terrific noise. Very large size hail dropped from the center of the whirl. The pieces of ice (hailstones) were “so large that they could not be grasped in one hand.” The violent wind unroofed the railroad depot, and demolished a switch house. Examining the tornado path the next day, it was determined the tornado was about 500 yards wide.<sup>112</sup>

On 30 June 1877 in Vevay, Indiana in the *United States*, at the close of a remarkably violent storm, there was a heavy shower lasting five minutes, which fell from an apparently cloudless sky. The raindrops were of a large size and when caught by a sheet of blotting paper made circles 2½ inches in diameter.<sup>112</sup>

On 3 July 1877, there was a destructive hailstorm that passed over the eastern portion of Bradford County, Pennsylvania in the *United States*. Growing crops along Wyalusing Creek were almost totally destroyed. Persons living in the vicinity report that hailstones were piled up along the fences 30 inches [0.8 m] in depth.<sup>178</sup>

On 6 August 1877, a severe wind and rainstorm occurred at Council Bluffs, Iowa, in the *United States* between 2 and 3 o’clock in the morning coming from the northwest. The new building of the Deaf and Dumb Institute was left a mass of ruins. The roof was caught up bodily carried to the southeast and literally torn into fragments. One piece weighing not less than five tons, being carried 40 rods (660 feet, 200 meters). While other pieces weighing between two and three tons were carried still further away. There were fragments scattered over the country for more than a mile. To give some idea of the force of the wind, the front wall of the main building, having a stone basement two feet in thickness, is said to have been moved seven inches at the top, gradually decreasing to about one half inch at the base. The brick walls of the third story in some places were blown entirely down. The fourth story was almost entirely demolished. The buildings in the rear of the main building and somewhat protected were also greatly damaged. The roofs of the engine and gashouses being torn away and two chimneys blown down.<sup>112</sup>

On 12 August 1877 in Jamestown, New York in the *United States*, at 1:15 p.m., “during a thunderstorm, a ball of fire, apparently two feet in diameter, entered a church, killing one boy and severely burning several persons; instantly the whole interior of the building grew hot and dry, the air hard to breathe and supremely oppressive.”<sup>112</sup> [ball lightning]

On 21 August 1877, there was a violent wind and hailstorm that struck Chestertown, Maryland in the *United States* and extended to Queen Anne’s County. Hailstones as large as hen’s eggs did much damage to the orchards and window glass. This was the sixth hailstorm of the season and the most destructive one. It struck between Centreville and Ruthsburg. One of the hailstones weighed one-quarter pound. They killed poultry and broke the leg of a hog. The destruction to fruit and grass amounts to almost a total loss, while the corn is more than a third destroyed.<sup>112</sup>

On 21 August 1877, London reported there have been unusually severe floods throughout *Great Britain* and *Ireland*. This flood caused great damage to crops.<sup>106</sup>

On 25 August 1877 in Omaha, Nebraska, in the *United States*, there was a severe wind and rainstorm at 3 a.m. Two spans of the Missouri River Bridge, each 150 feet along with the stable of the Omaha Omnibus Company were blown down. As the immense cloud passed over the river, a tornado dropped down lifting up the water in vast quantities and whirling it around in a funnel shape. The spans destroyed were at the eastern terminus of the bridge. The wrought iron stringers and columns of the bridge spans were twisted and bent like so many pieces of paper and carried partly into the river and partly against the eastern embankment of the river on the south side of the bridge.<sup>112</sup>

In *Great Britain*, it was reported on 31 August 1877, that the most disastrous flood ever known in southern *Wales* devastated a portion of the country between Cardiff and Swansea. The railway traffic was entirely suspended, and the destruction to the crops, in a circuit of 50 miles is irreparable. Some small towns were inundated and valuable cattle drowned. South London was subjected to a succession of thunderstorms and rainfalls to those experienced in the tropics. Gardens and conservatories sustained immense damage.<sup>106</sup>

In September 1877, millions of sheep and cattle perished, and hundreds of families rendered homeless by floods in *Argentina*.<sup>106</sup>

On 21 September to 5 October 1877, a storm [hurricane] moved from the *Barbados* westward over the Caribbean Sea and recurved between *Cuba* and *Yucatan* into the Gulf of Mexico, and by the night of October 2<sup>nd</sup> had reached the coast of Florida near Saint Marks in the *United States*. Moving thence northeast the storm passed off the middle Atlantic coast, and was central south of Newfoundland, *Canada* on the night of the 5<sup>th</sup>. This storm caused immense damage to property and considerable loss of life in the *West Indies*, and during its passage over the continent was attended by very severe storms and destructive tides.<sup>120</sup>

On 21 September to 5 October 1877, a hurricane struck the *Caribbean* island of Curacao, and Pennsylvania and the eastern coast of the *United States*. Most sources indicate more than 84 deaths resulted. [Additionally there was some loss of life in *Cuba* according to Appendix of Gutierrez-Lanza in Sarasola (1928) and a steamship *Magnolia* foundered off Hatteras in North Carolina.]<sup>141</sup>

On 8 October 1877, there were three feet of snow in Schipka Pass [Balkan Mountains in *Bulgaria*]. The roads were unfit for the movement of troops. On 15 October, the bridge over the Danube River at Nicopol [northern *Bulgaria*] was swept away. On 26 October, it is reported that there has been much rain and snow in the *Balkans*, impeding [military] operations. Horses are daily suffocated in liquid mud four feet deep.<sup>106</sup>



On 14-15 October 1877, there was a most violent gale that caused great destruction of property on land and shipping throughout *England*, with loss of life.<sup>90</sup>

On 14 October 1877, a violent gale swept over the *United Kingdom* and inflicted enormous damage and loss of life. In fury and violence it exceeded any storm in *England* for many years. The west of England, Bristol, Bath and Bridgewater suffered most, roofs were stripped, skylights carried away, trains stopped by overthrown timber and telegraph posts, railway stations, churches, private houses, and buildings either wrecked or seriously damaged. In the Midland counties there was also great havoc, while in both *Wales* and *Scotland*, the storm was very severe. At most of the seaports the destructive effects of the gale were very manifest. In Windsor and other parks, the largest trees were uprooted. At Wolverhampton [in West Midlands, *England*], there was scarcely a street in the town where the houses are not partly unroofed. Many vessels were lost and in some cases none of the crew were saved. The *Olga*, towing the Cleopatra's Needle, an ancient Egyptian obelisk, had to abandon her charge in the Bay of Biscay. [The *Olga* capsized and all six members of her crew were lost.] The obelisk has since been recovered and taken into Perrot. The *Lockfyne*, from Calcutta to London was thrown on her beam in the *Channel* and the *Knapton Hall* steamer, in endeavoring to assist, collided and floundered with nine of the crew drowned.<sup>106</sup>

In 1877, during the night of the November 23<sup>rd</sup>-24<sup>th</sup>, when a storm, which had advanced from the north Pacific coast, was central in West Virginia in the *United States*, the *U.S.S. Huron* was wrecked on the North Carolina coast 50 miles north of Cape Hatteras. A southeasterly wind was blowing, with a heavy southeast swell, at the scene of the disaster.<sup>119</sup>

On 24 and 25 November 1877, a storm produced unusually heavy rainfall and widespread flooding in the *United States*. As a result, the Savannah River reached its maximum height, 23 feet 10 inches, at Augusta, Georgia on the 23<sup>rd</sup> when the lower portion of the city flooded. The Chervis and Horn's creeks were higher than ever before recorded. Fishing Creek in South Carolina was the "highest water ever known" – train wrecked. The Roanoke River at Weldon, North Carolina, rose 6 feet 9 inches higher than the highest water mark known, sweeping away two railroad bridges. The Dan River at Danville, Virginia was "within one foot of highest water mark ever known". The Little and Big Sandy Rivers "higher than ever known." In Pittsylvania and Henry counties in Virginia and Caswell and Rockingham counties in North Carolina, the streams all overflowed, doing immense damage; in Fall Creek "every bridge swept away". The James River at Buchanan, rose 6 feet higher than during the freshet of 1842; the railroad lumber house, which was several feet above the high water mark of 1842 was swept away; immense damage done to the James River and Kanawha Canal. At Lynchburg, Virginia, the water reached within three feet of the great freshet of 1870, the maximum of the flood being 33 feet. The Amherst and two other bridges were swept away. At Richmond, Virginia, on the 25<sup>th</sup>, the river rose 24 feet 7 inches above the ordinary high tide or 2 feet 1 inch above the high water mark of 1870. The river, which is normally 200 yards wide, was now from two to three miles wide, flooding the whole riverfront of the city to the tops of houses. The city of Manchester, Virginia, opposite Richmond was nearly half underwater. The Rivanna, North Anna and Jacksons rivers "all as high as 1870". The Rivanna River causing great damage at Charlottesville, Virginia. The Rappahannock River at Fredericksburg, Virginia rose 22 feet above the ordinary water level. The North Branch of the Potomac River at Piedmont, Virginia was stated to be higher than any flood since 1810. Along the course of the South Branch, immense damage was done. At the junction of the Potomac and the Shenandoah rivers, on 25 November, both rivers were twenty-six feet above the low water mark, or three feet higher than in 1870. Considerable damage was done in all valleys. Conococheague creek rising in South Mountain, Pennsylvania rose four feet higher than the highest watermark known or 15 feet above the ordinary level at Chambersburg, Pennsylvania at midnight on the 24<sup>th</sup> doing considerable damage. In Washington D.C., Baltimore, Maryland and Philadelphia, Pennsylvania, the wharves and streets along the riverbank were submerged. In Georgetown D.C. at 7

p.m. on the 24<sup>th</sup>, the Potomac was 3 feet and 9 inches below the level of the wharf at the foot of Washington Street. But by 1 a.m. on the 26<sup>th</sup>, when the highest point of the flood was reached, it was 6 feet and ½ inch above the wharf. In Maine, severe freshets also occurred on the 26<sup>th</sup> in the Passumpsic, Androscoggin and Kennebec rivers.<sup>112</sup>

On 24-25 November 1877, there was a storm that caused much damage on the southeastern coast [of *Great Britain*].<sup>90</sup>

On 27 November 1877, a very severe hurricane struck the Grenfell district in New South Wales, *Australia*. The Wesleyan and Primitive Methodist churches, the Oddfellows' Arms Hotel, and a number of other places were blown to the ground. The Presbyterian Church, public hospital, public school, Anglican parsonage, flour company's mill, the principal stores and numerous other buildings sustained serious injury. Scarcely a building in the town escaped damage. Stores and private dwellings have been unroofed, and windows and doors smashed in all directions. Falling timber injured several persons. Considerable damage was done to the harvest, particularly the wheat crops. Many farmers are ruined. [The winds were so strong that] the wheat grain being threshed out of the haystacks and blown away. Falling trees killed many sheep and cattle. Trees and gardens were destroyed and the telegraph lines interrupted so that communications completely stopped. During the thunderstorms, two horses were struck by lightning and died.<sup>106</sup>

On 27 November 1877, a severe hurricane devastated the Grenfell district in New South Wales, *Australia*.<sup>103</sup>

In 1877 in southeastern *Spain*, inundations in the province of Murcia caused serious damage to railways. Also, the floods caused twenty-two people to drown.<sup>106</sup>

In 1877 at Wreschen (now Września in central *Poland*), during service, the church was struck by lightning killing six and injuring 80 others.<sup>106</sup>

In 1877, a fearful hurricane struck the island of Curaçao, on the coast of *Venezuela*, involving the loss of property valued at 2 million dollars, and the loss of life was great. In the city of Curaçao, many solid structures were crushed by the waves, burying hundreds of people in the ruins.<sup>106</sup>

In 1877 during the period between 11 June and 10 July, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Hsüan-p'ing.<sup>153</sup>

*Also refer to the section 1876 A.D. – 1879 A.D. for information on the worldwide drought and famine during that timeframe.*

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**Winter of 1877 / 1878 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1877 occurred on 29 November.<sup>116</sup>

The winter of 1877-78 in Bradford County, Pennsylvania in the *United States* was open and mild without sleighing until the middle of February. There were only a few cold days, about the middle of January. By the 10<sup>th</sup> of March, the snow had entirely disappeared, the weather was warm and the bluebirds appeared. Planting was completed early. There were severe frosts in May and on June 6 there was a frost with ice.<sup>178</sup>

The winter of 1877-78 in New England in the *United States* was mild. The weather was mild during the first two months of winter but then the weather turned stormy. Spring was late and cold.<sup>199</sup>

In the *United States* during the winter of 1877-78, the temperature dropped to -38° F at Woodstock, Vermont in January. The temperature at Albany, New York fell to -18° F in January.<sup>113</sup>

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**1878 A.D.** On 14 January 1878, a cyclone struck Darwin in the Northern Territory of *Australia*. Every building in Darwin was damaged.<sup>99</sup>

On Bourbon Island (now *Reunion Island* and part of the French Republic) in the western *Indian Ocean* on January 15, there was a cyclone that devastated the island and the next crops, it is feared, will show a considerable deficiency.<sup>57</sup>

On 17 January 1878, a cyclone struck Darwin, *Australia*. Every building was damaged in the city.<sup>101</sup>

On 6 February 1878, there was an extraordinary fall of rain in Sydney, *Australia*; nearly 8 inches in 24 hours. The heavy rains were very general throughout Riverina.<sup>103</sup>

In *Tahiti* in the southern Pacific Ocean on February 7<sup>th</sup>, there was a terrible hurricane, by which much property was destroyed and about 120 lives lost.<sup>57</sup>

In *Australia* in February, "After the terrible drought which has afflicted the country, the abundant storms have been welcomed, but the parched earth has not been equal to carrying off such an enormous quantity of water suddenly poured upon it, and disastrous floods have followed, causing great destruction of life and property. The railway at Campbeltown was flooded to a depth of 2 feet, mail carts have been washed away, numbers of trees, fences, walls, etc., uprooted and thrown down, bridges destroyed and other serious disasters have occurred. At Scone, near Sydney, 1.33 inches of rain fell in twenty-five minutes. Some hailstones, which accompanied the rain, measured as much as 1½ inch in circumference. Serious damage has also been done by heavy thunderstorms, many buildings being struck and destroyed by lightning." During a storm in Sydney, as much as 10.88 inches of rain fell in forty-eight hours.<sup>47</sup>

On 20 February 1878, there were disastrous floods at Sandhurst in Victoria, *Australia*.<sup>103</sup>

On 8 March 1878, a cyclone struck Cairns, *Australia*, doing considerable damage.<sup>101</sup>

On 16 March 1878, there was a serious flood in Melbourne, *Australia*. Several chains of the Yau Yean aqueduct were swept away.<sup>103</sup>

In California in the *United States*, in the early months of this year great damage was sustained in the lowlands of this important grain-producing State. We draw the following summary from the letter of the (London) *Times* correspondent:<sup>47</sup>

"By the overflow of the Sacramento and American rivers, the whole country around Sacramento was flooded, the water breaking through the levees that were built to protect the city from inundation, and the safety of the entire city was at one time imperiled. The river rose 25 feet 11½ inches above low water mark, and a rise of a few inches more would have completely swamped the city. Fortunately the Yolo levees gave way in time, and allowed the water within the embankment to spread out over the Yolo and Solano plains. Immense exertions were made to repair the broken levees by means of sand bags, which were brought to the scene of disaster by a locomotive, followed by a train and flat cars. In the neighbouring town of Washington the water in many places stood 10 feet deep, trees were laid prostrate, and shanties and outhouses washed away. Although several houses were completely wrecked and a great deal of property destroyed, no lives were lost, though several persons had very narrow escapes. In other parts of the country the people were not so fortunate. Of the twenty-five islands which may be counted in the

Sacramento Archipelago, scarcely one was to be seen during the inundation, Union and Sherman Islands, both protected by levees, having been submerged. Boats and steamers were busy in every direction in affording assistance to the distressed, and moving among the islands and sloughs for the purpose of carrying off cattle and people to the mainland.”<sup>47</sup>

“In Sutter county the whole of the tule lands were overflowed, dwellings, barns, outhouses, and fencing completely destroyed, and a large amount of grain in bags carried away by the flood. The loss in livestock in many parts of the country has also been very severe. The area of land thus submerged embraces the richest and most productive portions of the State, sufficient to produce cereals for our (*England's*) entire population. Besides the immense amount of damage sustained in loss of property, the floods have left a deposit of silt, to do away with which will cause much trouble and expense to our farmers. What the amount of loss experienced in the Sacramento Valley is, I have not the means of ascertaining, but it is supposed to be several million dollars. The bed of the Sacramento has been elevated several feet, and the elevation increases in some places at the rate of about one foot a-year. The debris washed down from mining camps above the Yuba River long since caused an overflow of lands in the Marysville district, and the entire destruction of agricultural pursuits on those lands. The same causes are extending to and influencing the Sacramento, and even the harbour at Mare Island, the naval station of the Pacific, is said to be shoaling so much as to prevent freedom to navigation. The question as to whether mining tailings should be allowed to be shot into rivers, and, by filling them up, injuring agricultural interest, has long been discussed by the legislature; but the consideration of impeded navigation and the serious destruction of property by excessive floods, will probably now turn the scale in favour of some restrictions on the mining interest, which has so long withstood any reform in this respect.”<sup>47</sup>

In *England* on the 29<sup>th</sup> of March, there was a tornado in the south of *England*, followed by snow. It was during this event, that Her Majesty's ship “*Eurydice*” was lost off the Isle of Wright.<sup>57</sup>

In *Ceylon (Sri Lanka)* in March, “During the last four months *Ceylon* has been visited by a succession of floods, which have caused great destruction of property and seriously impaired the prospects of the coming coffee crop. In some districts as much as 50 inches of rain have been registered in twenty days; and from the 1<sup>st</sup> of November to the 20<sup>th</sup> of January last, 130 inches of rain were gauged at Laggala. The natives express the opinion that the ‘sky is moth eaten, and hence the constant leakage.’ Up to the last advices from Galle the prospects of fine weather were as remote as ever. Rice and grain have consequently increased enormously in price – from an exactly opposite cause to that which gave rise to the late famine in the adjoining continent, and which has also created such distress in *Australia* and at the Cape of Good Hope (*South Africa*). In all these colonies prolonged droughts, which have only just broken, have prevailed to such an extent as to seriously interfere with business operations of all kinds.”<sup>47</sup>

In *France* in March, “There were inundations in the Indre-et-Loire, and the Seine and other rivers were also very high. Snow is falling in the east, and frost has done some damage in the south. At Vernay, near Tours, the flood swept away a bridge over a rivulet, and part of a luggage train fell into the water, the stoker and conductor being drowned.”<sup>47</sup>

In *England* in April, there was very heavy fall of rain in and round London. (This rainfall was said to amount to 3 inches.) Great floods in Kent. At Lewisham (south London) all ordinary traffic was suspended, and the inhabitants were carried through the streets to the railway stations in boats and carts.<sup>47</sup>

In *England* in the early days of April, there was a terrible gale. The *East Anglian Daily Times*, in describing the effects of the gale upon Lowestoft fishing boats said that upwards of 200 lost every net

they had onboard, and out of 500 boats, only 100 are now fit for sea.<sup>57</sup> [Lowestoft is in Suffolk on the North Sea coast of southeastern *England*.]

On 10-11 April 1878, there were inundations in London, *England* from storms and heavy rain.<sup>90</sup>

On 28 October 1838; 11 July 1874; 11 April 1878, and 12 December 1883, storms struck London, *England*, which destroyed from twenty to thirty lives in each case, and from \$1 to \$3 million (U.S.) dollars in property damage. [In present currency, that would be equivalent to \$27-\$81 million dollars in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>197</sup>

In Canton (now Guangzhou), *China* on April 12, there was a destructive hurricane, accompanied by two waterspouts, caused immense damage.<sup>57</sup>

In the Bay of Biscay (off the coast of *Spain*) on April 20, there were continuous storms. "During the recent hurricane about 150 fishermen from the neighbourhood of Bilbao and Santander were drowned."<sup>57</sup>

In *England* in May, there were great floods in the Thames valley.<sup>47</sup>

On 20 May 1878 in the *United States*, there was a great hailstorm in the city of San Antonio, Texas. "Our city is a perfect wreck; every house in it has received some damage: many are in complete ruins, with nothing but fragments of walls standing. The hailstones penetrated the best roofs, going through tin roofs like cannon balls. All the windows facing to the north have been smashed in; even windows, shutters, and doors were broken down. The appearance of the city could not have been worse under a severe bombardment. The roofing of the entire city is perforated like a sieve. The hailstones were of irregular shape and all sizes, as if a mass of ice had broken above our devoted heads, and been driven by a tornado to the earth. One hailstone was found weighing over 5 pounds (2.3 kilograms), while a great many as large as a man's fist were picked up. Many of the families whose houses were beaten down took shelter under beds and tables, and thus escaped bodily harm. We have only heard of one death, a negro boy; several had limbs broken and were severely bruised, while the whole population was frightened almost to death. The damage is of every character, and 500,000 dollars will not cover it all. [In present currency, that would be equivalent of over \$12 million in damages based on the Consumer Price Index (CPI) inflation rates.] The corn patches and gardens are flattened to the ground, and have the appearance of having passed through a chopping mill. All the fruit crop is destroyed. The storm resembled a terrific battle; so fearful was the noise that no one could hear unless they screamed in each other's ears. We learn that the hailstorm extended from 5 to 25 miles in extent—destroying everything over a region 30 miles from north to south, and 10 to 20 miles from east to west."<sup>93</sup>

In Hong Kong, *China* on May 21, there were terrible thunderstorms, occasioning much damage.<sup>57</sup>

In 1878 during the period between 6 May and 8 August, floods struck Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-shan; Kiangsi (now Jiangxi province) in southern *China* at Chi-an, Nan-ch'ang, Ch'ing-chiang, Lin-ch'uan, Nan-k'ang, Kiukiang and Shang-jao; Hupeh (now Hubei province) in central *China* at Ao-ch'êng; and Kwangtung (now Guangdong province) on the south coast of *China* facing the South China Sea at Jao-p'ing.<sup>153</sup>

In the *United States* on May 23, a terrible tornado crossed a portion of Wisconsin, passing from the southwest to the northeast, and devastating a long strip of country, including the towns of Mineral Point, Mount Vernon, Primrose, Oregon, and Paoli, while the feeble effects of the same tornado were felt at Madison also as far south as Chicago. In the direct path of the storm everything was demolished, and hundreds of buildings were destroyed. The debris was blown many miles. From reports thus far received it appears that 30 persons were killed and 50 injured. Several dead were carried to long distances by the



whirlwind and then dashed to the ground. Those injured were generally in destroyed buildings. In one case a school house with the teacher and scholars were carried away several rods, three of the scholars being killed, but some escaping unhurt.<sup>57</sup>

In *Great Britain* in May, there was a severe storm, accompanied with lightning in various parts of the kingdom. During the storm which passed over Perthshire, *Scotland* on the 28<sup>th</sup> and 29<sup>th</sup>, the monument which was erected by Mr. Crieff in 1832 in memory of Sir David Baird, the hero at the storming at Seringapatam, was almost entirely destroyed. The monument, which was a counterpart of Cleopatra's Needle, was 80 feet high, and cost 4,000*l.* to erect. It was struck on the top 20 feet of it was thrown to the ground, and the base was also injured by the electric field.<sup>57</sup>

In June 1878, there was an inundation in northern *Italy*. Much damage was caused by the overflowing of the Po and Mincio rivers.<sup>90</sup>

In *England* in June, great rainfall at Bath and other parts of the West of *England*.<sup>47</sup>

On 12-14 June 1878 at Point Pleasant, Louisiana in the *United States*, 16.55 inches of rain fell.<sup>116</sup>

On 23 June 1878 in *England*, there was a most severe hailstorm in Surrey. "The hail increased in size to more than an inch in diameter, and fell more than one hour and a half, doing an incredible amount of damage. At the time I write—4:30—it still rains, but the hail lies on the garden paths like shingle on the seashore. Chickens and birds were killed, fruit and vegetables of all kinds utterly destroyed. The glass in all the houses is much damaged; our nearest neighbor has only three panes left. The villagers, I am told, were crying and afraid to stay in their houses, which were rapidly becoming flooded."<sup>93</sup>

On 27 June 1878 in *Scotland*, there was a severe hailstorm in Edinburgh.<sup>93</sup>

In *Ireland* on June 27, a great storm struck the south of *Ireland*; much damage occasioned.<sup>57</sup>

On 29 June 1878 in *England*, there was a severe hailstorm in Berkshire and Oxfordshire. At Abingdon the stones were of the size of walnuts. In the neighborhood of Bicester, the hail, which accompanied the storm, was almost blinding. People were unable to discern anything at a greater distance than 30 yards. Two sheep were killed by the electric fluid [lightning] at Fewcott; another place in the same district. The storm lasted nearly half an hour.<sup>93</sup>

In *England* on June 30, there were very severe storms in various parts of the country, accompanied by lightning and torrents of rain. At Enfield (north of London) 3.07 inches of rain was recorded during a thunderstorm. Hailstones in west of *England*.<sup>57</sup>

In the *United States* on the 4<sup>th</sup> of July, a tornado, accompanied by thunder, lightning, and hail occurred at Pittsburg, Pennsylvania, inflicting great damage within a radius of 10 miles from that town. The lightning destroyed the Vesta Oilworks, consuming 80,000 barrels of petroleum. Torrents of rain at the same time swept down the hills into the Alleghany and Monongahela rivers. One house was quite swept away, and five persons were drowned. The tornado burst over a party picnicking at Rossgrove, seven miles from Pittsburg, uprooting five large trees, which fell upon a large number of people who had sought shelter beneath them, killing fourteen and injuring thirty.<sup>57</sup>

In southern *Austria* on July 9, along the Valley of the Save, a severe hailstorm caused a great deal of damage to crops. The hailstones are reported to have been unusually large. They broke the tiles on roofs and severely injured several persons.<sup>57</sup>



In *Switzerland* on July 23, great damage was done throughout Central and Eastern Switzerland by a series of severe thunderstorms. Many buildings were destroyed and set on fire by the lightning, rivers overflowed their banks, and the Berne-Lucerne Railway received injuries so serious that the traffic between those places has had to be temporarily suspended. At the same time a heavy hailstorm devastated the crops and vineyards in the neighborhood of Montreux; and the hamlet of Thusinge, Canton Vaud, was almost destroyed by fire.<sup>57</sup>

In *England*, during the latter part of July, there were continued storms of great severity.<sup>57</sup>

On 9 August 1878, a tornado struck Wallingford, Connecticut in the *United States*. The width of the tornado was a ½ mile [0.8 kilometers] wide and the path was 2 miles [3.2 kilometers] long. Thirty-four people lost their lives. One hundred and sixty buildings were totally destroyed. Property damage amounted to \$2 million. [In present currency, that would be equivalent to \$47 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>199</sup>

In August 1878, there were many thunderstorms, which destroyed life and property in *England*.<sup>90</sup>

On 25 August 1878 in *Italy*, a hailstorm did great damage to crops.<sup>93</sup>

In *France*, the losses from hailstorms in 1878 were very light.<sup>93</sup>

From May to September 1878, the hailstorms in *England* were of singular severity, and of unusually wide extent—traversing several counties before their force was spent. Several of the storms occurred at night—a very unusual occurrence.<sup>93</sup>

On 1-13 September 1878, a hurricane struck the *Dominican Republic*, *Haiti*, and east coast of the *United States*. There were 9 deaths from Florida and Pennsylvania. At Aux Cayes, *Haiti*, a number of persons were killed. In the towns of Aquin, and Cavaillon in *Haiti*, a large number of lives were lost.<sup>141</sup>

On 25-28 September 1878, a hurricane struck *Haiti*. An American brigantine was wrecked at Tiburon and all hands lost.<sup>141</sup>

On 9-13 October 1878, a hurricane struck coastal New England in the *United States* causing 27 deaths.<sup>141</sup>

On 16-17 October 1878, an inundation caused by heavy rains struck Murcia, *Spain*. The provinces of Andalusia, Alicante, Almeria, and Malaga in southern *Spain* suffered about 1,000 lives lost. There was much damage to property and about 2,000 houses were destroyed.<sup>90</sup>

On 21-24 October 1878, a hurricane struck *Cuba* and the eastern coastal waters of the *United States* causing more than 71 deaths.<sup>141</sup>

On 21-24 October 1878, a storm [hurricane] moved from south of *Cuba* northward to the North Carolina coast of the *United States*, and thence to south central New York, where it recurved eastward and passed over New England and south of Nova Scotia, *Canada*. A hurricane prevailed at Havana, Cuba, on the night of the 21<sup>st</sup>, with heavy rain, doing much damage to buildings and shipping. At Key West, Florida, the barometer fell to 29.53 inches (750 millimeters), and the highest wind force was fifty-four miles per hour. At Kitty Hawk, North Carolina, the wind reached a velocity of eighty-eight miles per hour, and the barometer fell to 29.06 inches (738 millimeters) on the 22<sup>nd</sup>. The storm's vortex passed almost directly over Washington, D.C., where the lowest barometer reading of 28.80 inches (732 millimeters), occurred about 7:15 a.m. on the 23<sup>rd</sup>. The storm moderated somewhat in severity after recurving eastward over New England, but throughout its entire course over the continent was exceptionally severe, and ranks as

one of the most destructive storms on record for the Atlantic coast. At Philadelphia, Pennsylvania, over seven hundred substantial buildings were totally destroyed or seriously damaged, bridges injured, and twenty-two vessels sunk, entailing a loss variously estimated at from \$1,000,000 to \$2,000,000. [In present currency, that would be equivalent to \$22 to \$45 million in damages based on the Consumer Price Index (CPI) inflation rates.] Other loss of life and great damage by freshets and winds occurred elsewhere in Pennsylvania. A large number of steamers, ships, and coasting vessels were dismantled, wrecked, or sunk along the New Jersey, Virginia, and North Carolina coasts, entailing loss of life and immense pecuniary damage. The wind reached seventy-two miles per hour at Philadelphia, and from eighty to eighty-eight miles per hour along the Atlantic coast.<sup>120</sup>

On 4 November 1878, the Murrumbidgee & Yass Rivers in New South Wales, *Australia* flooded. The Murrumbidgee River was 25 feet (7.6 meters) above the normal summer water level at Gundagai.<sup>99</sup>

About 10 December 1878, there was an inundation in *Hungary*.<sup>90</sup>

Around 12 December 1878, the Susquehanna River flooded and at Towanda, Pennsylvania in the *United States*, the water rose 20 feet [6.1 m].<sup>178</sup>

*Also refer to the section 1876 A.D. – 1879 A.D. for information on the worldwide drought and famine during that timeframe.*

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**Winter of 1878 / 1879 A.D.** The winter was noted in *England* for constant low temperature and long continued moderate frosts. That winter in *England* was approximately 5.4 degrees Fahrenheit colder overall (November – February) than the 20-year average.<sup>70</sup>

The winter of 1878-79 in Bradford County, Pennsylvania in the *United States* was mild. The first week of January was cold but the end of the month was warm. The first snowstorm was on 6 November when it snowed all day; the deepest snowfall, 10 inches [25 cm] occurred on 17 February. It snowed every day the last week in February. There was good sleighing nearly all of January and February.<sup>178</sup>

In the *United States* during the winter of 1878-79, the temperature dropped to -16° F at Mount Auburn, Ohio, a suburb of Cincinnati on January 3<sup>rd</sup>. The temperature at Columbus, Ohio fell to -20° F in January. The temperature at Omaha, Nebraska fell to -22° F in January. The temperature at Newport, Rhode Island fell to 3° F in January. The temperature near Arlington, Illinois fell to -25° F in January. The temperature at Winnemucca, Nevada fell to -14° F in January. The temperature at Fayette, Mississippi fell to 7° F in January. The temperature at Clarksville, Tennessee fell to -10° F in January. The temperature at Shreveport, Louisiana fell to 6° F in January. The temperature in Norfolk, Virginia fell to 8° F in January. The temperature at Kitty Hawk and Charlotte, North Carolina fell to 11° F in January. The temperature at Sandy Hook, New Jersey fell to -3° F in January.<sup>113, 126</sup>

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**1879 A.D.** In February 1879, there was a flash flood in the Northern Territory of *Australia*. The Daly River and Katherine flooded, and the Overland Telegraph was severely disrupted. Six people were killed.<sup>99</sup>

In March 1879, there were heavy floods at Cooma in New South Wales, *Australia*.<sup>103</sup>

On 12-13 March 1879, there was an inundation at Szegedin [now Szeged in southern] *Hungary* caused by storms and rain. The dams of the River Theiss gave way and the town was nearly destroyed. Out of 6,566 houses, only 331 stood. Many persons drowned and thousands were left homeless. [Another inundation occurred about 3 June 1887 but not quite so disastrous, and still another in March, 1888].<sup>90</sup>

On 13 March 1879 in *India*, there was a hailstorm of extraordinary severity that passed over the Tipperah district in Eastern Bengal. The magistrate's official report says: "Some hailstones fell as large as cricket-balls. The storm lasted only about 15 minutes, and its track was apparently not more than 300 yards wide. Large trees were uprooted; bamboo clumps swept down like grass, and houses leveled with the ground. Twenty-nine persons were killed and 114 wounded, mostly by the falling trees and houses. A considerable number of cattle were killed, and among the victims was a tiger."<sup>93</sup> [Tripura is a landlocked hilly state in northeastern *India*.]

There were heavy rainfalls in the North-Western Provinces of *India* in 1879.<sup>185</sup>

In 1879-80 in Chhindwara, *India*, the autumn crops were poor due to excessive rain.<sup>180</sup>

On 22-24 April 1879 at Terrell, Texas in the *United States*, 18.0 inches of rain fell.<sup>116</sup>

From May 16 to August 3, 1879, there was a series of destructive hailstorms in *England*, especially that of the date last named, extending over a great part of the Eastern Counties, and lasting for some hours.<sup>93</sup>

In 1879, several regions of *China* experienced flooding during the period of 20 June – 18 July:<sup>153</sup>  
— Hopei (now Hebei province) in northern *China* at Yü-t'ien and Pao-ti experienced flooding.  
— Kansu (now Gansu province) in northwest *China* at Wu-tu and Wên experienced flooding. At Wên, the city walls were damaged and over 10,830 people were drowned. The flooding in this region continued into the period of 19 July - 17 August, when Wên and Wu-tu both reported innumerable people and cattle drowned.

On 3 August 1879 in *England*, there was a hailstorm at Kew and Richmond (Middlesex and Surrey). The Royal Gardens at Kew were devastated by the storm. The storm, which began at 2 A.M. lasted about 10 minutes in duration. It drove from the northeast, and expended its greatest fury in the neighborhood of Richmond. There was violent thunder and lightning. About 16,000 squares of glass were broken—many of the squares having clean "bullet" holes through them. The hailstones averaged about 1½ inches in diameter [one as large as 3½ inches was reported from an adjoining locality], and came down with sufficient force to become embedded in the loose soil and even in the lawns. The stones also went clean through the leaves of many of the plants. Damage at the gardens £2000.<sup>93</sup>

On 2-3 August 1879, a storm struck Kew, *England* and neighborhood. On 16-17 August 1879, a storm struck Cheshire, *England* and *Wales*.<sup>90</sup>

On 17-19 August 1879, a storm of great strength moved from the *Bahamas* along the Atlantic coast of the *United States*, attended by gales of hurricane force and unusually high tides.<sup>119, 120</sup>

On 18 August 1879, record high winds was observed at Cape Lookout, North Carolina in the *United States*, where the velocity of 138 miles an hour was registered before the anemometer was blown away, and the winds reached an estimated velocity of 165 miles an hour.<sup>124</sup>

The hurricane of 16-20 August 1879 entered the *United States* at Cape Lookout, North Carolina and skirted the Atlantic coast thence northeastward to Eastport, Maine. An enormous amount of damage resulted from this storm. Not only was the damage to inland property very excessive, but also the damage to maritime interests may be estimated from the fact that over one hundred large vessels were shipwrecked, dismantled, or disabled, and two hundred yachts or smaller vessels injured. The wind reached a measured velocity of one hundred and thirty-eight miles per hour at Cape Lookout, where the anemometer was carried away. The barometer fluctuated with extraordinary rapidity, producing a fall of 0.85 inch in 5½ hours off the New Jersey coast, followed by a rise of 0.93 inch in 6½ hours.<sup>120</sup>

On 18 August 1879, a hurricane struck North Carolina and coastal Virginia in the *United States* causing 46 deaths.<sup>141</sup>

During the autumn of 1879, a drought prevailed throughout Bradford County, Pennsylvania in the *United States* and a great portion of nation from August until the beginning of November. Wells, springs and smaller streams dried up. In September, the water level on the Susquehanna River was extremely low and never known to have been lower. Many farmers were required to drive their livestock long distances for water. Pastures were ruined and livestock were only kept alive by feeding them hay and grain. Forest fires did great damage.<sup>178</sup>

In September 1879, there was a serious flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 43 feet 3 inches (13.91 meters) above the sea level height at Windsor Bridge.<sup>99, 109</sup>

On 24-28 October 1879, a hurricane struck the *Gulf of Mexico*. A schooner from Pensacola, Florida was completely wrecked and all the crew was lost except for two men.<sup>141</sup>

On 16-21 November 1879, a hurricane struck the east coast of the *United States* and some lives were lost.<sup>141</sup>

In November 1879, a West Indian hurricane, first located over the southeastern *Bahamas*, moved rapidly northward and northeastward, passing Cape Hatteras, North Carolina in the *United States* on the night of the 19<sup>th</sup>, and Halifax, Nova Scotia, *Canada*, the afternoon of the 20<sup>th</sup>, and thence moved northeast over the Gulf of Saint Lawrence or Newfoundland, *Canada*. Furious gales, attaining hurricane force at sea, attended the passage of this storm, and barometer readings falling to, or nearly to, 29.00 inches (737 millimeters) were reported by shipmasters.<sup>119, 120</sup>

On 28 December 1879, a violent gale struck *Scotland*. The Tay bridge was blown down.<sup>90</sup>

*Also refer to the section 1876 A.D. – 1879 A.D. for information on the worldwide drought and famine during that timeframe.*

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**Winter of 1879 / 1880 A.D.** There were long frosts with thaws from 22 November 1879 to 2 February 1880 [in *England*].<sup>90</sup>

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1879 occurred on 3 November.<sup>116</sup>

The winter of 1879-80 in Bradford County, Pennsylvania in the *United States* was one of the warmest and most remarkable ever remembered. It began with much rain and little snow. There was a light snowfall on 24 October and 21 & 25 December. On 3 February, there was a heavy snowfall, which supported sleighing for around ten days (the only run of winter). The last snow fell on 11 & 15 March. Only on two days, 20 December & 1 February, did the temperature fall below zero Fahrenheit. There were many summer-like days in January and February. Considerable plowing was done in January, and [maple] sugar camps were operating in January and February. Bluebirds and robins appeared the first week in March and most of the month produced beautiful weather. Spring opened early and warm, although there was a heavy frost on the 13<sup>th</sup> & 14<sup>th</sup> of May.<sup>178</sup>

The minimum temperatures in degrees Fahrenheit in the *United States* during January 1880 were as follows: **Maine**: -15° at Orono and 0° at Eastport. **New Hampshire**: -12° on Mt. Washington and -10° at

Dunbarton. **Vermont:** -12° at Newport and 0° at Burlington. **Massachusetts:** -10° at Billerica and 8° at Boston and Springfield. **Rhode Island:** 15° at Newport. **Connecticut:** 0.7° at Southington and 10° at New Haven. **New York:** -6° at Madison Barracks, -2° at Sidney Plains and Plattsburg Barracks, 1° at Albany, 16° at Buffalo and 17° at New York City. **Pennsylvania:** -3° at Dyberry, 3° at Catawissa, 19° at Philadelphia and 20° at Pittsburg. **Delaware:** 20° at Dover. **Maryland:** 3° at Woodstock, 12° at Cumberland, and 17° at Baltimore. **District of Columbia:** 14° at Washington. **Virginia:** 13° at Mt. Solon, 23° at Lynchburg, 29° at Walnut Grove and 31° at Cape Henry and Norfolk. **West Virginia:** 12° at Morgantown and 18° at HeIvetia. **North Carolina:** 15° at Highlands, 25° at Fayetteville and Wilmington, 26° at Weldon, and 34° at Cape Lookout. **South Carolina:** 27° at Aiken and 33° at Charleston. **Georgia:** 30° at Atlanta and Gainesville, and 34° at Savannah and Forsyth. **Florida:** 36° at Gulf Hammock, 40° at Pensacola and Houston, 45° at Jacksonville and 65° at Key West. **Alabama:** 30° at Green Springs and 39° at Mobile. **Mississippi:** 32° at Brookhaven and Fayette, and 35° at Vicksburg. **Louisiana:** 28° at Okaloosa, 33° at Shreveport and 42° at New Orleans. **Texas:** 5° at Fort Elliott, 21° at Pilot Point, 28° at Mason, 32° at Denison, 38° at Rio Grande and 47° at Galveston. **Ohio:** 6° at Westerville and Urbana, 15° at Columbus, 18° at Cleveland and 25° at Cincinnati. **Kentucky:** 28° at Louisville and Bowling Green. **Tennessee:** 25° at Knoxville and McMinnville, 26° at Ashwood and 29° at Nashville, and Chattanooga. **Arkansas:** 20° at Mt. Ida and 32° at Little Rock. **Michigan:** -2° at Marquette, 5° at Alpena, 9° at Lansing and Kalamazoo, 12° Grand Haven, 13° at Northport, 16° at Port Huron and 19° at Detroit. **Indiana:** 15° at Spiceland, 18° at Fort Wayne, 20° at Indianapolis and 26° at New Harmony. **Illinois:** 10° at Riley, Belvidere and Sterling, 20° at Chicago and 30° at Cairo. **Missouri:** 14° at Corning, 18° at Kansas City and 23° at St. Louis. **Kansas:** -3° at Fort Wallace, 15° at Holton, Manhattan, Cedar Vale and Yates Center, and 20° Leavenworth. **Wisconsin:** -12° at Ashland and Neillsville, -6° at La Crosse, and 6° at Madison. **Iowa:** -6° at Cresco, -3° at Fort Dodge, 6° at Glenwood, 10° at Des Moines and Dubuque, and 21° at Keokuk. **Nebraska:** -19° at Fort Sidney, -2° at Genoa and North Platte, and 5° at Omaha. **Indian Territory:** 23° at Fort Sill and 26° at Fort Gibson. **Minnesota:** -19° at Duluth and -12° at St. Paul. **Dakota:** -35° at Fort Buford, -32° at Pembina, -21° at Bismarck, -7° at Deadwood, -5° at Morrilton and -2° at Yankton. **Colorado:** -17° at Fort Garland, -15° on Pike's Peak, -7° at Fort Lyon and -3° at Denver and Huerfano. **New Mexico:** -2° at Santa Fe, 7° at Silver City and 20° La Mesilla. **Wyoming:** -25° at Fort Fred Steele and -11° at Cheyenne. **Utah:** -16° at Coalville and 2° at Salt Lake City. **Nevada:** 0° at Winnemucca. **Arizona:** -17° at Prescott, 8° at Fort Verde, and 30° at Yuma. **Idaho:** -11° at Fort Hall and 13° at Boise City. **Montana:** -18° at Virginia City. **California:** 25° at Sacramento and Salinas City, 26° at Red Bluff, 27° at Visalia and Princeton, 30° at Los Angeles and 37° at San Francisco. **Oregon:** 18° at Umatilla, 25° at Roseburg and 26° at Portland.<sup>125</sup>

In the *United States* during the winter of 1879-80, the temperature at Fort Stevenson, (now located under 120 feet of water in Lake Sakakawea, North Dakota) fell to -54° F in December. The temperature at Fort Totten, North Dakota fell to -51° F in December. The temperature at Sydney Barracks (now Sidney, Nebraska) fell to -37° F in December. The temperature at Omaha, Nebraska fell to -17° F in December. The temperature at North Platte, Nebraska fell to -27° F in December and -21° F in March. The temperature at Fort Hall, Idaho fell to -30° F in December. The temperature at Fort Halleck, Nevada fell to -22° F in December. The temperature at Winnemucca, Nevada fell to -20° F in December. The temperature at Prescott, Arizona fell to -18° F in December. The temperature at Fort Apache, Arizona fell to -2° F in December. The temperature at Santa Fe, New Mexico fell to -13° F in December. The temperature at Fort Elliott, Texas fell to -10° F in December. The temperature at Salt Lake City, Utah fell to -10° F in December. The temperature at Cresco, Iowa fell to -35° F in December. The temperature at Dubuque, Iowa fell to -19° F in December. The temperature at Saint Paul, Minnesota fell to -39° F in December. The temperature at Burlington, Vermont fell to -19° F in December. The temperature at La Crosse, Wisconsin fell to -20° F in December. The temperature at Fort Custer, Montana fell to -23° F in March. The temperature at Cheyenne, Wyoming fell to -24° F in December and -17° F in March.<sup>113, 126</sup>



The United States Signal Service observer at St. Michaels, *Alaska*, reported the winter of 1879-80 as one of unusual severity. Long continued cold weather prevailed during January, February and March of 1880, accompanied by severe gales and much snow during the two latter months. The natives report that no winter of such severity has ever been known by them. The temperature at Fort Reliance, 400 miles southeast of Fort Yukon, reached  $-69^{\circ}$  F ( $-56^{\circ}$  C). Migrating birds were from eight to ten days late this spring in arriving at St. Michaels. The winter was exceedingly severe, very cold and stormy, from the mouth of the Sanana [Tanana River], down the Yukon River and along the seacoast from Kuskoquim [Kuskokwim] River to Cape Prince of Wales. The natives narrowly escaped starvation, being compelled in some cases to eat their dogs and the tanned sealskin covers of their boats, while large numbers of dogs died of starvation. Spring was from ten to fifteen days late.<sup>125</sup>

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### **1880 A.D. – 1886 A.D. Australia. Drought**

During 1880-86, *Australia* experienced a national drought.<sup>101</sup>

On 24 and 25 January 1880, the high temperature in Perth, *Australia* reached  $110^{\circ}$  F ( $43.3^{\circ}$  C). There were 21 days in January/February 1880 where the temperature was  $100.0^{\circ}$  F or greater.<sup>102</sup>

During the summer of 1880-81 in Perth, *Australia*, there were 10 days when the temperature was  $100.0^{\circ}$  F or greater.<sup>102</sup>

On 17 February 1882, the high temperature in Perth, *Australia* reached  $113.8^{\circ}$  F ( $45.4^{\circ}$  C). A week earlier on 10 February, the high temperature was at  $113.6^{\circ}$  F ( $45.3^{\circ}$  C). During the summer of 1881-82, there were 10 days when the temperature was  $100.0^{\circ}$  F or greater.<sup>102</sup>

On 14 December 1882, the high temperature in Perth, *Australia* reached  $111^{\circ}$  F ( $43.9^{\circ}$  C). During the summer of 1882-83, there were 6 days when the temperature was  $100.0^{\circ}$  F or greater.<sup>102</sup>

During the summer of 1883-84 in Perth, *Australia*, there were 5 days when the temperature was  $100.0^{\circ}$  F or greater.<sup>102</sup>

On 31 January 1885, the high temperature in Perth, *Australia* reached  $112^{\circ}$  F ( $44.4^{\circ}$  C). During the summer of 1884-85, there were 9 days when the temperature was  $100.0^{\circ}$  F or greater.<sup>102</sup>

During the summer of 1885-86 in Perth, *Australia*, there were 14 days when the temperature was  $100.0^{\circ}$  F or greater.<sup>102</sup>

In New South Wales, this drought was the worst drought since 1837-39. The areas most affected were the south coast, the northern tablelands and the northern wheat belt. At Bourke, the Darling River was below the low summer levels for 17 months during 1884-85. It is estimated that 9 million sheep died during this period. The number of cattle fell by 2.9 million during 1879-85. The wheat yield in 1885-86 was 10.5 bushels per acre, the lowest since 1870-71.<sup>101</sup>

Southeastern Queensland suffered from drought beginning in 1881. The coastal areas and central highlands were severely affected beginning in 1883. In 1883, the summer rains failed. The year 1884 was one of the worst seasons ever in the western districts. In 1884, two million sheep died in Queensland. In 1885, the wheat yield was 65% of the average annual yield harvested in the prior decade. During the period 1882-86, cattle livestock increased by 0.5 million in Queensland, while at the same time they decreased 1.2 million in New South Wales.<sup>101</sup>



In Victoria, the worst areas affected by the drought were Gippsland and the north. In 1885, the Goulburn River flow at Murchison was cut in half. On 1 January 1886, in the Otway Range, a severe brushfire raged for 2 days. Forest and homesteads were destroyed between Warrnambool and Port Phillips.

On 4 and 5 January 1886, Western Australia suffered from damaging fires.<sup>101</sup>

In South Australia, the severe drought affected the interior in the years 1882 and 1884. Agriculture was badly hit beginning in 1884. The wheat yield in 1885 of 3.2 bushels per acre was the lowest since recordkeeping began in 1859.<sup>101</sup>

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**1880 A.D.** On 12 January 1880, there was a great flood at Basseterre on the Island of St. Kitts in the *West Indies*. According to William Alexander, “While strolling one morning along the streets of this city the writer’s attention was attracted to a plain, massive monument in the cemetery with the following inscription: “Sacred to the memory of those who perished in the flood in Basseterre, St. Christopher, on the 12 of January, 1880, and commemorative to that awful visitation, in which 231 persons lost their lives, of whom 101 are buried here.” Beyond the mere facts as to dates and results, as set forth in the above inscription, there seems to be no official record bearing on the event, and I have compiled the following lines by the help of the memory of eyewitnesses:<sup>123</sup>

— It seems there was no premonitory signs of the impending disaster further than toward sunset an unusual warmth was felt which continued up to 9 o’clock p.m., when “an intense cold set in,” then a light shower of rain fell. The clouds gathered early in the evening, and very soon the city was enshrouded in intense darkness. “The darkness could almost be felt.”

— Occasional flashes of lightning accompanied by “deep rumbling thunder” now and then relieved the painful feeling. About 11 o’clock the rain began again, and eyewitnesses say it “looked like sheets of water pouring out of the clouds.” Soon the place was flooded, and ere long the water began to creep into the houses, to the great consternation of the inmates, who, upon attempting to escape, found the streets like rivers, making egress not only unsafe but well-nigh impossible. Those who were so fortunate as to possess an “upstairs” availed themselves of the security afforded by a more elevated position, but unfortunately the great bulk of the population lived then, as now, in little one-story, one-roomed houses (if one can call them houses at all) built of light material and loosely put together, so that soon houses and all began to move seaward. The rain continued for about four hours, resulting as above indicated in the drowning of 231 persons certainly, and possibly more, beside the loss of property.

— Many were buried beneath a layer of mud several feet deep that came down from the fields and mountains.

— It was very roughly estimated that 23 inches of rain fell in those four hours.

In 1880, there was a great flood on the island of St. Kitts in the *West Indies*.<sup>144</sup>

On 24 March 1880 in southwestern *India*, there was a great storm in Dharwad. The storm which was ushered in by the fall of some very heavy hailstones — several of the largest stones, which were spherical in shape, measuring no less than 9 or 10 inches in circumference. One piece of ice picked up was about 5 inches long, and pointed at one end. There were lightning and thunder on a grand scale.<sup>93</sup>

On 4 March 1880, a severe tornado struck Indianapolis, Indiana in the *United States*. The tornado followed a zigzag course through the city causing an estimated \$100,000 in damage [approximately \$2.2 million in present dollars using the Consumer Price Index (CPI)].<sup>125</sup>

On 31 March 1880, a very violent hailstorm struck parts of Cowen and Dallas counties in Texas in the *United States*. Near Plano, the hail zone was 200 yards wide and the hailstones were as large as hickory nuts. The ground was covered like snowdrifts.<sup>125</sup>

On 3 April 1880, a hailstorm produced hail as large as a man's fist was reported near Mt. Airy, Georgia in the *United States*. On 6 April, a hailstorm struck Augusta, South Carolina with hailstones the size of partridge eggs. This hailstorm was reported to have killed young livestock in Orangeburg County, South Carolina. On 7 April, a hailstorm struck Maxey, Georgia in the United States with several hailstones 12 inches in circumference. At Bairdstown, Georgia, one hailstone weighed 2 pounds.<sup>125</sup>

Around 18 April 1880, destructive tornadoes struck the western states in *North America* and caused great loss of life and property.<sup>90</sup>

April 1880 produced a rash of tornados and high winds in many areas of the *United States* causing considerable destruction of property and loss of life. Some of the areas affected include: Kansas, Louisiana, Georgia, Missouri, Arkansas, Iowa, Illinois, Indiana, Wisconsin, Ohio, Pennsylvania, New York and Mississippi. On 2 April, a severe tornado struck Ottawa, Kansas destroying much property and injuring 15 persons and killing many. It began by demolishing seven houses, then unroofed a freight depot and overturned two railroad cars. On 2 April, a severe tornado struck Girard, Kansas, killing 3 persons and destroying 17 houses. On 3 April, a tornado struck Dalton, Georgia killing two people and injuring many and 18 houses were completely demolished. This tornado was one mile wide. This tornado travelled 100 miles and then struck Cherokee, Georgia at 2 a.m. in the morning of the 3rd. Hail was reported the size of a man's fist. Even though this county was sparsely populated at the time, the tornado destroyed 50 dwellings of all kinds, killed 3 people and badly injured many. The average width of the tornado was 1 mile. The tornado passed through the northern part of Elbert County, Georgia blowing down many houses and the largest trees. Its passage resembled a cloud of smoke and fire rolling on the ground. On 16 April, a high storm with severe winds unroofed two freight depots and damaged several other buildings in Wheeling, West Virginia. On the same day high winds struck the entire central and southern parts of Ohio unroofing many buildings. This storm also brought high winds to Pennsylvania, New York and Lake Erie causing considerable damage. On 18 April, a severe tornado struck Beloit, Wisconsin causing loss of life and approximately \$75,000 in property damage. Also on the 18<sup>th</sup> a furious tornado struck Greenville, Illinois demolishing or tearing to pieces numerous houses in almost every portion of the city. On the same day in Champaign, Illinois the old university building was badly wrecked and many other buildings partially demolished. Storms struck many parts of Illinois on that day. At Jacksonville, Illinois, the storm tore the roof off the county poorhouse and tore a large icehouse to pieces and swept away the bridge across the Big Sandy River. Also on the 18<sup>th</sup>, another line of tornados struck. They began in Missouri near the Arkansas line, where 10 persons were killed in the Crow creek settlement and six on Flat creek. This tornado struck Marshfield, Missouri around 6 p.m. All of the buildings, both brick and frame, in a city of nearly 2,000 inhabitants were demolished (except half a dozen). The ruins took fire during the storm. Sixty-five people were killed and about 200 were injured. In the vicinity of the town, the violence of the storm was such that trees three feet in diameter were for a space of several hundred yards wide lifted entirely out of the ground, limbs twisted off and split into kindling wood, and the bark of trees peeled off as if struck by lightning. Loss of property in these two counties (Green and Webster) was estimated at over 1 million dollars [approximately \$22.3 million in present dollars using the Consumer Price Index (CPI)]. At the same time, another tornado struck Webster County, Missouri killing 7 people. At Licking, Missouri, the entire town was destroyed, except three houses: 300 persons were left homeless, one person was killed and 17 wounded (5 seriously). At Cuba, Missouri, the town and surrounding country were nearly laid to waste. The tornados struck several other towns and countryside in Missouri bringing death and destruction including New Bloomfield, Barnettsville, Russellville, the Pacific Railroad near Scott's Station, several locations in Callaway County. Those near the tornado described the terrible tornado cloud and the sound of "10,000 express trains". The Missouri Weather Service describes the average width of the (Finley Creek Valley storm) destructive path for a distance of 100 miles and a width of at least 3,000 feet. They describe the Marshfield storm was about 45 miles long and an average of 1,500 feet wide. The Missouri storms took the lives of at least 100 people. The storms also struck Arkansas on the same day (April 18<sup>th</sup>). A tornado

struck Fayetteville, Arkansas destroying 100 buildings, killing 2, injuring 20-30 people, and causing over \$100,000 in damage. The town of Goshen, Arkansas was almost entirely swept away by the tornado. At El Paso, Arkansas, the tornado killed 10 persons and injured 20 more. On April 24, a tornado struck Joplin, Missouri. Barns, hoisters, engine rooms and buildings through the mines all demolished. Twelve houses were blown down and several persons injured. Webb City, Missouri was completely wrecked by this storm. On April 25, a tornado struck Macon, Mississippi. It demolished 22 houses and other buildings, including all railroad shops and depots. Sixteen boxcars were blown off the tracks, many of the cars were turned bottom side up. Twenty-two persons were killed and 72 injured. Damage was estimated at over \$100,000. A pair of railroad car trucks, weighing 8,000 pounds, was lifted 200 yards from the track. Many other tornados were reported during this April outbreak.<sup>125</sup>

The rash of tornados that struck the *United States* in April 1880 continued into the months of May and June. On 10 May, tornados and violent storms struck a number of cities in Illinois. At Jacksonville, Illinois, 20-30 buildings were demolished and seven persons killed. At Alsey, Illinois, not a dozen houses remained standing within the city limits. At Arrowsmith, Illinois, damage was estimated at \$100,000 [approximately \$2.2 million in present dollars using the Consumer Price Index (CPI)]. At Woodlawn, Illinois, a tornado destroyed a railroad station and other buildings, killing 4 people. On 22 May, a tornado struck Wakeman, Ohio causing \$25,000 damage. Solid oak trees, three to five feet in diameter, were twisted off like brittle pipe-stems; animals were carried long distances and dashed in shapeless masses, and poultry were stripped of their feathers and yet found alive. On 28 May, a tornado swept through Savoy, Texas, killing 12 people and injuring over 60, some fatally. Every house in a tract, 48 in number, was destroyed. On 29 May, a tornado struck Suffield, Connecticut causing \$30,000-\$40,000 damage. The width of the storm track was about 1 mile. On 10 June, a ½ mile wide tornado struck Pottawattamie County, Iowa, destroying everything in its path. Twenty people were killed outright and all buildings literally torn to pieces. On 14 June, storms struck many towns in Ohio. At Venice and Symmes Corner, Ohio between 50-60 buildings were badly injured or destroyed. A heavy iron bridge, 113 feet long, spanning Indian Creek, was whirled from its abutments. Two other heavy bridges in the vicinity were similarly destroyed. At Miami, Ohio, the storm left the town in ruins. A large covered bridge over the Little Miami River was swept away.<sup>125</sup>

On 25 May 1880 in northern *India*, there was a great storm at Mussoorie [in the foothills of the Himalayas]. In the afternoon a storm remarkable for its fury, extensive area, and size and structure of its hailstones, enveloped that station and Deyrab and Rajpore at the foot of the hill. A discharge of stones as large as pigeons' eggs opened the attack. This was followed by a continuous downpour of hailstones, oblate spheres as large as small marbles. The whole station was penetrated by these hailstones, and it presented the appearance of being strewn broadcast with acidulated drops. These stones were of pure clear ice, and, barring their shape, quite amorphous. Not so the large stones, whose structure and mode of formation were very puzzling. First an opaque nucleolus surrounded by a concentric nucleus of clear ice, and this by a radiating periphery. The nucleus being opaque was rapidly frozen; it must then have moved through alternate layers of hot and cold air to receive the concentric accretions of pure ice. The radiating periphery was translucent, but not transparent.<sup>93</sup>

On 30 May 1880 at 5:30 p.m., a large hailstorm struck Silver City, Iowa in the *United States* covering an area 3-4 miles wide and 12 miles in length. An hour after the storm, many of these hailstones measured 1½ inches in circumference. The next day at 10 a.m., they were the size of hen eggs. Many were rough, jagged blocks of ice.<sup>125</sup>

Floods struck Texas and Indiana in the *United States* in May 1880. From the 27<sup>th</sup> to the 29<sup>th</sup>, heavy rains produced floods in Texas affecting many cities including Castroville, Pilot Point, Coleman, San Saba, Calvert, Lampasas and Brackettville. At Brackettville, the water was 8-feet deep on Main Street and over 20 people were reported drowned. The Colorado River rose 30 feet during the storm. The floods in

Indiana occurred on the 21<sup>st</sup> affecting many cities including Vincennes, Sullivan, Huntington, and Wabash. A brickyard near Vincennes, Indiana was submerged and a quarter of a million bricks were washed away.<sup>125</sup>

On 18 June 1880 in *Switzerland*. "During the last few days various parts of *Switzerland* have been visited with severe thunder and hailstorms. The crops in the district of Porrentruy [in northeastern *Switzerland*] are completely ruined, many of the hailstones which fell there weighing upwards of 15 grams."<sup>93</sup>

On 20 June 1880 in southeastern *Romania*. "Heavy hailstorms caused grave damage to the crops in the district of Brălia [Brăila]."<sup>93</sup>

On 21 June 1880, a terrific storm of wind and hail passed over western Bradford County, Pennsylvania in the *United States*, extending from Wells to LeRoy. The wind blew down trees, fences and buildings from Granville Center in a southeasterly direction to Towanda Creek and LeRoy Township. Hail destroyed nearly all the wheat, corn and oats on some farms. The path of the storm was a half-mile [0.8 km] in width.<sup>178</sup>

The maximum temperatures in degrees Fahrenheit in the *United States* during July 1880 were as follows: **Maine**: 95° at Orono, 94° at Portland. **New Hampshire**: 100° at Dunbarton, (62° on summit of Mt. Washington). **Vermont**: 99° at Charlotte, 89° at Burlington. **Massachusetts**: 101° at Boston, 100° at Somerset. **Rhode Island**: 88° at Newport. **Connecticut**: 97° at Mystic, 88° at New London. **New York**: 96° at Ardenia, 91° New York City, 85° at Buffalo. **New Jersey**: 99° at Atlantic City and Moorestown. **Pennsylvania**: 96° at Chambersburg, Egypt and Wellsboro, 95° at Philadelphia. **Delaware**: 97° at Dover. **Maryland**: 99° at Baltimore. **District of Columbia**: 98° at Washington. **Virginia**: 102° at Norfolk. **West Virginia**: 89° at Morgantown. **North Carolina**: 104° at Weldon, 98° at Wilmington. **South Carolina**: 97° at Charleston. **Georgia**: 100° at Forsyth, 96° at Augusta. **Florida**: 100° at Houston, 97° at Key West and Jacksonville. **Alabama**: 100° at Montgomery. **Mississippi**: 97° at Vicksburg. **Louisiana**: 101° at Point Pleasant, 96° at Shreveport. **Texas**: 108° at Eagle Pass, 103° at Laredo, Rio Grande and Edinburg, 102° at Stockton, 101° at Denison, Pilot Point, Concho and Castroville, 100° at Griffin, Fort McKavett and Decatur. **Ohio**: 98° at Jacksonburg, 97° at Columbus. **Kentucky**: 95° at Louisville. **Tennessee**: 95° at Memphis, Nashville and Chattanooga. **Arkansas**: 96° at Mt. Ida, 95° at Little Rock. **Michigan**: 95° at Niles, 93° at Detroit. **Indiana**: 97° at Laconia, 93° at Indianapolis. **Illinois**: 100° at Louisville, 96° at Springfield. **Missouri**: 98° at Corning, 95° at St. Louis. **Kansas**: 103° at Fort Wallace and 95° at Leavenworth. **Wisconsin**: 95° at La Crosse. **Iowa**: 98° at Keokuk. **Nebraska**: 98° at Genoa, 97° at North Platte and Omaha. **Indian Territory**: 100° at Fort Gibson. **Minnesota**: 90° at Minneapolis. **Dakota**: 98° at Fort Keogh. **Colorado**: 95° at Denver. **New Mexico**: 107° at La Mesilla. **Wyoming**: 93° at Cheyenne. **Utah**: 95° at Salt Lake City. **Nevada**: 96° at Winnemucca. **Arizona**: 110° at Yuma and Burkes. **Idaho**: 98° at Boise City. **Montana**: 86° at Virginia City. **California**: 108° at Red Bluff, 105° at Visalia. **Oregon**: 107° at Umatilla. **Washington Territory**: 94° Olympia.<sup>125</sup>

On 13 July 1880 in northeastern *England*. "Very large stones in the neighborhood of Liverpool."<sup>93</sup>

On 24 July 1880 in *Ireland*, there was a very severe hailstorm at Moylough in the County of Galway, which lasted half an hour.<sup>93</sup>

In July 1880, there was a very severe famine in Tauris [southern *Turkey*] and *Asia Minor*.<sup>90</sup>

Many thunderstorms in *England* in July 1880.<sup>90</sup>

On 12-13 August 1880, a storm of great strength in the west Gulf of Mexico devastated the Texas coast at the mouth of the Rio Grande in the *United States*.<sup>119, 120</sup>

On 10-13 August 1880, a hurricane struck offshore Yucatan, *Mexico* causing 30 deaths. [The dates in several accounts of this event vary.]<sup>141</sup>

On 18-19 August 1880, a hurricane struck *Jamaica*. Some accounts identify 30 deaths while others claim 12.<sup>141</sup>

On 18 August 1880, a storm of great strength at the Island of *Jamaica* caused loss of life and immense damage to shipping and property.<sup>119, 120</sup>

On 18 August 1880, a hurricane struck *Jamaica*.<sup>124</sup>

In August 1880, a hurricane struck Port Royal, *Jamaica*. It wrecked every vessel in the island except the Commodore's ship and a little surveying schooner.<sup>67</sup>

*Russia* suffered from a major famine in 1880.<sup>96</sup>

In 1880 in *Germany*, the hail damage losses sustained by the Magdeburg Company were very heavy during this season.<sup>93</sup>

On 20 August 1880 in central *France*, there was a terrific hailstorm at Riom (a fertile plain near the Ambone). The storm lasted for 20 minutes. The hailstones were as large as fowls' eggs, and some as large as a man's fists. Branches of trees were cut off, and birds were killed.<sup>93</sup>

On 26-31 August 1880, a storm of great strength moved north of the *Bahamas* and crossed north Florida in the *United States* on 29<sup>th</sup>-30<sup>th</sup>, strewing the Florida coast with wrecks and doing great damage to property and crops.<sup>119, 120</sup>

On 29 August 1880, a hurricane struck near St. Augustine, Florida in the *United States* causing 68 deaths.<sup>141</sup>

About 8-11 October 1880, inundations struck the midland counties of *England* causing much damage.<sup>90</sup>

On 12-13 October 1880, a hurricane struck the southeast coast of Texas in the *United States*. Many lives were lost.<sup>141</sup>

On 27-28 October 1880, there were severe storms in *England* that caused much destruction by inundations.<sup>90</sup>

Mr. J. Eliot in an elaborate report on the Madras Cyclone of May 1877 drew several conclusions about cyclones in the *Bay of Bengal*. He observed that the most powerful cyclones in the Bay tend to occur at or about the minimum sunspot period and that at least one intense cyclone occurs at each minimum sunspot period.<sup>125</sup> [Madras is now Chennai, *India*.]

A tropical hurricane traced across the ocean and became one of the most disastrous storms ever experience in Europe. On 28 October 1880, a deep depression appeared off the southwest coast of England, with unusually heavy rains in *England* and snow in *Scotland*. More than 160 vessels were reported wrecked on the British coast alone, and many lives lost. This storm also caused great damage along the shores of the North Sea and the Baltic.<sup>75</sup>



A typhoon struck the coast of *Japan* on 4 October 1880. Wind speed of 100 miles per hour were measured in Tokio [Tokyo] where it demolished more than 1,000 houses, damaged 2,000 other homes, killed 28 persons and injured 60 more some seriously. An immense scaffolding, used in the building of the temple of Hijio-Honto, was blown down, the debris forming a mass more than one hundred feet high. At Yokohama, Kobi [Kobe] and at many other villages in the interior, the loss of life and property was very great. Many bridges were swept away, and vessels in the harbors dragged their anchors and were driven out to sea.<sup>75</sup> [Hijio-Honto is in Nara, the ancient capital, in southern Honshū Island, *Japan*. Heijio-kyo, the Heijio Palace, extended about one kilometer wide and one kilometer long and served as the site of the Emperor's residence and the government offices. Yokohama and Kobi are located in southeastern Honshū Island.]

In 1880 during the period between 8 August and 8 November, a drought engulfed Kiangsu (now Jiangsu province) on the east coast of *China* at Yangchow; Shantung (now Shandong province) on the east coast of *China* at Yü-t'ai; and Hopei (now Hebei province) in northern *China* at Hsing-t'ai.<sup>153</sup>

*Also refer to the section 1880 A.D. – 1886 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1880 / 1881 A.D.** The *Baltic Sea* froze.<sup>37</sup>

During the winter of 1880-81, the *Baltic Sea* was completely covered with ice.<sup>68</sup>

Winter set in very early in *Russia* during the winter of 1880-81. In October 1880, they experienced a series of twelve consecutive days of hard frost. On 17 October 1880, the river Neva [in northwestern *Russia*] was covered with thick ice. According to the records dating back to 1706, the river was covered with ice in October on only three other times: 29 October 1805, 31 October 1811 and 30 October 1852.<sup>75</sup>

On the 16<sup>th</sup> of January 1881, an area of low pressure developed over the *Azores*. On the 17<sup>th</sup>, this disturbance moved northeastward and was centered near the southern part of the *Bay of Biscay*. On the 18<sup>th</sup>, the storm center moved over the *English Channel*. The storm produced violent easterly gales over the *North Sea* and at nearly all weather stations on the *British Isles*, while strong westerly gales occurred in the *Bay of Biscay*, and in western *France*. On the 18<sup>th</sup>, an unusually heavy fall of snow occurred in *England* and in the northern half of *France*. In the southern counties of *England*, the snowfall ranged from ten to eighteen inches, and in some instances, the latter amount may have been exceeded. Snowdrifts of four to twelve feet were general over southern *England*, and, in some cases they attained a depth of twenty feet. The number of deaths due to the snow in *England* and *Wales* is estimated at a hundred. In Paris, *France*, the snowfall caused hundreds of market-wagons to be abandoned near the suburbs of Paris, in the heavy drifts, which had formed, and many of the streets of Paris were completely blocked. By the 19<sup>th</sup>, the storm center had moved over *Belgium* and Holland [now *the Netherlands*] and then into *Germany*. By the 20<sup>th</sup>, the center had moved into eastern *Prussia*. On the 21<sup>st</sup>, the center was over central *Russia*. On the 22<sup>nd</sup>, the center was in the vicinity of the Ural Mountains.<sup>75</sup>

On 17-21 January 1881, there was a severe snowstorm, or blizzard [in *Great Britain*]. Railways and other traffic were largely stopped. There was great loss of life at sea.<sup>90</sup>

There was a very severe frost in *Britain* beginning on 18 January 1881 lasting about 14 days.<sup>90</sup>

The winter of 1880-81 in Bradford County, Pennsylvania in the *United States* was long and cold with much snow. The first snowstorm struck on 18 November and the last on 12 April. During the winter a total of 98 inches [2.5 m] of snow fell. The heaviest single snowfall was 10½ inches [27 cm] in the latter part of December. On December 30<sup>th</sup> the temperature dropped to -8° F [-22° C] and on February 7<sup>th</sup> it dropped to -19° F [-28° C]. The winter was a most unhealthful one. Spring did not appear until after the



middle of April.<sup>178</sup>

In the *United States* during the winter of 1880-81, the temperature dropped to -12° F at Mount Auburn, Ohio, a suburb of Cincinnati on November 19<sup>th</sup>. The temperature at Fort Benton, Montana fell to -59° F in December. The temperature at Fort Assiniboine (near Havre, Montana) fell to -42° F in December. The temperature at Milwaukee, Wisconsin fell to -21° F in December. The temperature at Dubuque, Iowa fell to -19° F in December. The temperature at Chicago, Illinois fell to -15° F in December. The temperature at Escanaba, Michigan fell to -23° F in December. The temperature at Detroit, Michigan fell to -11° F in December. The temperature at Saint Louis, Missouri fell to -15° F in December. The temperature at Cheyenne, Wyoming fell to -24° F in December. The temperature at Columbia, South Carolina fell to 5° F on December 30<sup>th</sup>. The temperature at Wabash and Spiceland, Indiana fell to -18° F in December. The temperature at Emmitsburg, Maryland fell to -19° F in December. The temperature at Flemington, West Virginia fell to -21° F in December. The temperature at Charleston, South Carolina fell to 13° F on December 30<sup>th</sup>. The temperature at Montgomery, Alabama fell to 8° F in December. The temperature at Mobile, Alabama fell to 14° F in December. The temperature at Linden, New Jersey fell to -18° F in December. The temperature at Pensacola, Florida fell to 17° F in December. The temperature at Atco, New Jersey fell to -24° F in January. The temperature at Fort Niobrara, Nebraska fell to -35° F in January. The temperature at North Platte, Nebraska fell to -27° F in January. The temperature at Saint Vincent, Minnesota fell to -42° F in December and -44° F in January. The temperature at Marquette, Michigan fell to -26° F in January. The temperature at Baltimore, Maryland fell to -6° F in January. The temperature at Fort Union, New Mexico fell to -25° F in January and -21° F in February. The temperature at Fort Concho, Texas fell to -1° F in January. The temperature at Atlanta, Georgia fell to 1° F in December and -1.3° F in January. The temperature at Mount Solon, Virginia fell to -18° F in January. The temperature at Charlotte, North Carolina fell to 11° F in January. The temperature at Washington D.C. fell to -13° F in December and -14° F in January. The temperature at Camp Sheridan (near Hay Springs, Nebraska) fell to -29° F in February. The temperature at Denver, Colorado fell to -20° F in February.<sup>113, 126</sup>

Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>

During the winter of 1880/81, there was very heavy snowfall in South Dakota in the *United States* and old residents state that at the end of February the average depth of snow in the vicinity of Huron, South Dakota was 3 to 4 feet.<sup>137</sup>

There were heavy snowstorms in the *United States* and *Canada* during April 1881. At Westerville, Ohio, the month opened with from twelve to fifteen inches of snow; on the 5<sup>th</sup> there was a snowfall of seven inches. At Sioux City, Iowa on the 8<sup>th</sup>, there was a very heavy storm of sleet and snow, over ten inches on the level; wires broken and railroad communication obstructed. At Sheldon, Iowa on the 8<sup>th</sup>, for sixty miles to the eastward the whole country covered with from two to three feet of snow; the *Chicago, Milwaukee and St. Paul* railroad, for a distance of thirty miles, passed through snowcuts [a road cut through deep snow], the walls of which were in many places above the tops of the [railroad] cars. In Sanborn, Hartley, Spencer, Emmetsburg, Algona and other neighboring towns in Iowa, people have been cut off from the necessities of life, by snow blockades for the previous three weeks, and until within a few days not a single train had passed through that section since the 1<sup>st</sup> of January; fully two-thirds of the livestock in that section perished. At Fairmount, Minnesota on the 11<sup>th</sup>, there was a very heavy snow in southern Minnesota during night; trains delayed. At Greenbrier County, West Virginia, there was sixteen inches deep snow in several localities west of White Sulphur Springs. At Yankton, [South Dakota] on the 13<sup>th</sup>, all railroads north and west were still blockaded by snow; the entire Missouri slope buried in snow. At Derby Line, Vermont on the 15<sup>th</sup> & 16<sup>th</sup>, there was very heavy snow, eleven inches deep on the level. At Edgerton, Wisconsin on the 16<sup>th</sup>, the snowdrifts were from three to five feet high. At Manitoba,

Canada on the 20<sup>th</sup>, the snow was very heavy about the tributaries of the Mississippi River. In the towns of Havelock and Winthrop, Iowa and others to the north on the 22<sup>nd</sup>, the ground was still covered with several feet of snow. In vicinity of Big Storm and Traverse Lakes, Dakota on the 22<sup>nd</sup>, the snow was partly gone from the hills, but in the ravines and gulches the snow was fifteen to fifty feet deep.<sup>132</sup>

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**1881 A.D.** On 12 April 1881, a violent tornado first appeared near Commerce, Mississippi, a small town on the Mississippi River, where it wrecked ten cabins, three gin houses and a store. Then the tornado moved near Hernando. In that vicinity the loss to property and life was very severe, 25 buildings of various kinds were totally demolished and 10 persons killed. The length of storm path was about 25 miles and the width from 100 to 300 yards. Very heavy rain and hail followed this tornado at Senatobia and several other points in the vicinity, in some cases the hailstones were the size of hen's eggs. On the same day, a violent tornado visited several towns including Brinkley, Forrest City and Cotton Plant in Arkansas. After the passage of the storm, showers of jagged pieces of ice, four to six inches in width and two to two-and-a-half inches in thickness fell, resembling broken river ice.<sup>132</sup>

On 4 April 1881 there was ice gorging and flooding on the Missouri River, which caused the lower portion of Yankton, South Dakota in the *United States* to flood. The lower floors of over 200 dwellings, shops and mills were covered from 1 to 4 feet of water causing a great damage to property. On the 7<sup>th</sup>, the gorge broke. The water fell rapidly and as a result the steamer *Peninah* was carried away from her moorings and lodged on a railroad track two miles down the river. Reports from the submerged farming districts state that about 200 persons perished from cold and hunger. Thousands of cords of wood were carried away by the ice, leaving whole communities destitute of fuel. On the 13<sup>th</sup>, water in the overflowed districts was gradually subsiding. Ice was piled to a height of 10 to 30 feet along the banks, on the bars and over the bottoms. At Green Island every house but one had been swept away. Ice throughout the place was from 10 to 20 feet deep. Damages to steamboat property was estimated at \$60,000 [\$1.3 million in today's currency]. This included two boats sunk and seven of the largest steamers lying high up on the ice and far inland. In the vicinity of Yankton it is estimated that at least 7,000 people have been driven from their homes: the ice gorge which caused this unprecedented flood extended to Vermillion, filling the river channel for a distance of over 30 miles with solid ice and rising in places to a height of over 30 feet above the surface of the water. About fifteen miles below Yankton, in a bend of the river, were situated 20 families, who could not be rescued because of the mountains of ice surrounding them.<sup>132</sup>

At Omaha, Nebraska in the *United States* on 7 April 1881, the Missouri River was one vast field of ice, cakes varying in size from three to one hundred feet square; trees, logs, bridge timbers, the debris of houses, were constantly flowing downstream. At Mandan, North Dakota on the 8<sup>th</sup>, the immense fields of ice about the city was still intact; over one hundred men were employed in cutting out the railroad track and in opening a road through the heavy ice on Main Street. At Gayville, South Dakota on the 15<sup>th</sup>, the town was submerged to a depth of six feet, and surrounded by heavy ice. At Davenport, Iowa on the 2<sup>nd</sup>, the Mississippi River was open from the bridge down to the ferry crossing at the foot of Main Street. At some places along the shore, the ice was piled up to a height of 30 feet, composed of huge blocks three feet in thickness. On the 10<sup>th</sup>, an area of thirty to forty acres [of ice] passed down in a body and the levee flooded for two miles. At 11 a.m., the water stood seven inches deep in stores, warehouses and machine shops on Front Street, and whole blocks of dwelling houses were inundated. The sawmills suffered heavily, many piles of lumber and rafts were swept from their booms. One raft of 600,000 feet of lumber was broken up and carried away in front of the city. At 11.45 a.m., water rose to 18 feet 8 inches above the low-water mark, being 4 inches higher than ever before recorded. At Elgin, Illinois on the 21<sup>st</sup>, ice on the Fox River gorged for a distance of nine miles, and piled up to a height of 12 feet, damage to property \$500,000 [\$11 million in today's currency].<sup>132</sup>

At Battleford, *Canada* on the 21 April 1881, ice gorged and Saskatchewan River overflowed. By the 22<sup>nd</sup>, the river was higher than ever before. All bridges for miles about were swept away. Every house in lower part of town flooded. There was water of unusual depth in swamps along the line of the *Canada Pacific* [railroad], between Winnipeg and Portage la Prairie, owing to the sudden melting of heavy snow.<sup>132</sup>

In April 1881, massive flooding occurred in the *United States* and *Canada* causing an unprecedented loss of life and property and these floods were typified by the extreme height to which the water rose during the prevalence of the flood. The loss of property in monetary figures:

\* Over the territory from British America [*Canada*] southward to the latitude of Sioux City, Iowa, \$3.3 million [In present currency, that would be equivalent to \$74 million in damages based on the Consumer Price Index (CPI) inflation rates.]

\* From Sioux City, Iowa to the latitude of St. Louis, Missouri the loss was \$2.5 million [a \$56 million loss in present currency].

The probable causes that were at work in producing this great calamity, other than the immediate influence of the breaking up of ice, are worth discussion. First, note that in the Northwest, up to about the 12<sup>th</sup> of April, snow was upon the ground to the depth of 15 to 50 feet, the accumulation of almost the entire winter. In the Upper Mississippi valley as far south as Burlington, Iowa, it varied from 3 to 5 feet. Second, recall the fact that, during the month of March 1881, these regions were subjected to the heaviest snowstorms experienced, in many instances, for a period of the past twenty-five years. Third, this remarkable accumulation of snow coincided with very low temperatures. The mean temperature for March throughout the Upper Mississippi and Missouri valleys was from -1.4° F. to -3.1° F. below normal. This was a very important factor, which prevented the gradual and harmless disappearance of the large masses of snow. Fourth, during the winter, ice formed in the western rivers to a thickness and extent, in several instances, never before realized. With these conditions present, the month of April opened with occasionally heavy falls of snow and low temperatures between the 1<sup>st</sup> and 12<sup>th</sup>. Following this, the temperature rose slowly until the 20<sup>th</sup>, after which the temperature rise was more rapid, reaching the maximum of the month between the 22<sup>nd</sup> and 26<sup>th</sup>. These were the principal forces responsible for the remarkable floods of April 1881.<sup>132</sup>

Several accounts of the floods of April 1881 in the *United States* and *Canada* are detailed as follows:<sup>132</sup>

— Manitoba, British America [*Canada*] on the 22<sup>nd</sup>, all streams emptying into the Red River of the North overflowed, great loss to lumbermen and farmers.

— Winnipeg, British America [*Canada*] on the 29<sup>th</sup>, river 25 feet above low water mark, several grain warehouses flooded.

— Emerson, British America [*Canada*] on the 29<sup>th</sup>, lower portion of town flooded, bridge carried away.

— Vermillion, South Dakota, on the 8<sup>th</sup>, forty-five houses swept out of the town, highest water ever known.

— Grand Forks, North Dakota on the 21<sup>st</sup>, Red River rose 16 feet in past thirty-six hours.

— Casselton, North Dakota on the 22<sup>nd</sup>, entire town nearly underwater, flood unprecedented, all communication closed.

— Meckling, South Dakota on the April 8<sup>th</sup>, entire town carried away, except the elevator, in which were gathered for safety about 1,000 people.

— Fort Sisseton, South Dakota on the 22<sup>nd</sup>, all bridges between Fort Sisseton and Brown Valley carried away; the entire valley on the Dakota side of the Minnesota River covered to a depth of several feet.

— Mapleton, North Dakota on the 22<sup>nd</sup>, town completely submerged, loss of property very great.

— Yankton, South Dakota on the 8<sup>th</sup>, bottomlands for miles in every direction submerged, nearly 1,000 people have been rescued from farm houses and other buildings in this county alone; some people in their dwellings are still surrounded by ice walls of almost impenetrable character. On the 14<sup>th</sup>, in the district between Yankton and Vermillion, a distance of 23 miles, 2,500 people were suffering for the necessaries of life, and below Vermillion to Big Sioux 5,000 more were completely destitute; from the records of the Surveyor General's office, it has been ascertained that the flood on the Dakota side of the Missouri, covered over 227,000 acres.

- Pierre, South Dakota on the 8<sup>th</sup>, town completely underwater; the floods in this section and for miles on either side are unparalleled; the bottomlands for a width of over fifteen miles were overflowed, making a perfect inland sea.
- Big Stone City, South Dakota on the 23<sup>rd</sup>, Whetstone River overflowed, flooding the country for miles; Big Stone Lake 7 feet above high-water mark, highest ever known; all bridges gone and several miles of the *Hastings and Dakota* Railroad washed away.
- Union County, South Dakota on the 15<sup>th</sup>, water disappearing rapidly, leaving thousands of acres covered with huge cakes of Missouri ice, hay and straw stacks, wire fences, wrecked houses, and the debris of bridges.
- Civil Bend, South Dakota on the 15<sup>th</sup>, heavy river ice covered the fields for miles to the depth of 6 to 8 feet, rendering travel of any kind almost impossible; all sloughs filled with water and have to be crossed in skiffs; houses either wrecked by the ice or floated off by the water; hay, grain, fences, saw logs, lumber and cord wood, entirely swept away; loss of livestock very severe.
- Fargo, North Dakota on the April 23<sup>rd</sup>, Bed River rose four feet during the night, but could rise ten feet more without serious damage; at Williams' farm, 16 miles to the west, entire country flooded.
- Rockford, Illinois on the 20<sup>th</sup>, majority of town flooded, water in many cases flowing into the windows of dwellings; water 22 inches higher than the high-water mark of 1877; river two to three miles wide: loss of property in Kane County estimated at \$300,000; in the newspaper offices, men at work with a foot of water beneath them.
- Sterling, Illinois on the 20<sup>th</sup>, Rock River 12 feet above low-water mark and rapidly rising; lower part of city flooded; *Chicago and Northwestern* Railroad covered with water for five miles; river between Sterling and Erie overflowed, submerging the country for many miles; loss of property estimated at \$150,000.
- Milan, Illinois on the 20<sup>th</sup>, town partially submerged, bridge swept away; loss estimated at \$20,000.
- Chicago, Illinois on the 19<sup>th</sup>, Des Plaines River greatly swollen and pouring into the canal. On the 20<sup>th</sup>, canal broke its barriers, flooding all cellars and basements in the vicinity; flood spread considerably in southwestern part of city; several lumber yards inundated and all the docks on the south side were invisible; at 2 p.m., flood extended from Lincoln Street to the river, a distance of over two miles; canal filled with floating corn and hay, brought down the river from inundated farms in the surrounding country; water several inches higher than the flood of 1847, which was the highest point ever reached. On the 21<sup>st</sup>, flood increasing; only four cars of freight arrived during day; every railroad track that enters the city covered with water; several street bridges washed away.
- Elgin, Illinois on the 20<sup>th</sup>, Fox River overflowed, portion of city submerged. Two bridges and a dam were swept away; loss estimated at \$150,000. Bridges and dams at Carpentersville, Dundee, South Elgin, St. Charles and Geneva were carried away; loss estimated at \$200,000. The flood was so irresistible that buildings were swept down the stream like shingles. The *Milwaukee and St. Paul* Railroad Bridge was carried away, severing all communication westward for twelve days.
- Rock Island, Illinois on the April 15<sup>th</sup> at 11 a.m., three-fourths of the city underwater, general depth in business part of town 12 inches, while in the lower portions of town it was from three to four feet. Two hundred families were driven from their homes. At 11.45 a.m., [ice] gorge broke, water receding four feet in thirty minutes.
- Joliet, Illinois on the 20<sup>th</sup>, Des Plaines River highest ever known: lower portion of city flooded; damage to property estimated at \$50,000.
- Dixon, Illinois on the 19<sup>th</sup>, Rock River overflowed, much damage to property.
- Quincy, Illinois on the 20<sup>th</sup>, all lowlands above and below the city entirely inundated; river five miles wide; thousands of acres of farmlands overflowed; much loss of livestock, farm machinery and buildings.
- Venice, Illinois on the 25<sup>th</sup>, town entirely surrounded by water; people abandoning their houses.
- Madison, Illinois on the 25<sup>th</sup>, new levee broken; all farms on the American bottoms flooded; loss of livestock, farm buildings and implements very great.
- Fort Dodge, Iowa on the 25<sup>th</sup>, Des Moines River overflowed; rose 6 feet in 30 hours; families on lowlands abandoned their homes.
- Iowa Point, Iowa on the 30<sup>th</sup>, water up to the windows of the depot; every house flooded.
- Plum Hollow, Iowa on the 29<sup>th</sup>, great destruction of property and much suffering on the bottomlands throughout Fremont County; hundreds of families driven from their homes; flood unprecedented.
- Hamburg, Iowa on the April 29<sup>th</sup>, railroad track from Hamburg to Council Bluffs entirely washed away; all telegraph poles down; town flooded, houses abandoned.
- Sioux City, Iowa on the 8<sup>th</sup>, portion of city flooded to a depth of 4 to 6 feet. On the 21<sup>st</sup>, Big Sioux, Floyd, and other streams overflowed, causing great damage to wagon and railroad bridges. On the 29<sup>th</sup>, water rose 2 feet in past 24 hours; many families driven from their homes in the surrounding country by the overflow of creeks and small rivers.

- Lemars [Le Mars], Iowa on the 22<sup>nd</sup>, Floyd River overflowed; several bridges swept away together with 200 feet of railroad tracks.
- Des Moines, Iowa on the 22<sup>nd</sup>, river falling; debris of buildings and bridges floating by for several days.
- Council Bluffs, Iowa on the April 8<sup>th</sup>, all bottomlands about the city completely underwater and many families in the suburbs compelled to abandon their houses. On the 9<sup>th</sup>, water rising rapidly; nearly one-half of the city submerged to a depth of three feet; people rapidly deserting their homes; a broad and heavy stream coming in from a bend in the river north of the town swept down Broadway, the principal business street, carrying away a large amount of property; on the west side of the town the *Union Pacific* transfer depot, the bridges over Spoon Lake, together with the *Union* Stock Yards and numerous residences and railroad buildings, were inundated; all railroad communication has ceased; all transfers have to be made by boats, or by shoving flat cars through the water over the small bridges; several hundred loaded freight cars were entirely submerged. The *Kansas City, St. Joe and Council Bluffs* railroad, from the latter place to Pacific Junction, a distance of eighteen miles, was completely underwater. Ice was piling up fast all over the flooded section. On the 22<sup>nd</sup>, river rising at rate of one inch per hour; all bottomlands flooded to a depth of four to six feet; railroad tracks and the *Union* depot inundated. Water 17 inches higher than ever before known. On the 23<sup>rd</sup>, river now eight miles wide; over 500 houses in southern part of city surrounded by water; all communication with Omaha cut off. On the 29<sup>th</sup>, water 22 feet above low-water mark; 300,000 feet of lumber washed away during day by breaking away of the cofferdam.
- Burr Oak, Kansas on the 30<sup>th</sup>, town entirely flooded; water reaching to the eaves of many buildings; inhabitants floating about on rafts or buoys day and night.
- Elmwood, Kansas on the 30<sup>th</sup>, town submerged; inhabitants lost everything.
- Wathena, Kansas on the April 30<sup>th</sup>, town flooded; people passing about in skiffs or on rafts; houses abandoned.
- Belmont, Kansas on the 30<sup>th</sup>, all bottomlands underwater; town abandoned.
- George City, Kansas on the 30<sup>th</sup>, lower portion of city and the adjacent bottoms submerged; all railroad communication cut off; highest water ever known.
- Atchison, Kansas on the 25<sup>th</sup>, water 20 feet 8 inches above low-water mark; highest point ever reached. All houses on the east bank south of railroad track flooded; brick stack over 200 feet from the shore; all lowlands between the timber belt and town submerged; ice houses at Sugar Lake undermined and destroyed. On the 26<sup>th</sup>, East Atchison entirely surrounded with water; people leaving in boats for places of safety.
- Oak Mills, Kansas on the 29<sup>th</sup>, entire town swept away. A large island nearby upon which were gathered all the livestock of the neighborhood, was submerged, drowning the animals.
- Troy, Kansas on the 30<sup>th</sup>, all bottomlands overflowed: water highest ever known; town deserted.
- Leavenworth, Kansas on the 12<sup>th</sup>, river overflowed; all railroad travel suspended. On the 14<sup>th</sup>, river falling; 15<sup>th</sup>, railroad travel resumed; 22<sup>nd</sup>, water rising; railroad track again submerged; 23<sup>rd</sup> to 26<sup>th</sup>, river rising slowly; bottomlands overflowed and much property washed away. On the 27<sup>th</sup>, water 5 to 20 feet deep over the bottoms, with a width of over two miles; all buildings abandoned; several miles of railroad track washed away; river filled with debris of every description, showing that destruction of property upstream was immense. On the 28<sup>th</sup>, river rose rapidly all day, houses and barns carried away and much livestock along the Missouri river bottoms drowned; opposite city, bottoms from 3 to 10 feet underwater; over 100 families left destitute; town of east Leavenworth entirely abandoned and several houses floated away; river over three miles wide; highest water since 1844.
- Alpena, Michigan on the April 29<sup>th</sup>, Richardson's dam near mouth of Alpena River carried away by unprecedented high water; 500,000 feet of logs swept out into the bay.
- St. Paul, Minnesota on the 29<sup>th</sup>, water 19½ feet above low-water mark. West St. Paul entirely submerged; every house abandoned; water so deep that some of the houses only showed their gables above the flood; river full of debris of every description, coming down from the upper portions of the State; hundreds of cattle, horses and hogs drowned in the surrounding country. On the east side, flats above the city covered with water and the Sioux City shops and stockyards surrounded. The following are dates of highest water for many years past: June 1851; July and August 1852; April 1862; April 23<sup>rd</sup> 1866; April 19<sup>th</sup> and July 20<sup>th</sup> 1867; April 18<sup>th</sup> 1869; April 1<sup>st</sup> 1870. Loss to railroads and private property estimated at over \$100,000.
- Cassilton, Minnesota on the April 25<sup>th</sup>, Red Lake River overflowed, inundated the town; people abandoned their homes.
- Bell Plain, Minnesota on the 25<sup>th</sup>, bottomlands covered to a depth of five feet.
- Lenseur, Minnesota on the 25<sup>th</sup>, town partially underwater; wagon bridge carried away.
- Halleck, Minnesota on the 25<sup>th</sup>, all lowlands underwater; highest water ever known.
- Redwood Falls, Minnesota on the 22<sup>nd</sup>, Minnesota River highest since 1868; water fifteen feet above low-water mark; Ramsey creek 11 feet above low-water mark, highest since the floods of 1870; all dams and bridges in vicinity carried away.



- Le Sueur, Minnesota on the April 22<sup>nd</sup>, river covered the entire valley between the bluffs, water rising two inches per hour. On the 23<sup>rd</sup>, water rose 30 inches during the night. Henderson Bridge was carried away. Greatest flood ever experienced in this section.
- Mankato, Minnesota on the 23<sup>rd</sup>, lower portion of town flooded to a depth of several feet; West Mankato, Le Hillier and the city flats covered with water 2 to 5 feet deep; several hundred cords of wood carried away; Mineopa and Warren creeks overflowed, causing much damage in the vicinity; warehouses at Gardiner City, containing 7,000 bushels of wheat, swept away; all railroad tracks completely washed out.
- Marshall, Minnesota on the April 22<sup>nd</sup>, Redwood River overflowed; bottomlands underwater, and also the entire railroad tracks between Marshall and Amiret.
- Springfield, Minnesota on the 22<sup>nd</sup>, Cottonwood River overflowed; thousands of acres underwater; all communication cut off.
- Carver, Minnesota on the 22<sup>nd</sup>, river 10 feet above low-water mark; portion of the town underwater.
- Huron, Minnesota on the 22<sup>nd</sup>, James River overflowed; several buildings submerged to a depth of three feet.
- Sleepy Eye, Minnesota on the 22<sup>nd</sup>, surrounding country submerged; all railroad travel closed.
- Burns, Minnesota on the 22<sup>nd</sup>, Cottonwood River overflowed: railroad bridge and 80 feet of track carried away.
- St. Peter, Minnesota on the 22<sup>nd</sup>, river rising very rapidly, washing away over 700 feet of railroad track; river opposite town over a mile wide; largest portion of town flooded.
- Granite Falls, Minnesota on the April 25<sup>th</sup>, town entirely surrounded by water; all bridges carried away.
- Minnesota Falls, Minnesota on the 23<sup>rd</sup>, all the bottoms covered to depth of 4 to 6 feet; water highest ever known.
- St. James, Minnesota on the 22<sup>nd</sup>, Watonwan River overflowed; railroad bridges at Wadelia [Madelia] carried away; all railroad communication cut off.
- Shakopee, Minnesota on the 23<sup>rd</sup>, water 3½ feet above low-water mark, or 26 inches higher than ever before recorded, damage to property very great.
- Big Stone, Minnesota on the 28<sup>th</sup>, town flooded; railroad tracks washed away; highest water ever known.
- Sioux Falls, Minnesota on the April 22<sup>nd</sup>, three street bridges carried away; property of the Sioux Falls Water Power Company seriously damaged. On the 27<sup>th</sup>, several flouring mills carried away; every building in the town more or less damaged; loss estimated at \$140,000.
- Fergus Falls, Minnesota on the 25<sup>th</sup>, upper country one unbroken sheet of water for about 25 square miles.
- Ortonville, Minnesota on the 25<sup>th</sup>, bottomlands covered with 4 feet of water; highest flood ever experienced.
- Crookston, Minnesota on the April 25<sup>th</sup>, all the lowlands between Crookston and Glyndon overspread with ice, carried up by overflowing rivers and creeks; Red Lake River above its banks; wagon bridge carried away.
- Stevenson, Minnesota on the 25<sup>th</sup>, surrounding country covered with water; railroad tracks washed out; all communication closed.
- Montevideo, Minnesota on the 22<sup>nd</sup>, river higher than for many years. Water extends from bluff to bluff in a vast lake, varying in depth from 8 to 10 feet. In the lower portion of town, houses filled with 4 to 8 feet of water. The bridge across the Chippewa River was carried away. All communications were cut off. On the 23<sup>rd</sup>, water still rising rapidly; all of the bottomlands at the confluence of the Minnesota and Chippewa rivers one vast sea of water, covering many thousands of acres; many miles of railroad track washed away; all bridges on Dry Weather creek carried away.
- Craig, Missouri on the 25<sup>th</sup>, water three-feet deep in stores and houses; all business suspended; portion of town abandoned.
- Phelps City, Missouri on the 25<sup>th</sup>, town nearly submerged; inhabitants fled to the bluffs for safety; highest water and most destructive flood ever known.
- St. Joseph, Missouri on the April 25<sup>th</sup>, river 29 feet 9 inches above low-water mark, or 9 inches above the highest point ever reached. French bottoms, above city, flooded; people abandoned their houses. Opposite city all lands flooded; inhabitants fled to the hills for safety; railroad machine shops surrounded and all railroad tracks underwater.
- Hannibal, Missouri on the 21<sup>st</sup>, railway tracks on Front Street submerged; steamboat warehouses entirely surrounded. On the 25<sup>th</sup> at 3 a.m., Say levee broke at a point 1½ miles above East Hannibal, the break was 130 feet and still cutting; loss of ice about 28,000 tons; river over 19 feet above low-water mark and still rising.
- Forrest City, Missouri on the April 25<sup>th</sup>, levee built to protect town of Harlem and the broad bottomlands opposite city gave way during the night, flooding the bottomlands to a depth of 10 feet. In the town of Harlem only six houses were above the waterline, a large number of neighboring farms were 4 to 6 feet underwater. On the 29<sup>th</sup>, 7,000 people were driven from their houses. All the railroad tracks were underwater. Business was entirely suspended. Over 1,500 houses flooded and abandoned.
- St. Louis, Missouri on the 25<sup>th</sup>, Sny levee broke during the evening opening a crevasse 175 feet wide, flooding 40,000 acres of growing wheat. The estimated value of icehouses and ice destroyed was over \$100,000. About 40



miles of the *Keokuk and St. Louis* railroad was inundated. On the 28<sup>th</sup>, large portion of North St. Louis and Carondelet were submerged, all bottoms on the Missouri side were flooded, and situation on the Illinois side very deplorable. All buildings and railroad tracks between the stockyards and Venice were badly damaged, water several feet deep.

— Lexington, Missouri on the 29<sup>th</sup>, river 22 feet and 8 inches above low-water mark, highest since 1844. The Roy and Lafayette county bottoms submerged and rapidly depopulated; thousands of horses, cattle and hogs perished, water seven feet deep in many of the houses.

— Oregon, Missouri on the 24<sup>th</sup>, all the bottomlands flooded, about 3,000 people in Holt County rendered homeless. The river reached its highest point on the 27<sup>th</sup>, higher than ever before experienced, not excepting the great flood of 1844.

— Covington, Nebraska on the April 8<sup>th</sup>, town completely submerged and entirely abandoned by its inhabitants.

— Brownville, Nebraska on the 25<sup>th</sup>, town partly underwater, all business suspended.

— White Cloud, Nebraska on the 26<sup>th</sup>, river highest ever known, railroad tracks washed out, several buildings under water.

— Doniphan, Nebraska on the 26<sup>th</sup>, water highest since the flood of 1844. All the lowlands underwater, great loss to railroad and other property.

— Nebraska City, Nebraska on the 20<sup>th</sup>, the river was 10 miles wide. It is estimated that about 10,000 head of cattle perished along the bottomlands.

— Jackson, Nebraska on the 7<sup>th</sup>, entire portion of state between Jackson and Covington submerged, all communication cut off, loss of property without precedent; no such flood since the settlement of the country.

— Plattsmouth, Nebraska on the 23<sup>rd</sup>, all bottomlands underwater to a depth of six to eight feet, farmers on Iowa side have abandoned their houses and report heavy losses of cattle.

— Pacific Junction, Nebraska on the 23<sup>rd</sup>, town submerged to a depth of four to eight feet; great suffering and loss of property.

— Omaha, Nebraska on the April 8<sup>th</sup>, river 21 feet above low-water mark, highest ever known here and 2½ feet higher than the April flood of 1875 or the June flood of 1867; everything on the levee submerged and the lowlands on the east side of the river flooded for miles; river three miles wide opposite the city and filled to a considerable extent with floating ice; twelve of the largest buildings of the *Union Pacific* Railroad Company's shops were flooded to a depth of six to twelve inches and 1,300 men temporarily thrown out of employment. On the 9<sup>th</sup>, river opposite city increased to a width of six miles; damage to property immense. On the 20<sup>th</sup>, water 20 feet above low-water mark; all the bottoms again submerged; railroad business entirely suspended, shops and depots flooded. On the 22<sup>nd</sup>, water 22 feet 10 inches above low water mark and rising at the rate of one inch per hour; all railroad connections severed; Union stockyards flooded; 300,000 feet of lumber carried away; Elkhorn River overflowed, railroad partially carried away. On the 23<sup>rd</sup>, at 2 p.m., river 23 feet and 4 inches above low-water mark, or 16 inches higher than ever before recorded; all passengers going east compelled to pass to the local depots in boats; \$30,000 worth of lumber carried away. On the 24<sup>th</sup>, water 4 feet higher than the flood of 1867; current very rapid; all railroad tracks washed away. On the 29<sup>th</sup>, water still rising; 50,000 feet of lumber carried away; the *Union Pacific* Railroad shops, smelting works, Willow Springs distillery and several large warehouses were flooded.

— Huntsville, Texas on the 22<sup>nd</sup>, heaviest storm of rain ever known here; surrounding country flooded; all bridges carried away; crops seriously damaged.

— Beloit, Wisconsin on the 20<sup>th</sup>, town partially inundated; great loss to mill property.

— Fort Atkinson, Wisconsin on the 20<sup>th</sup>, all the lowlands flooded; ice came down in huge masses, crushing bridges, dams and every obstacle in its path; water rose to within a few inches of the top piers of the city bridge; highest ever known.

— Milwaukee, Wisconsin on the April 21<sup>st</sup>, flood highest and most destructive ever known here; basements along the docks and several lumberyards and tanneries submerged. At West Bend, Thevisville, Newburg and other neighboring places all dams and bridges gone.

On 15 July 1881, the temperature in the shade at Camden-Square in London, *England* reached a peak of 94.6° F (34.8° C).<sup>97</sup>

On 16 July 1881, a tornado struck Bradford County, Pennsylvania in the *United States*. July was an exceedingly hot month and the weather continued notably warm without rain through August and September. On July 10 and August 5, local thermometers stood at 102° F [39° C]. The drought prevailed from the first week in July until the 13<sup>th</sup> of October. It was widespread and extended over several states,

causing much damage and suffering. Corn and buckwheat especially were ruined. Wells, springs and creeks dried up and there was virtually a water famine. The water level in the Susquehanna River was the lowest in 41 years. Forest fires did much damage.<sup>178</sup>

In August 1881, significant rainfalls produced floods in Cheshire and Lancashire, *England*.<sup>90</sup>

On 27 August 1881, a storm of great strength moved northwest to the coast near Savannah, Georgia in the *United States*, causing extensive destruction of property and loss of life.<sup>119, 120</sup>

On 27 August 1881, a hurricane struck Georgia and South Carolina in the *United States* causing approximately 700 deaths.<sup>141</sup>

On 28 August 1881, a hurricane struck South Carolina in the *United States*.<sup>117</sup>

On 23-28 August 1881, a storm [hurricane] entered the *United States* near Savannah, Georgia and followed a very unusual course to the northwestward to Minnesota. The loss of life and damage to property in Charleston, South Carolina; Tybee Island, Georgia; and along the adjacent coast was very great. About four hundred persons lost their lives, and hundreds of houses were totally destroyed. The loss of property was estimated at over one and one-half million of dollars. [In present currency, that would be equivalent to \$33 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>120</sup>

In October 1881, there were great inundations caused by rains in southeast *Europe*.<sup>90</sup>

On 8 October 1881 a typhoon struck Haiphong, *Vietnam* and several cities in *China*. Approximately 300,000 people perished.<sup>197</sup>

On 8 October 1881, a typhoon struck Haifong [Hai Phong, *Vietnam*], about 300,000 people perished.<sup>90</sup>

In 1881, a powerful cyclone struck Haiphong on the northeast coast of *Vietnam* causing 300,000 deaths.<sup>98</sup>

On 14 October 1881 the maximum temperature measured at the Central Vermont Railroad station [in Northfield, Massachusetts] in the *United States* was 92° F.<sup>138</sup>

On 14-19 October 1881, a violent hurricane struck *England*. There was great destruction of life and property. Houses were thrown down or unroofed. Large trees were torn up by the roots. Telegraph wires and poles were blown down. There were about 130 wrecks of which 105 were British.<sup>90</sup>

On 19-20 October 1881, a storm on the south and west coasts of *England* caused many wrecks with much loss of life.<sup>90</sup>

On 26-27 November 1881, there was great destruction of life and property [in *Great Britain*] by gales.<sup>90</sup>

On 27 November 1881, the lighthouse, Calf Rock, in Bantry Bay, *Ireland* was destroyed.<sup>90</sup>

On 17-21 December 1881, destructive gales struck *England*. There were many wrecks and loss of life by sea and land.<sup>90</sup>

*Also refer to the section 1880 A.D. – 1886 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1881 / 1882 A.D.** The following are the lowest temperatures observed in January 1882 in the *United States and Canada:*<sup>75</sup>

St. Vincent, Minnesota	(-42° F, -41.1° C)
Fort Pembina, Dakota Territory	(-40° F, -40.0° C)
Saranac Lake, New York	(-40° F, -40.0° C)
Mount Washington, New Hampshire	(-39° F, -39.4° C)
Parry Sound, Canada	(-38° F, -38.9° C)
Fort Keogh, Montana	(-37° F, -38.3° C)
Terry's Landing, Montana	(-36° F, -37.8° C)
Saratoga, New York	(-36° F, -37.8° C)
Whitehall, New York	(-35° F, -37.2° C)
Fort Brady, Michigan	(-34° F, -36.7° C)
Halleck, Nevada	(-34° F, -36.7° C)
Norwich, New York	(-33° F, -36.1° C)
Fort Stevenson, Dakota Territory	(-32° F, -35.6° C)
Fort Missoula, Montana	(-31° F, -35.0° C)
Eagle Rock, Idaho	(-30° F, -34.4° C)
Halleck, Nevada	(-30° F, -34.4° C)
Wells, Nevada	(-30° F, -34.4° C)
Lunenburg, Vermont	(-29° F, -33.9° C)
St. Johns, New Brunswick, Canada	(-28° F, -33.3° C)
Alpena, Michigan	(-27° F, -32.8° C)
Cooperstown & Johnstown, New York	(-27° F, -32.8° C)
Gardiner, Maine	(-27° F, -32.8° C)
Carline, Nevada	(-27° F, -32.8° C)
Quebec, Canada	(-26° F, -32.2° C)
Montreal, Canada	(-26° F, -32.2° C)
Glen's Falls, New York	(-26° F, -32.2° C)
Burlington, Vermont	(-25° F, -31.7° C)
Elko, Nevada	(-25° F, -31.7° C)
Lake George, New York	(-25° F, -31.7° C)
Plattsburgh, New York	(-25° F, -31.7° C)
Ticonderoga, New York	(-25° F, -31.7° C)
Coalville, Utah	(-25° F, -31.7° C)
Burlington, Vermont	(-24.8° F, -31.6° C) coldest day since 1857
Keeseville, New York	(-24° F, -31.1° C)
South Lee, Massachusetts	(-24° F, -31.1° C)
Portsmouth, New Hampshire	(-24° F, -31.1° C)
Grafton, New Hampshire	(-22° F, -30.0° C)
Pike's Peak, Colorado	(-22° F, -30.0° C)
Fort Bridger, Wyoming	(-22° F, -30.0° C)
Port Henry, New York	(-22° F, -30.0° C)
Embarrass & Neillsville, Wisconsin	(-20° F, -28.9° C)
Blooming Grove, Pennsylvania	(-19° F, -28.3° C)
Kingston, Canada	(-19° F, -28.3° C)
Toronto, Canada	(-18° F, -27.8° C)
Cresco, Iowa	(-17° F, -27.2° C)
Saugeen, Canada	(-16° F, -26.7° C)
Anticosti, Canada	(-16° F, -26.7° C)
Fort Wallace, Kansas	(-15° F, -26.1° C)
Contoocookville, New Hampshire	(-15° F, -26.1° C)
Eastport, Maine	(-14° F, -25.6° C)
Southington, Connecticut	(-14° F, -25.6° C)
Albany, New York	(-14° F, -25.6° C)
Boston, Massachusetts	(-13° F, -25.0° C)
New Haven, Connecticut	(-12° F, -24.4° C)

Cheyenne, Wyoming	(-12° F, -24.4° C)
La Crosse, Wisconsin	(-11° F, -23.9° C)
Fort Union, New Mexico	(-11° F, -23.9° C)
Port Stanley, Canada	(-10° F, -23.3° C)
Newport, Rhode Island	( -8° F, -22.2° C)
Deer Park, Maryland	( -8° F, -22.2° C)
North Platte, Nebraska	( -8° F, -22.2° C)
Colfax, Washington Territory	( -8° F, -22.2° C)
Prescott, Arizona	( -8° F, -22.2° C)
Elmira & Morrison, Illinois	( -7° F, -21.7° C)
Rochester, New York	( -7° F, -21.7° C)
Fort Supply, Indian Territory	( -6° F, -21.1° C)
Newport, Rhode Island	( -6° F, -21.1° C)
Dubuque, Iowa	( -5° F, -20.6° C)
Oregon, Missouri	( -4° F, -20.0° C)
South Orange, New Jersey	( -4° F, -20.0° C)
Winnemucca, Nevada	( -4° F, -20.0° C)
Erie, Pennsylvania	( -2° F, -18.9° C)
Barnegat, New Jersey	( -1° F, -18.3° C)
Dodge City, Kansas	( 0° F, -17.8° C)
Hudson, Ohio	( 0° F, -17.8° C)
Salt Lake City, Utah	( 0° F, -17.8° C)
Summit, California	( 1° F, -17.2° C)
Denver, Colorado	( 1° F, -17.2° C)
Lafayette, Indiana	( 1° F, -17.2° C)
Chicago, Illinois	( 1° F, -17.2° C)
Cleveland, Ohio	( 2° F, -16.7° C)
Umatilla, Oregon	( 4° F, -15.6° C)
Fort Elliott, Texas	( 4° F, -15.6° C)
Weldon, North Carolina	( 5° F, -15.0° C)
Saint Louis & Springfield, Missouri	( 6° F, -14.4° C)
Baltimore, Maryland	( 7° F, -13.9° C)
Indianapolis, Indiana	( 7° F, -13.9° C)
Santa Fe, New Mexico	( 7° F, -13.9° C)
Campo, California	( 7° F, -13.9° C)
Washington, D.C.	( 8° F, -13.3° C)
Chincoteague, Virginia	( 8° F, -13.3° C)
Flemington, West Virginia	( 8° F, -13.3° C)
Morgantown, West Virginia	( 9° F, -12.8° C)
Breakwater, Delaware	(10° F, -12.2° C)
Mount Ida, Arkansas	(15° F, -9.4° C)
Ashwood, Tennessee	(16° F, -8.9° C)
Louisville, Kentucky	(16° F, -8.9° C)
Charlotte, North Carolina	(16° F, -8.9° C)
Bowling Green, Kentucky	(18° F, -7.8° C)
Knoxville, Tennessee	(18° F, -7.8° C)
Aiken, South Carolina	(21° F, -6.3° C)
Augusta, Georgia	(22° F, -5.6° C)
Fort Barrancas, Florida	(22° F, -5.6° C)
Thornville, Georgia	(24° F, -4.4° C)
Montgomery, Alabama	(24° F, -4.4° C)
Little Rock, Arkansas	(24° F, -4.4° C)
Charleston, South Carolina	(26° F, -3.3° C)
Fayette, Mississippi	(28° F, -2.2° C)
Shreveport, Louisiana	(30° F, -1.1° C)
Vicksburg, Mississippi	(30° F, -1.1° C)

Jacksonville &amp; Pensacola, Florida

( 32° F, 0.0° C)

The depth that rivers and lakes froze in January 1882 in the *United States*:<sup>75</sup>

- \* At Le Claire, Iowa, ice on *Mississippi River* frozen over opposite city and 10 inches thick at the head of the upper rapids on January 16<sup>th</sup>.
- \* At Dubuque, Iowa, the *Mississippi River* frozen over; teams [of wagons] crossing on the ice on the 18<sup>th</sup>.
- \* At La Crosse, Wisconsin and St. Paul, Minnesota, the *Mississippi River* frozen over during the month.
- \* At Yankton, South Dakota and Omaha, Nebraska, the *Missouri River* frozen over during the month.
- \* At Clay Centre, Kansas, the *Republican River* frozen over on the 28<sup>th</sup>, ice eight inches thick.
- \* At Marysville, California, the *Yuba River* on the 13<sup>th</sup> full of floating ice; coldest weather for years.
- \* At Madison, Wisconsin, *Forest Lake* frozen over on the 2<sup>nd</sup>.
- \* At Terry's Landing (Terry, Montana), the *Yellowstone River* closed by ice on the 13<sup>th</sup>.
- \* At Fort Keogh, Montana, the *Yellowstone River* frozen over on the 5<sup>th</sup>.
- \* At Fort Custer, Montana, the *Big Horn River* closed by ice on the 9<sup>th</sup>.
- \* At Charleston, Illinois, the *Embarrass River* was frozen over on the 5<sup>th</sup>; on the 24<sup>th</sup> the ice was 3-5 inches thick.
- \* At Rockford, Illinois, the *Rock River* was frozen solid on the 1<sup>st</sup>.
- \* At Fort Brady, Michigan, the *Sault St. Marie River* was frozen over on the 3<sup>rd</sup>.
- \* At Madison Barracks, New York, *Lake Ontario* bay was frozen over on the 2<sup>nd</sup>.
- \* At Buffalo, New York, the *Niagara River* was frozen over on the 4<sup>th</sup>.
- \* At Port Huron, Michigan, an ice bridge formed across *Lake Huron* Bay from Fort Gratiot Lighthouse to Point Edwards on the 24<sup>th</sup>.
- \* At Alpena, Michigan, Thunder Bay on *Lake Huron* was frozen over on the 1<sup>st</sup>; navigation closed.
- \* At Grand Haven, Michigan, the *Grand River* was frozen over on the 4<sup>th</sup>.
- \* At Duluth, Minnesota, *Lake Superior* was frozen over 600 feet from the docks on the 10<sup>th</sup>.
- \* At Red Bank, New Jersey, the *North Shrewsbury River* was frozen over.
- \* At Peekskill, New York, the *Hudson River* frozen solid for many miles northward. "Ice cutting very active everywhere north of Catskill". [Ice was cut during the winter for refrigeration during the summer months.]
- \* At Poughkeepsie, New York, on the *Hudson River*, a steamer, *Daniel S. Miller*, bound for New York, became fast in the ice on the 24<sup>th</sup> off Cold Spring in the Highlands.
- \* In New York City, navigation on the *North Hudson River* was closed on January 4<sup>th</sup> due to the ice. [This is rather later than normal. During the previous 100 years, navigation on the river continued later than December only eleven times.]
- \* At Chincoteague Island, Virginia, the *Chincoteague Bay* was partially frozen over and navigation was obstructed on the 24<sup>th</sup>.
- \* At Cape Lookout, North Carolina, the *Core Sound* was frozen over on the 22<sup>nd</sup>.
- \* At Chicago, Illinois on the 3<sup>rd</sup> and Milwaukee, Wisconsin on the 5<sup>th</sup>, *Lake Michigan* was frozen.
- \* At Port Huron, Michigan, the *Black River* was frozen over on the 1<sup>st</sup> and the ice was 7 inches thick on the 17<sup>th</sup>.
- \* At Toledo, Ohio, the *Maumee River* was frozen over on the 2<sup>nd</sup>.
- \* At Cleveland, Ohio, the *Cuyahoga River* was frozen over on the 2<sup>nd</sup> and *Lake Erie* on the 4<sup>th</sup> was full of ice as far as the eye could reach.
- \* At Erie, Pennsylvania, ice formed in the harbor of *Lake Erie* to a depth of 8 inches on the 1<sup>st</sup>.
- \* At Burlington, Vermont, *Lake Champlain* was frozen between the docks on the 5<sup>th</sup> and navigation was closed on the 23<sup>rd</sup>.
- \* At Sandusky, Ohio, the *Sandusky Bay* was frozen over during the night of the 1<sup>st</sup> and navigation was suspended.
- \* At Bangor, Maine, the *Penobscot River* was closed for navigation on the 2<sup>nd</sup>.
- \* At New Haven, Connecticut, the *Quinnipiac River* and the harbor was frozen over on the 4<sup>th</sup>. On the same day, the *Connecticut River* was closed for navigation. [This is rather later than normal. Over the previous 40 years, the river was always closed earlier in the winter season.] The steamer *Granite State* from New York to Hartford caught in the ice at Lynn.

The winter of 1881-82 in Bradford County, Pennsylvania in the *United States* was warm and open with little snow and only a short run of sleighing during the beginning of February. There was a flurry of snow on the 4<sup>th</sup> of November but the weather soon became warm and December was remarkably summer-like. During the second week in January, the weather turned cold and there was a snowstorm on the 19<sup>th</sup>. The coldest day was 24 January when the temperature dropped to -10° F [-23° C]. On 4 & 5 February, snow

fell to the depth of 8 inches [20 cm], the heaviest fall of the season. Sleighing was of short duration. February was a month of unusual mildness. Most of March was warm while April presented all sorts of weather with snow squalls.<sup>178</sup>

On 12 & 13 January 1882, a snowstorm struck Southern California in the *United States*. At San Geronimo, California on the 12<sup>th</sup>, there was a remarkable fall of snow in the surrounding country. From San Bernardino eastward to the edge of the desert and from San Diego southward, snow fell to a depth of 4 to 15 inches. [Colton, California recorded 10 inches of snow in January.] There is no record of any such storm in former years, but some of the old Mexican inhabitants speak of a similar storm as occurring some 50 years ago. The storm was unusual because it came from the east and was accompanied by a violent gale. In Los Angeles on the 13<sup>th</sup>, the hills all about the city were white with snow. In the San Geronimo Pass, two special freight trains were blocked by the snow. The cuts in the Pass were filled to a depth of from six to eight feet with drifted snow. [San Geronimo, California received a total of 16.5 inches of snow in January. At San Geronimo the minimum temperature was 19° F (-7.2° C) on the 12<sup>th</sup>.] At Riverside, California on the 13<sup>th</sup>, snow was 5 inches and still falling; good sleighing in the orange groves. In Tucson, Arizona on the 12<sup>th</sup>, there was very heavy snowfall during the night in the desert and on the 13<sup>th</sup>, a fierce snowstorm raged in the mountains. In Campo, California on the 12<sup>th</sup>, the minimum temperature was 6.5° F (-14.2° C). On the 13<sup>th</sup>, snow fell to a depth of 20 inches and “all communications with the outside world cut off.” On the 15<sup>th</sup>, there was nearly 3 feet of snow on the ground with drifts 8 feet deep. It was the most remarkable storm ever known at Campo. Hundreds of birds were killed by exposure and livestock suffered severely. On the 16<sup>th</sup>, all communications still cut off. On the 18<sup>th</sup>, snow slowly disappearing and reports from the surrounding country show great losses in livestock. The roads were still impassable.<sup>75</sup>

In San Diego, California, the storm, which began on the 12<sup>th</sup>, was the most remarkable storm since 1847. It continued for 38 hours and gave the largest rainfall of any one storm in the month of January. [As of the 13<sup>th</sup>, the rainfall was 3.02 inches.] It was also the coldest storm on record. On the morning of the 14<sup>th</sup>, snowflakes were observed but they melted as fast as they fell. Accompanying this storm, snow varying in depth from two to five inches was reported from the low hills at El Cajon, Poway, Bernardo, and other points within 15 to 25 miles of the station, “where such a thing was never before experienced.”<sup>75</sup>

The storm as it passed over Ventura County, California on the 12<sup>th</sup>, produced a very violent windstorm. It is said a tornado occurred in Ojai valley, destroying houses and barns and uprooting and breaking the strongest trees. At Wilmington [Los Angeles], California on the 12<sup>th</sup>, there was a most terrible storm for many years, accompanied by a blinding fall of snow and sleet; several vessels dragged anchor in the harbor, and one of them became a total wreck. At San Buenaventura [Ventura], California, the weather was extremely cold: lambs and sheep dying from exposure.<sup>75</sup>

Several snowstorms struck *North America* during February 1882. At St. Paul, Minnesota, snowstorms on the 20<sup>th</sup> and 21<sup>st</sup> dumped nearly two feet of snow and because of the winds, the snow was badly drifted. All trains delayed because of snow blockades. In Montreal, Canada on the 22<sup>nd</sup>, the streets were blockaded by 4 feet of snow. In Carbondale, Pennsylvania on the 4<sup>th</sup> the snowstorm dropped 36 inches on the level. In Springfield, Massachusetts, the snowstorm was the heaviest since 1854. On 1 February in Massachusetts, the snowfall at Springfield was 22 inches on the level; at Stockbridge 22 inches; at Boston 18 inches; at Gloucester 18 inches; at South Framingham 20 inches; and at Lowell 18 inches on the level. At St. John in New Brunswick, Canada on February 10, there was a heavy snowstorm accompanied by violent winds from the northeast. All trains on the St. John and Maine Railroads were blockaded and tremendous drifts formed on the Inter-Colonial Railroad. The railroad car shed of the latter railway company was demolished by the heavy weight of the snow; loss estimated at \$75,000 [approximately \$1.7 million in present dollars using the Consumer Price Index (CPI)].<sup>75</sup>



During the winter of 1881-82, Lake Constance at the *Switzerland/Germany/Austria* border froze over on 6 February. In *Italy*, the winter was very severe. In Venice, water froze in the cisterns causing a scarcity of drinking water. In Naples, Italy, frost and snow prevailed.<sup>75</sup>

During the winter of 1881-82, news from *Iceland* states that the Spitzbergen floe-ice surrounds the north and east coasts, entirely preventing navigation. Owing to the presence of these immense ice fields, vegetation has made no progress, causing a great loss of horses and sheep through starvation. Epidemics of measles and smallpox have been introduced into the island from Europe, and are making extensive ravages among the population, especially at Rejkjavik.<sup>75</sup>

An article by Mr. E. Douglas Archibald was published in *Nature*. He suggested that an abundance of icebergs in the lower latitudes of the *North Atlantic*, tend to be associated with the solar maximum of the sunspot cycle.

Years of the Greatest Frequency of Floating Ice	Sunspot Cycle (corrected)
1789	Solar Cycle 4 / Solar Maximum 1787
1816-1818	Solar Cycle 6 / Solar Maximum 1816
1828-1829, 1831	Solar Cycle 7 / Solar Maximum 1830
1862-1864	Solar Cycle 10 / Solar Maximum 1860
1868-1869	Solar Cycle 11 / Solar Maximum 1870

In 1862, Heis's 'Wochenschrift' noted that floating ice masses in the Atlantic causes a noticeable cooling of weather in June over *Europe*.<sup>75</sup>

**1882 A.D.** Severe gales produced much destruction in *England* and *Scotland* on 6 January and 29 April 1882.<sup>90</sup>

On 16-17 January 1882, a severe cyclone struck Darwin, *Australia*.<sup>101</sup>

On 17 January 1882, a cyclone struck Darwin in the Northern Territory of *Australia*. The gale caused severe damage to buildings in the city.<sup>99</sup>

Indiana in the *United States* experienced great floods during February 1882. At New Albany, Indiana, the greatest flood on the Ohio River occurred in 1832, which set the high water mark. (The flood of 1847 was two feet below this mark. The flood of 1867 was 4 ½ feet below the high water mark. The flood of 1882 was close to the 1867 flood level. The flood of 1869 was 5 feet below the high water mark.) At New Albany on the 21<sup>st</sup>, 600 homes were under water. Portions of the city along the riverfront flooded for a distance of 2 miles. All manufacturing establishments were closed. Over 100 feet of the trestlework of the Air Line Railroad was washed away. On the opposite shore of the Ohio River at Louisville, Kentucky, several portions of the city were under floodwater 4-6 feet deep. Most of the distilleries were compelled to close and many factories were surrounded by water. At Madison, Indiana on the 19<sup>th</sup>, the starch factory, saw mills, shipyards, cooper shops and cellars on Ohio Street and the railroad depot were flooded with the water still rising. By the 21<sup>st</sup>, nearly a 1,000 people were thrown out of employment as manufacturers and residences flooded. At Aurora, Indiana on the 21<sup>st</sup>, the water was 4-6 feet deep on many streets and people were compelled to move to the second story of their homes. At Lawrenceburg on the 21<sup>st</sup>, all communications with the town was cut off. Almost the entire city was a sea of muddy water. Railroads were all washed out, highways submerged and no steamer could affect a landing. About 3,000 people were homeless. The water attained a depth of 12 feet in the streets and rushed through with a terrible force. Horses, cattle and hogs were left to their fate and soon the rushing torrents covered their bodies. The Kentucky shore opposite Evansville, Indiana, was entirely submerged to the tops of trees. In Terre Haute, Indiana, the Wabash River flooded. The railroads were badly damaged and all communications suspended.<sup>75</sup>

The flooding in the *United States* in February 1882 was fairly widespread. The flooding even extended into Ontario, Quebec and Montreal, *Canada*. At Greenville, Mississippi a levee broke flooding the surrounding country. Damage to the levee is estimated at \$500,000 [approximately \$11 million in present dollars using the Consumer Price Index (CPI)]. At St. Louis, Missouri, about 500,000 feet of lumber were carried off by the floodwaters. In New York, the heavy rains caused landslides. At Thurman, New York, 400 feet of railroad track was covered and at Hadley, New York, 100 feet of railroad track was covered. Throughout the United States, scores of bridges, homes, business, farms, roads, telegraph poles & wires, and railroad tracks were washed away. In Tennessee, the floods endangered 30,000 individuals and resulted in the loss of one million bales of cotton, the loss of 30,000 head of livestock and 50 human lives.<sup>75</sup>

The flooding in the *United States* continued into March 1882 in the central Mississippi and Ohio valleys and in Tennessee. The Mississippi River ranged from 10 to 20 miles in width from Cairo, Illinois to New Orleans, Louisiana. Clarendon, Arkansas, reported that the backwaters from the Mississippi River extended to a distance of 135 miles, and that the entire countryside was underwater. The river was 2 feet higher than ever known before. In Louisiana, the overflow in Concordia Parish extends from the Black to the Mississippi Rivers (35 miles); in Tensas Parish it extends from the Tensas River and Bayou Macon to the Mississippi River (30 miles); in Franklin Parish it extends from the Tensas to the Ouachita Rivers (10 miles), in Madison Parish it extends from Bayou Macon to the Mississippi River (35 miles), and in East Carroll Parish it extends from Bayou Macon to the Mississippi River (10 miles). Following the course of the river from Vicksburg to Coldwater, is about 450 miles. The entire country contiguous is swampland. In width it is probably 60 miles and is known as the Yazoo Delta. It is bounded on the east by hills and on the west by the Mississippi River. During this flood the entire lowlands were submerged, with the exception of a few knolls or Indian mounds where livestock and people gathered to flee the flood. Tributary streams (Coldwater, Tallahatchie, Yazoo, Sunflower, Big and Little Deer Creek) were swollen beyond memory. Even though the loss of life from the flood was not large; the loss of cattle, livestock, provisions, and agricultural implements was great beyond comparison. In Arkansas, families are huddled together like animals praying<sup>75</sup> for food. They cling to rafts, scaffolds and logs. For a distance of 300 miles, no land is to be seen.

Early in March 1882, the Mississippi River in the *United States* flooded. About 85,000 persons were made homeless through floods in the lower Mississippi valley.<sup>97</sup>

During early March 1882 in Bradford County, Pennsylvania in the *United States*, a freshet on Wyalusing Creek caused considerable damage to bridges and dams. On 26 June 1882, a furious wind and hailstorm passed over the southeastern portion of Bradford County. The storm uprooted trees, unroofed buildings and destroyed crops. Hailstones fell the size of a hen's egg. The storm was most severe around Lime Hill, Camptown, Merryall and Spring Hill.<sup>178</sup>

On 26 March 1882, a hailstorm struck 20 miles north of Corning, Missouri in the *United States*. The hailstones drifted to a depth of 3 ½ feet [1.1 meters] in some places. On 5 May, a hailstorm struck St. Louis, Missouri. Some of the hailstones were the size of hen's eggs but the largest were the size of baseballs. On 8 June, a hailstorm struck Laredo, Texas. Some of the hailstones weighed one pound and they drifted to a depth of 6 inches. On 16 June 1882, in Dubuque, Iowa in the *United States*, for thirteen minutes, commencing at 2:54 p.m., the largest and most destructive hailstones fell that were ever seen at this place. The hailstones measured from one to seventeen inches in circumference; the largest weighing one pound twelve ounces. Washington Park was literally covered with hailstones as large as lemons, and large basketfuls could be gathered in a few minutes. They exhibited diverse and peculiar formations, some being covered with knobs and icicles half an inch in length; others were surrounded by rings of different colored ice with gravel and blades of grass imbedded within them. The foreman of the Novelty

Iron Works, of this city, stated that in two large hailstones, melted by him, were found small living frogs. [Although this account may sound implausible, consider the fact that hailstorms are often paired with very energetic tornadoes.] A number of persons were severely cut and bruised by the falling hailstones. The damage inflicted is estimated at \$5,000 [equivalent to \$110,000 in today's dollars]. One florist lost 2,387 panes of glass. Hundreds of windows of south and west exposure were broken, including twenty windows of heavy French plate glass.<sup>75</sup>

Due the late heavy rains, on 26 April 1882, the main sewer of Saint Louis, Missouri drainage system suddenly gave way. Fifteen blocks of houses were flooded almost immediately. Many of the occupants had to be rescued by boat. The damage was estimated between \$250,000 and \$500,000 [approximately \$5.5 million to \$11 million in present dollars using the Consumer Price Index (CPI)].<sup>75</sup>

On 10 May 1882, a tornado struck McAlester, Indian Territory [now McAlester, Oklahoma] in the *United States*. Approximately 125 lives were lost and \$500,000 in property damage was sustained. [In present currency, that would be equivalent to \$13.6 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>197</sup>

In May 1882, excessive rain in the western Gulf States in the *United States* caused disastrous floods, especially in the state of Arkansas. At Jacksonport, Arkansas, the overflow caused the town to be completely submerged. People fled to the upper stories of storehouses. The whole country for miles around being a sea of water. In Batesville, Arkansas on May 12<sup>th</sup>, during a heavy rainstorm, which continued in torrents for 24 hours, the rivers and creeks rose to an unusual height. Mills, houses, bridges, and fences were washed away, and not only the crops but in many cases, the soil is gone, leaving only a bare clay surface. The damage to property in the valley of the White River is estimated at \$500,000 [approximately \$11 million in present dollars using the Consumer Price Index (CPI)]. Floods were also reported in southern Illinois, southern Indiana, Kentucky, Tennessee (where at Memphis 600,000 - 1,000,000 feet of logs were carried out of the Wolf River), Louisiana, Mississippi, Texas, Minnesota and Iowa.<sup>75</sup>

On 19 April 1882, a tornado struck Brownsville, Mississippi in the *United States* completely destroying a large part of the town. Eleven persons were killed and 150 injured. Over 50 houses in the heart of town were demolished. At Monticello, Mississippi, the entire town was destroyed by a tornado. Only 3 houses on the outskirts of town remained standing. Ten persons were killed instantly. Out of a population of 150, very few escaped without injury. During the night of 8 May at McAllister, a mining settlement in the Indian Territory, a violent tornado destroyed the entire place. Fifty-nine houses were totally demolished and twenty-seven damaged, twenty-one people were killed and forty-two wounded. Also in May, a tornado struck South Fork, Arkansas. It lifted and carried away the town's post office. Hundreds of sheep, hogs, horses and cattle were lost or killed. \$5,000 in silver and currency were scattered to the winds and lost. One hundred families were rendered homeless and without shelter. Damage estimated at \$150,000 [approximately \$3.3 million in present dollars using the Consumer Price Index (CPI)].<sup>75</sup>

The year 1882 produced other powerful tornados in the *United States*. The town of Grinnell, Iowa, was destroyed, with a loss of \$1,000,000 in property and 100 lives. [In present currency, that would be equivalent to \$27 million in damages based on the Consumer Price Index (CPI) inflation rates.] Just seven days later Emmetsburg, Iowa, was blotted off the map, with a loss approximately equal to that at Grinnell.<sup>197</sup>

On 17 June 1882, a tornado first observed in Jefferson, in Green County, Iowa in the *United States* and then travelled 200 miles to Grinnell, Iowa. Along its path, it struck several towns including Malcolm, Brooklyn and Mount Pleasant. The damage to property and crops in the towns and vicinity is estimated at \$500,000 [approximately \$11 million in present dollars using the Consumer Price Index (CPI)]. This

tornado then struck Grinnell where it destroyed or damaged 140 houses, killed 60 and seriously injured about 150 people. The loss of property in Grinnell was estimated at \$600,000 [approximately \$13 million in present dollars using the Consumer Price Index (CPI)]. This tornado also leveled to the ground a three-story building at Iowa College and wrecked a train consisting of an engine and 21 cars.<sup>75</sup>

The weather was cold almost across the entire *United States* in May and many areas sustained damaging frosts. These frosts destroyed crops and fruit trees. During May, snow fell in many states including New Hampshire, Vermont, Massachusetts, Pennsylvania, Michigan, Illinois, Minnesota, Dakota, Montana, Wyoming, Colorado, New Mexico, Idaho, Washington Territory, Nevada, Iowa, Maine, New Jersey and North Carolina.<sup>75</sup>

On 23 June 1882, a tidal wave on Lake Erie struck Cleveland, Ohio in the *United States*. A curtain-like cloud, moving silently inward with terrific velocity produced immense waves that broke on the shoreline. Hundreds of fish were cast ashore and the fires in the Lake Erie rolling mills were put out. A scow loaded with sand landed high and dry on the shore. The wave broke completely over the railroad tracks along the shore, covering them to a depth of several feet and submerging the Erie street pier. The damage was estimated at \$30,000 and affected the shoreline for a distance of 35 miles. Similar lake and river tidal waves observed prior to this one includes:<sup>75</sup>

- \* A tidal wave on Lake Erie on 10 May 1823 at Otter Creek on the *Canadian shore* and at Kettle Creek twenty miles away, which attained a height of 9 feet.
- \* Three tidal waves on Lake Erie in 1830 at Madison Creek, Ohio, the first rising 15 to 20 feet.
- \* A tidal wave on Lake Erie in 1844 or 1845 at Euclid Creek, fifteen feet in height.
- \* On 5 December 1856 at Toledo, Ohio the waves in Lake Erie suddenly rose ten feet higher.
- \* In 1841 at Berne, *Switzerland*, Lake Geneva receded suddenly leaving ships at anchor on the bare ground.
- \* In 1789 on Lake Superior, opposite Isle Royal, the water suddenly fell four feet, returning with a great rush.
- \* In August 1845, an enormous wave, twenty feet in height on Lake Superior was observed between Cooper Harbor and Eagle River.

The following are the highest temperatures observed during July 1882 in the *United States*:<sup>75</sup>

Opelika, Alabama	(102° F, 38.9° C)
Mobile, Alabama	( 96° F, 35.6° C)
Phoenix, Arizona	(114° F, 45.6° C)
Texas Hill, Arizona	(118° F, 47.8° C)
Prescott, Arkansas	(100° F, 37.8° C)
Fort Smith, Arkansas	(100° F, 37.8° C)
Red Bluff, California	(105° F, 40.6° C)
Indio, California	(117° F, 47.2° C)
West Las Animas, Colorado	( 99° F, 37.2° C)
Fort Lyon, Colorado	(101° F, 38.3° C)
New Haven, Connecticut	( 90° F, 32.2° C)
New London, Connecticut	( 90° F, 32.2° C)
Delaware Breakwater, Delaware	( 88° F, 31.1° C)
Washington, D.C.	( 95° F, 35.0° C)
Live Oak, Florida	( 98° F, 36.7° C)
Key West, Florida	( 95° F, 35.0° C)
Jesup, Georgia	(101° F, 38.3° C)
Savannah, Georgia	( 95° F, 35.0° C)
Fort Lapwai, Idaho	(113° F, 45.0° C)
Chicago, Illinois	( 90° F, 32.2° C)
Peoria, Illinois	( 97° F, 36.1° C)
Indianapolis, Indiana	( 89° F, 31.7° C)
Fort Wayne, Indiana	( 94° F, 34.4° C)

Des Moines, Iowa	( 92° F, 33.3° C)
Clinton, Iowa	( 94° F, 34.4° C)
Wellington, Kansas	(101° F, 38.3° C)
Dodge City, Kansas	(101° F, 38.3° C)
Louisville, Kentucky	( 91° F, 32.8° C)
Franklin, Louisiana	(101° F, 38.3° C)
Shreveport, Louisiana	(100° F, 37.8° C)
Portland, Maine	( 94° F, 34.4° C)
Baltimore, Maryland	( 93° F, 33.9° C)
Boston, Massachusetts	( 98° F, 36.7° C)
Sumerset, Massachusetts	(102° F, 38.9° C)
Port Huron, Michigan	( 91° F, 32.8° C)
Harrisville, Michigan	( 92° F, 33.3° C)
Saint Paul, Minnesota	( 92° F, 33.3° C)
Vicksburg, Mississippi	( 96° F, 35.6° C)
Meridian, Mississippi	(104° F, 40.0° C)
Springfield, Missouri	( 98° F, 36.7° C)
Sedalia, Missouri	(100° F, 37.8° C)
Fort Buford, Montana	(101° F, 38.3° C)
Cartersville, Montana	(106° F, 41.1° C)
North Platte, Nebraska	( 93° F, 33.9° C)
Omaha, Nebraska	( 93° F, 33.9° C)
Winnemucca, Nevada	( 97° F, 36.1° C)
Beowawe, Nevada	(108° F, 42.2° C)
Mount Washington, New Hampshire	( 60° F, 15.6° C)
New Market, New Hampshire	( 94° F, 34.4° C)
Little Egg Harbor, New Jersey	( 99° F, 37.2° C)
Fort Bayard, New Mexico	(115° F, 46.1° C)
La Mesilla, New Mexico	(107° F, 41.7° C)
Fort Hamilton, New York	( 97° F, 36.1° C)
New York City, New York	( 93° F, 33.9° C)
Wadesborough, North Carolina	(105° F, 40.6° C)
Kitty Hawk, North Carolina	( 96° F, 35.6° C)
Cincinnati, Ohio	( 90° F, 32.2° C)
Ruggles, Ohio	( 92° F, 33.3° C)
Fort Supply, Oklahoma	(101° F, 38.3° C)
Umatilla, Oregon	(105° F, 40.6° C)
Philadelphia, Pennsylvania	( 94° F, 34.4° C)
Fort Adams, Rhode Island	( 90° F, 32.2° C)
Narragansett Pier, Rhode Island	( 89° F, 31.7° C)
Charleston, South Carolina	( 94° F, 34.4° C)
Chester, South Carolina	(100° F, 37.8° C)
Fort Sully, South Dakota	(100° F, 37.8° C)
Memphis, Tennessee	( 93° F, 33.9° C)
Withe [White], Tennessee	( 96° F, 35.6° C)
Eagle Pass, Texas	(111° F, 43.9° C)
Salt Lake City, Utah	( 96° F, 35.6° C)
Promontory, Utah	(110° F, 43.3° C)
Charlotte, Vermont	( 94° F, 34.4° C)
Cape Henry, Virginia	( 95° F, 35.0° C)
Norfolk, Virginia	( 95° F, 35.0° C)
Alamota, Washington	(105° F, 40.6° C)
Morgantown, West Virginia	( 84° F, 28.9° C)
Milwaukee, Wisconsin	( 88° F, 31.1° C)
La Crosse, Wisconsin	( 88° F, 31.1° C)
Fort Washakie, Wyoming	( 97° F, 36.1° C)



In 1882, a powerful cyclone struck Bombay [now Mumbai], *India* causing 100,000 deaths.<sup>98</sup>

Violent gales with damage struck [*Great Britain*], 22-23 August and 24 October 1882.<sup>90</sup>

On 8 August 1882, the propeller ship “Menominee” on Lake Michigan on her way to Chicago, Illinois in the *United States* encountered in mid-lake a thick cold cloud which burst on her decks, covering them with snow and slush to a depth of 6 inches. For 5 minutes the atmosphere was like winter, but as the steamer was moving rapidly she soon came into warmer weather.<sup>75</sup>

A heavy rainstorm in Texas in the United States on 23 & 24 August 1882 cause the Concho River to flood. Houses were swept away. People sought shelter in the tops of the highest trees but these were swept away and many people drowned. The town of Ben Fichlin was completely washed away. The town of San Angelos was also inundated. It was estimated that 50 people drowned in this flood and between 10,000 - 15,000 horses, cattle and sheep were lost. Property damage was estimated at \$150,000 [approximately \$3.3 million in present dollars using the Consumer Price Index (CPI)]. [Today, Ben Fichlin or Benficklin is a Texas ghost town.]<sup>75</sup>

On 2 September 1882, storm [hurricane] appeared north of *San Domingo*, moved westward over *Cuba* to the central Gulf where it recurved to the Alabama coast of the *United States* by the night of 9<sup>th</sup>.<sup>120</sup>

On 5-6 September 1882, a hurricane struck *Cuba* creating a good number of victims.<sup>141</sup>

A hurricane passed over Havana, *Cuba*, on 6 September 1882. The storm affected the major part of the island causing the most damage at Villa Clara and Cienfuegos. The storm traveled through the Gulf making landfall in the *United States* on 9 September near Port Eads, Louisiana. The vortex of the hurricane passed at midnight east of Pensacola and then moved northerly over Alabama, Georgia and South Carolina on the 10<sup>th</sup>. On the 11<sup>th</sup> the storm moved across North Carolina and then entered the Atlantic Ocean. New Orleans, Louisiana sustained \$200,000 in damage. Cedar Keys, Florida sustained \$100,000 in damage. Tuskegee, Alabama suffered \$50,000 in damage. At Beaufort [South Carolina], a double team was crushed by a falling tree killing two persons and injuring one other. At Pensacola, Florida, two men were drowned when the quarantine boat “Gov. Bloxham” on route to the quarantine station was capsized. At Quincy, Florida, five persons were killed. Many ships out at sea were damaged and a few sunk, but because of advanced Weather Service storm warnings, these were kept to a minimum. It was estimated that \$13 million [\$290 million in today’s dollars] of property and many persons remained safe in harbors on account of these warnings.<sup>75</sup>

On 21-24 September 1882 at Paterson, New Jersey in the *United States*, 17.9 inches of rain fell.<sup>116</sup>

A flood caused by heavy rainfall struck Rahway, New Jersey in the *United States* on 24 September 1882. It caused \$500,000 in damages [approximately \$11 million in present dollars using the Consumer Price Index (CPI)]. The streets were flooded, eight bridges were washed away, and two other bridges were undermined. All communications were cut off with the city for many hours. One person drowned and several were injured.<sup>75</sup>

During the middle of September 1882, there were inundations caused by the rising of the Lossie and Spey rivers in northern *Scotland*. A bridge was broken and other damage occurred.<sup>90</sup>

In September 1882, there was an inundation in the Tyrol River. There was much damage with loss of life in northern *Italy* and *Hungary*, and southern *France*.<sup>90</sup> [There are 41 rivers and streams of Tyrol. Tyrol is a historical region of west-central *Europe*.]



On 2 October 1882, a strong storm hit California in the *United States* causing approximately \$400,000 in damages to wheat, hay and grape crops [approximately \$9 million in present dollars using the Consumer Price Index (CPI)]. The greatest damage was done in Sacramento, San Joaquin, and Napa valleys, and was caused by heavy rains. The winds in this storm had attained a hurricane-like force.<sup>75</sup>

On 8-10 October 1882, a storm [hurricane] moved from south of *Cuba* to the east Gulf coast of the *United States*. Great loss of life and damage to property was reported in *Cuba*. The cyclone lost much of its energy after leaving *Cuba*.<sup>120</sup>

On 8 October 1882, a hurricane passed over *Cuba*. The greatest destruction occurred in the Vuelta Abajo region. The town of Pinar del Rio was almost destroyed. At Consolacion del Sur, Cuba, 75 percent of the houses were demolished and at Majaqua Galvez, Pilotos, Ceja de Luna Vinales, the damage was equally great. Thirty-six bodies were found in the vicinity of Consolacion del Sur, and many people were missing. At San Juan and Martinez, Cuba, 1,500 warehouses and dwellings were destroyed; in the Hacienda del Valle, Cuba, three hundred houses were ruined. Most of the houses in the township of San Luis, Cuba, were swept away, and thousands of cattle were drowned. In the district of Guane, Cuba, it is estimated that 2,000 houses and tobacco storage buildings were laid in ruins. The hurricane passed near Cedar Keys, Florida in the *United States* on the 10<sup>th</sup>. The center passed over the northern part of Florida and by the morning of the 11<sup>th</sup>, was in southeastern Georgia. On the afternoon of the 11<sup>th</sup>, the center was near Savannah, Georgia. The storm then continued up the Atlantic coast, following the trend of the shore, and finally passed off to the east of Cape Hatteras on the 12<sup>th</sup>.<sup>75</sup>

On 8-15 October 1882, a hurricane struck western *Cuba* and the coast of Labrador, *Canada*. One account cites 140 deaths while another claims 36 casualties.<sup>141</sup>

In *Germany*, there was a great rise of the Rhine and Danube rivers in November and December 1882. Five villages with above 250 houses, near Wiesbaden [in southwestern *Germany*] were destroyed in December 1882.<sup>90</sup>

In December 1882, there were great floods in the Thames valley and midland counties of *England*.<sup>90</sup>

In 1882 during the period between 18 April and 16 May, floods struck Hupeh (now Hubei province) in central *China* at Ao-ch'êng; Kiangsi (now Jiangxi province) in southern *China* at Tê-an; and Chekiang (now Zhejiang province) on the east coast of *China* at Ch'ang-shan. At Ch'ang-shan, the crops were damaged by the floodwaters. Then during the period between 15 July and 13 August, a drought engulfed Hupeh province at Chün, Yün-mêng and Hao-fêng. Then during the period between 8 August and 8 November, floods struck Chekiang province at Ch'ang-shan.<sup>153</sup>

*Also refer to the section 1880 A.D. – 1886 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1882 / 1883 A.D.** At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1882 occurred on 25 November.<sup>116</sup>

The winter of 1882-83 (following a fine fall) in Bradford County, Pennsylvania in the *United States* was moderate and broken. There was a short run of sleighing during the end of November. December was cold and dry but there was no further sleighing until the middle of January when the snow remained on the ground for a month. January 23 was the coldest day when temperatures dropped to -10° F to -14° F [-23° C to -26° C]. Bluebirds and robins appeared March 1<sup>st</sup> and most of the month produced beautiful weather. Spring began early, but there was frost on May 12, 13 and 14. May was memorable for numerous and severe thunderstorms.<sup>178</sup>

In the *United States* during the winter of 1882-83, the temperature at Spokane Falls, Washington fell to -28° F in January. The temperature at Lancaster, Wisconsin fell to -41° F in 1883. The temperature at Olympia, Washington fell to 9° F in January. The temperature at Fort Buford (near Williston, North Dakota) fell to -46° F in January and -40° F in February. The temperature at Pike's Peak, Colorado fell to -37° F in January. The temperature at Fort Washakie, Wyoming fell to -27° F in December. [This is the only U.S. Military Outpost named after an American Indian - Chief Washakie of the Shoshone tribe.] The temperature at Roseburg, Oregon fell to 12° F in January. The temperature at Salt Lake City, Utah dropped to -20° F in January. The temperature in San Francisco, California fell to 36° F in January. The temperature at Red Bluff, California fell to 19° F in January. The temperature at Dubuque, Iowa fell to -26° F in January. The temperature at Fort Grant, Arizona fell to 10° F in January. The temperature at Fort Elliott, Texas fell to -12° F in January. The temperature at Saint Vincent, Minnesota fell to -38° F in February. The temperature at Fort Assiniboine (near Havre, Montana) fell to -47° F in February. The temperature at Fort Benton, Montana fell to -41° F in February. The temperature at North Platte, Nebraska fell to -29° F in February. The temperature at Omaha, Nebraska fell to -24.9° F in February. The temperature at Cheyenne, Wyoming fell to -28° F in February. The temperature at Mount Washington, New Hampshire fell to -34° F in March.<sup>113, 126</sup>

**1883 A.D.** *Russia* suffered from a major famine in 1883.<sup>96</sup>

Early in January 1883, inundations near Worms, *Germany* caused much destruction. About 60 people drowned.<sup>90</sup>

On 10 January 1883, Raab [now Győr] in northwestern *Hungary* was partly submerged by a flood.<sup>90</sup>

Violent gales with damage struck [*Great Britain*], 26-28 January, 10 February, and 6 March 1883.<sup>90</sup>

In February 1883, there were inundations in Pennsylvania, and Cincinnati, Ohio in the *United States*.<sup>90</sup> [This produced very severe flooding along the Ohio River.]

In April 1883, tornadoes struck the southern states of the *United States*. About 150 people were killed.<sup>90</sup>

On 21-23 April 1883 very violent tornadoes occurred in the states of Iowa, Mississippi, Alabama, and Georgia in the *United States*. The destruction of property was very great; and in Mississippi and Georgia, there were from two to three hundred lives lost, and about one thousand persons injured.<sup>133</sup>

— At Talladega, Alabama, the tornado threw the northbound train on the east *Tennessee, Virginia and Georgia* railroad from the track down an embankment. Near Springville, Alabama, more than twenty houses were unroofed; one person was killed and several were wounded.

— At Sioux City, Iowa, during the night of the 21<sup>st</sup>, a severe storm passed over the eastern parts of Woodbury and Monona counties. A building near Correctionville, was carried a distance of eight rods (132 feet), and was badly damaged. At Dunlap, Iowa on the 21<sup>st</sup>, a tornado destroyed many farmhouses and killed much livestock. Trees were torn up by their roots and many small buildings were completely carried away; some loss of life was also reported. On the evening of the 22<sup>nd</sup>, a tornado passed up Maple River Valley, following the course of the *Chicago and Northwestern* railroad. At Danbury, Iowa, a church was wrecked and three houses blown down.

— At a point 2½ miles south of Botsford, Georgia, the tornado blew down all buildings and fences in its path. Several people were seriously injured and some were killed. At Swainsboro, Georgia on the morning of the 23<sup>rd</sup>, the tornado ripped through town scarcely leaving a house standing in its track, and rendering several families homeless. Two persons were known killed and several were injured. At Eastman, Georgia, a tornado passed over that place during the early morning of the 23<sup>rd</sup>, causing loss of life and property. At Augusta, Georgia on the 23<sup>rd</sup>, a destructive storm passed along the Athens branch of the Georgia railroad. Two dwellings near Woodville and Lexington were blown down, and also a large number of Negro cabins and gin-houses in Lincoln and Taliaferro

counties. At Albany, Georgia, eight persons were killed and about twenty-five wounded. The storm produced significant loss of life and great damage to property in Clark and Crawford counties in Georgia.

— At Starkville, Mississippi on the 22<sup>nd</sup>, the severest storm ever experienced in this community passed in a northeasterly direction about two miles north, sweeping everything before it. The width of the tornado's track was about three hundred yards, and within it everything was leveled to the ground. The largest trees were twisted off or blown down. At Starkville, thirteen houses were entirely destroyed. One of the number, a small frame building, was blown away, the only mark of its former position being the four sills upon which it rested. The ruins of the other houses presented the appearance of having been torn to pieces by an explosion. One life was lost. The towns of Wesson and Beauregard, Mississippi were visited by a most violent and destructive tornado on the 22<sup>nd</sup>. At Wesson, a town of about 1,700 inhabitants, twenty-seven houses were destroyed; thirteen persons were killed, and sixty were injured. The total loss at Wesson exceeded \$20,000. At Beauregard, Mississippi, a town of six hundred inhabitants every dwelling and store in the town was destroyed. Two rows of buildings on Railroad Avenue were leveled to the ground, and goods valued at \$150,000 were ninety percent damaged or destroyed. Twenty-nine persons were killed, and about forty were more or less seriously wounded. The force of the wind threw a solid iron screw of a cotton press, weighing six hundred and seventy-five pounds, a distance of 300 yards; and to drive through a red oak sapling, a piece of scantling [timber] three by four inches and ten feet in length. The damage at Beauregard from the tornado was estimated at \$450,000. [In present currency, that would be equivalent to \$10 million in damages based on the Consumer Price Index (CPI) inflation rates.] At Tillman Station, Mississippi, the storm was very violent, causing great damage to all property and some loss of life. Clay County, Mississippi was visited by two very violent tornadoes, causing loss of life and destroying buildings, trees and fences. In Monroe and the neighboring counties lying northward, a number of persons were killed, and many others were injured. The storm passed entirely through Clay County totally destroying a Negro settlement near Aberdeen. At Red Lick, Mississippi, a tornado struck about one mile east of the city on the 22<sup>nd</sup>, causing some loss of life and great damage to property. Everything in the track of the storm, which was about two hundred yards wide, was swept away. Ten persons were killed at Harrisville, and seven were killed near Morton. In Lowndes County, Mississippi a violent wind and rain storm from the southwest completely demolished all of the buildings on many of the plantations. At Caledonia, two persons were killed; every fence for miles around was swept away, and many trees and building were blown down. The town of Lawrence suffered heavy loss of property but no loss of life. The storm passed east of Natchez, on the opposite side of the river, in Concordia parish, Louisiana, where houses were unroofed, one person was killed and several wounded. Monticello, Mississippi, was almost destroyed by a tornado on the 21<sup>st</sup>, causing some loss of life. The track of the storm was about two hundred yards wide, within which everything was swept away.

— On the 23<sup>rd</sup>, violent tornadoes also struck near Stateburg, Charleston, Bishopville, Darlington and Saint Stephen's, South Carolina.

New Orleans, Louisiana in the *United States* reported that Arcadia, Bienville parish, was hit by a severe hailstorm during the afternoon of the 28 April 1883. The storm stripped the foliage from trees, killed some [live]stock and caused other damage within its track, which was from four to five miles in width. The ground was covered with hailstones, some of which weighed three-fourths of a pound, measuring eleven inches in circumference and four inches in diameter.<sup>133</sup>

On 16 May 1883, floods in Cachar [in Assam State in northeastern] *India* caused great distress.<sup>90</sup>

About 21 June 1883, the River Neisse [in southwestern *Poland*] rose and flooded *Silesia* [now in *Poland*] causing much damage.<sup>90</sup>

In 1883, several storms struck Bradford County, Pennsylvania in the *United States*. On 2 July 1883, a violent windstorm struck Sayre. The wind came from the north and blew out part of the southern side of seven brick houses on North Elmer Avenue and one residence from its foundation. Many outbuildings were blown away. Then on 5 July a terrific storm visited Towanda and vicinity. The Universalist church was struck by lightning for the second time that week. The streets were flooded everywhere. In Sheshequin, Wysox and Standing Stone, land was gutted and bridges carried away. On 29 October 1883, a furious windstorm visited the valley of Sugar Creek, uprooting trees, unroofing and demolishing buildings. The storm passed through Towanda and Wysox and did much damage.<sup>178</sup>

About 11-12 July 1883, there was an inundation in the Thames valley, Ontario, *Canada*, which caused much destruction of property. About 30 lives were lost.<sup>90</sup>

On 26 August 1883, a hurricane struck the Newfoundland banks in *Canada* causing 80 deaths.<sup>141</sup>

On 1-2 September 1883, violent gale in the *British Channel* caused many wrecks.<sup>90</sup>

On 4-5 September 1883, a hurricane struck *the Bahamas* causing 50 deaths.<sup>141</sup>

On 6 September 1883, a storm [hurricane] moved from off the eastern extremity of *Cuba* northwestward over the Bahamas to the North Carolina coast of the *United States* by the 11<sup>th</sup>.<sup>120</sup>

[A green sun was observed on the 9-10 September 1883 (in New England in the *United States*), a few weeks after the great eruption of the volcano at Krakatau, in the Sunda Strait. (Krakatau is a volcanic island in the Sunda Strait between the islands of Java and Sumatra in *Indonesia*.) Similar strangely colored suns were indeed observed at that time in other parts of the world, and had been observed on many other occasions. The Editor of this Monthly Weather Review had an excellent observation of a pale green sun in the damp atmosphere of Cape Ledo, [Angola] on the west coast of Africa, through a rather thick cirrus cloud. The explanation of this phenomenon has been made remarkably clear by the researches of Professor Barus. It appears that when the moisture begins to condense into cloud, the minute globules grow in size from microscopic invisibility up to the globules of fog. When these are all of some one uniform size the sunlight that penetrates them is analyzed into its elementary colors, as in the spectrum, and the visible color of the sun, as seen by us, depends upon the diameter of these globules, so that the color of the sun tells us of the size of the drops. These colors usually occur only when the globules are very small; that is to say, in the early stages of cloudy condensation, and the phenomenon is very closely allied to the colors shown by the soap bubble and known as the colors of thin plates.<sup>115</sup>]

On 11 September 1883, a hurricane struck *the Bahamas* and North Carolina in the *United States* causing 106 deaths.<sup>141</sup>

On 26 September 1883, a destructive gale struck on the coast of *Scotland* and *Ireland*.<sup>90</sup>

Around 29 October 1883, there was an overflow of the River Peneus in Thessaly, in central mainland *Greece* which did much damage.<sup>90</sup>

In the morning of 12 December 1883, a storm caused great loss of life and damage in London and other parts of *Great Britain*.<sup>90</sup>

On 28 October 1838; 11 July 1874; 11 April 1878, and 12 December 1883, storms struck London, *England*, which destroyed from twenty to thirty lives in each case, and from \$1 to \$3 million (U.S.) dollars in property damage. [In present currency, that would be equivalent to \$27-\$81 million dollars in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>197</sup>

In 1883 during the period between 8 February and 8 March, floods struck Hopei (now Hebei province) in northern *China* at Yü-t'ien and Peiping; Shensi (now Shaanxi province) in central *China* at Tso-shui; and Kansu (now Gansu province) in northwest *China* at Lanchow.<sup>153</sup>

*Also refer to the section 1880 A.D. – 1886 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1883 / 1884 A.D.** The minimum temperatures in Montana, Dakota and Minnesota in the *United States* on the January 4<sup>th</sup>, 1884 and over the central valleys and Southern states on the 5<sup>th</sup> and 6<sup>th</sup> were generally the lowest recorded since the establishment of the Signal Service stations. Over northeastern Montana and the northern parts of Dakota and Minnesota, the minimum temperatures were -40° F (-40° C) and below, on the morning of the 4<sup>th</sup>. Very low temperatures also occurred on the 24<sup>th</sup> – 26<sup>th</sup> during the passage of a high-pressure region over the lake region. The following are the lowest temperatures observed during January 1884.<sup>126</sup>

Montgomery, Alabama	( 8.0° F, -13.3° C)	
Mobile, Alabama	( 14.0° F, -10.0° C)	
Green Springs, Alabama	( -4.0° F, -20.0° C)	
Little Rock, Arkansas	( -3.0° F, -19.4° C)	
Lead Hill, Arkansas	(-15.0° F, -26.1° C)	
Huron, Dakota	(-38.0° F, -38.9° C)	[now Huron, South Dakota]
Bismarck, Dakota	(-40.0° F, -40.0° C)	[now Bismarck, North Dakota]
Vermillion, Dakota	(-34.5° F, -36.9° C)	[now Vermillion, South Dakota]
Jacksonville, Florida	( 21.0° F, -6.1° C)	
Pensacola, Florida	( 16.3° F, -8.7° C)	
Atlanta, Georgia	( -1.3° F, -18.5° C)	
Augusta, Georgia	( 14.0° F, -10.0° C)	
Olney, Illinois	(-30.0° F, -34.4° C)	
Springfield, Illinois	(-22.5° F, -30.3° C)	
Rockford, Illinois	(-40.0° F, -40.0° C)	
Chicago, Illinois	(-18.5° F, -28.1° C)	
Cairo, Illinois	(-16.0° F, -26.7° C)	
Marshall, Illinois	(-30.0° F, -34.4° C)	
Peoria, Illinois	(-27.0° F, -32.8° C)	
Edgington, Illinois	(-34.0° F, -36.7° C)	
Riley, Illinois	(-30.5° F, -34.7° C)	
Collinsville, Illinois	(-23.0° F, -30.6° C)	
Indianapolis, Indiana	(-25.0° F, -31.7° C)	
New Albany, Indiana	(-23.0° F, -30.6° C)	
Vincennes, Indiana	(-30.0° F, -34.4° C)	
Rising Sun, Indiana	(-22.0° F, -30.0° C)	
Shelbyville, Indiana	(-26.0° F, -32.2° C)	
Logansport, Indiana	(-24.0° F, -31.1° C)	
Vevay, Indiana	(-23.0° F, -30.6° C)	
Sunman, Indiana	(-24.0° F, -31.1° C)	
Dubuque, Iowa	(-24.0° F, -31.1° C)	
Sioux City, Iowa	(-21.0° F, -29.4° C)	
Council Bluff, Iowa	(-24.0° F, -31.1° C)	
Burlington, Iowa	(-33.0° F, -36.1° C)	
Des Moines, Iowa	(-30.4° F, -34.7° C)	
Fort Madison, Iowa	(-30.0° F, -34.4° C)	
Humboldt, Iowa	(-33.0° F, -36.1° C)	
Leavenworth, Kansas	(-21.0° F, -29.4° C)	
Independence, Kansas	(-20.0° F, -28.9° C)	
Fort Scott, Kansas	(-24.0° F, -31.1° C)	
Louisville, Kentucky	(-19.5° F, -28.6° C)	
Cynthiana, Kentucky	(-22.0° F, -30.0° C)	
Bangor, Maine	(-40.0° F, -40.0° C)	
Grand Rapids, Michigan	(-30.0° F, -34.4° C)	
Alpena, Michigan	(-20.0° F, -28.9° C)	
Mackinaw City, Michigan	(-15.9° F, -26.6° C)	
Port Huron, Michigan	(-11.3° F, -24.1° C)	
Grand Haven, Michigan	( -8.5° F, -22.5° C)	

Cheboygan, Michigan	(-30.0° F, -34.4° C)	
Minneapolis, Minnesota	(-30.0° F, -34.4° C)	
Vicksburg, Mississippi	( 10.3° F, -12.1° C)	
Saint Louis, Missouri	(-23.4° F, -30.8° C)	
Pierce City, Missouri	(-22.0° F, -30.0° C)	
Factoryville, New York	(-21.0° F, -29.4° C)	
New York City, New York	( 8.0° F, -13.3° C)	
Charlotte, North Carolina	( 5.0° F, -15.0° C)	
Kitty Hawk, North Carolina	( 8.6° F, -13.0° C)	
New River Inlet, North Carolina	( 4.0° F, -15.6° C)	
Fort Macon, North Carolina	( 8.5° F, -13.1° C)	
Scott Hill, North Carolina	( 4.9° F, -15.1° C)	
Raleigh, North Carolina	( 2.0° F, -16.7° C)	
Cincinnati, Ohio	(-20.0° F, -28.9° C)	[at suburb Mount Auburn]
Findlay, Ohio	(-20.0° F, -28.9° C)	
Norwalk, Ohio	(-24.0° F, -31.1° C)	
Wapakoneta, Ohio	(-26.0° F, -32.2° C)	
Urbana, Ohio	(-28.0° F, -33.3° C)	
Dayton, Ohio	(-28.0° F, -33.3° C)	
Toledo, Ohio	(-14.0° F, -25.6° C)	
Columbus, Ohio	(-20.0° F, -28.9° C)	
North Lewisburg, Ohio	(-23.5° F, -30.8° C)	
Westerville, Ohio	(-28.0° F, -33.3° C)	
Fostoria, Ohio	(-20.0° F, -28.9° C)	
Bellefontaine, Ohio	(-27.0° F, -32.8° C)	
Titusville, Pennsylvania	(-33.0° F, -36.1° C)	
Charleston, South Carolina	( 13.0° F, -10.6° C)	
Columbia, South Carolina	( 7.0° F, -13.9° C)	
Seneca, South Carolina	( 4.0° F, -15.6° C)	
Nashville, Tennessee	(-10.0° F, -23.3° C)	
Knoxville, Tennessee	(-16.0° F, -26.7° C)	
Chattanooga, Tennessee	( -1.0° F, -18.3° C)	
Memphis, Tennessee	( -2.0° F, -18.9° C)	
Fort Concho, Texas	( 4.0° F, -15.6° C)	[near San Angelo]
Randolph, Vermont	colder than -40.0° F – mercury froze on 3 occasions in January	
Johnsontown, Virginia	( 4.0° F, -15.6° C)	
Milwaukee, Wisconsin	(-24.3° F, -31.3° C)	
La Crosse, Wisconsin	(-29.0° F, -33.9° C)	
Sussex, Wisconsin	(-24.5° F, -31.4° C)	
Lancaster, Wisconsin	(-34.0° F, -36.7° C)	

The winter of 1883-84 in Bradford County, Pennsylvania in the *United States* was cold with several weeks of good sleighing from the middle of December until the first of March. There was a blizzard on January 3, and on the 10<sup>th</sup> the temperature dropped below zero. On 21 January, the temperature dropped in the county between -6° F and -16° F [-21° C and -27° C]. On 26 January, temperatures ranged from -10° F to -30° F [-23° C to -34° C], being -23° F [-31° C] in Towanda. On February 6, ice in the Susquehanna River broke up, but on the 29<sup>th</sup>, temperature in the county ranged from -6° F to -10° F [-21° C to -23° C]. On the 20<sup>th</sup> of March snow was still a foot [30 cm] deep in the roads on Armenia. On Memorial Day, 30 May 1884, light snow generally fell over the county, being 2 inches [5 cm] deep at Barclay and Long Valley. On 8 July, there was a flurry of snow in parts of the county.<sup>178</sup>

Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>



Major snowstorms struck the *United States* in January 1884. Oswego, New York reported the snowstorm on the 3<sup>rd</sup> interfered with railroad traffic. On the 9<sup>th</sup> the snow was reported to be five to ten feet deep in the cuts. Memphis, Tennessee reported a depth of more than nine inches of snow on the 7<sup>th</sup>. Richmond, Kentucky reported a depth of fourteen inches of snow on the 9<sup>th</sup>. Belleville, Ontario, *Canada* reported on the 9<sup>th</sup> the depth of snow was three feet on the level. Titusville, Pennsylvania reported that the snowfall of the 9<sup>th</sup> was the heaviest ever known to have fallen in one day. The county roads were blockaded in all directions, and trains on the railroads were abandoned. The roofs of many buildings were crushed beneath the weight of the snow. Dempster, New York reported that total depth of snowfall from the 1<sup>st</sup> to the 9<sup>th</sup> of January measured thirty-three inches. Wheeling West Virginia reported a heavy snowstorm prevailed on the 8<sup>th</sup>. The ground was covered to an average depth of twenty inches.<sup>126</sup>

The depth that rivers, bays and lakes froze in January 1884 in the *United States*:<sup>126</sup>

- \* At Calais, Maine, the *Saint Croix River* was closed to navigation during the night of the 15<sup>th</sup>-16<sup>th</sup>.
- \* At Narragansett Pier, Rhode Island, large fields of ice passed out of the *Narragansett Bay* on the 20<sup>th</sup>.
- \* At Block Island, Rhode Island: the harbor froze on the 6<sup>th</sup>.
- \* At Burlington, Vermont, *Broad Lake* froze over on the 9<sup>th</sup>, which is the earliest closing of the last ten years.
- \* At Charlotte, Vermont, the *Lake Champlain* was firmly frozen on the 10<sup>th</sup>.
- \* At New Haven, Connecticut, the harbor froze on the 6<sup>th</sup>.
- \* At New York City, New York, the flood tide on the morning of the 13<sup>th</sup> brought up from the *New York Harbor* an immense floe of ice which blockaded *East River* from shore to shore. At 6.30 a.m. the end of pier 27 was carried away and a two-masted schooner and a lighter on the north side of the pier were sunk. On the 22<sup>nd</sup> navigation was interrupted by ice fields in the upper harbor. All sailing vessels passing through the narrows on that date were compelled to employ tugs.
- \* Persons crossed on the ice from David's Island, New York to the mainland on the 27<sup>th</sup>.
- \* At Barnegat City, New Jersey, *Barnegat Bay* was closed by ice on the 7<sup>th</sup>, cutting off communication with the mainland.
- \* At Little Egg Harbor, New Jersey, there were large quantities of ice in the harbor on the 9<sup>th</sup>.
- \* At New York City, New York, there was considerable floating ice on the *Hudson River* on the 12<sup>th</sup>.
- \* At Philadelphia, Pennsylvania, from Trenton, New Jersey, to Port Richmond, the ice was sufficiently strong; to permit the crossing of teams on the *Delaware River* on the 8<sup>th</sup>. The river below Philadelphia was frozen nearly across for the first time in several years.
- \* At Delaware Breakwater, Delaware, the harbor at *Delaware Bay* was filled with ice on the 7<sup>th</sup>.
- \* At Chincoteague, Virginia, *Chincoteague Bay* froze over on the 6<sup>th</sup>.
- \* At Baltimore, Maryland, brisk winds on the 8<sup>th</sup> drove large quantities of ice from the *Chesapeake Bay* into the river and harbor, causing much inconvenience to vessels. There were large quantities of ice driven into the track of vessels on the west shore. The large amount of ice in the bay on the 9<sup>th</sup> rendered navigation very difficult. Many oyster boats were ice-bound and their crews experienced much suffering.
- \* At Baltimore, Maryland: ice formed rapidly in the harbor on the 6<sup>th</sup>, and on the 7<sup>th</sup> it varied from two to three inches in thickness.
- \* At Washington D.C., the *Potomac River* froze over on the 1<sup>st</sup>. The ice was strong enough for skating from about the 7<sup>th</sup> to 27<sup>th</sup>.
- \* At Oxford, Maryland: a breaking of the ice on the *Choptank River* occurred during the night of the 8<sup>th</sup>-9<sup>th</sup>. No serious damage resulted, although a number of vessels were carried several miles from the harbor by the ice.
- \* At Port Deposit, Maryland, on the 9<sup>th</sup> the ice in the *Susquehanna River* was seven inches thick. At the close of the month the ice in the *Susquehanna* was sixteen inches thick at Wilkes-Barre and Catawissa, Pennsylvania.
- \* At Oswego, New York, the harbor froze over on the 25<sup>th</sup>.
- \* At Detroit, Michigan, the *Detroit River* was frozen from shore to shore on the 1<sup>st</sup>.
- \* At Pittsburg, Pennsylvania: during the night of the 10<sup>th</sup>-11<sup>th</sup>, an ice-dam, which had formed in the *Monongahela River*, broke. Forty-one flats broke from their fastenings and were carried down the river.
- \* At Portsmouth, Ohio, on the 6<sup>th</sup> the *Ohio River* was filled with floating ice, which caused the suspension of navigation.
- \* At Cincinnati, Ohio, heavy floating ice on the *Ohio River* caused the suspension of navigation on the 7<sup>th</sup>-9<sup>th</sup>.
- \* At Cairo, Illinois, there was a heavy flow of ice on the *Ohio River* during much of January.
- \* At Charlestown, West Virginia: the ice in the *Elk River* broke up on the 12<sup>th</sup>, resulting in heavy losses to barge owners and lumbermen. The losses sustained by the stave and bark dealers alone are estimated at \$100,000. [In

present currency, that would be equivalent to \$2.4 million in damages based on the Consumer Price Index (CPI) inflation rates.]

- \* At Canal Dover, Ohio, the *Tuscarawas River* was frozen over on the 4<sup>th</sup>.
- \* At Cooperstown, New York, the ice in *Otsego Lake* was eighteen inches thick at close of month.
- \* At Buffalo, New York, floating ice covered the *Lake Erie* for several miles on the 3<sup>rd</sup>. Traffic on the New York Central railroad was interrupted on account of the tracks being covered with large quantities of ice, washed ashore by the storm of that date.
- \* At Port Huron, Michigan, ice formed on the *Saint Clair River* on the 5<sup>th</sup>.
- \* At Grand Haven, Michigan, the river froze over on the 3<sup>rd</sup>.
- \* At Grand Haven, Michigan, the westerly winds of the 23<sup>rd</sup> drove large quantities of ice from *Lake Michigan* into the entrance to the harbor, where it was reported to be from twenty to twenty-five feet in thickness. On that date heavy ice fields, extending lakeward as far as the eye could reach, were observed floating southward.
- \* At South Haven, Michigan, on the 19<sup>th</sup> a field of ice extended lakeward a distance of ten miles.
- \* At Traverse City, Michigan, the *Grand Traverse Bay* was frozen over on the 15<sup>th</sup>.
- \* In the *Straits of Mackinac* at Mackinaw City, Michigan, the steamer *Algolah*, in attempting to cross the straits on the 3<sup>rd</sup>, became fast in the ice when near the middle of the straits, where the ice was from one to three feet thick; she reached Saint Ignace on the 14<sup>th</sup>, and in attempting to return on the 15<sup>th</sup> became fast in the ice in the center of the straits. She arrived here on the 18<sup>th</sup>, and reported the ice to be from fifteen to twenty feet thick in the channel.
- \* At Keokuk, Iowa, the *Mississippi River* was frozen continually from this point to all points northward, throughout the month. At La Crosse, Wisconsin, the ice was reported to have been twenty-four inches thick on the 9<sup>th</sup>.
- \* At Cairo, Illinois, the *Mississippi River* froze over on the 4<sup>th</sup>.
- \* At Memphis, Tennessee, ice formed along the shores on the west bank of the *Mississippi River* on the 6<sup>th</sup>.
- \* At Saint Louis, Missouri, ice dams on the *Mississippi River* obstructed the harbor from the 8<sup>th</sup> to the 29<sup>th</sup>.
- \* At Vicksburg, Mississippi, the steamer *W. P. Thompson* encountered large quantities of drift ice about thirty-four miles north of this place on the *Mississippi River* on the morning of the 5<sup>th</sup> and was compelled to return back to Vicksburg.
- \* At Leavenworth, Kansas on the 5<sup>th</sup>, loaded wagons crossed the *Missouri River* on the ice, which was ten inches thick.
- \* At Lexington, Missouri, the ice in the *Missouri River* was eight inches thick on the 3<sup>rd</sup>.
- \* At Manhattan, Kansas, ice in the *Kansas River* was ten and one-half inches thick on the 7<sup>th</sup>.
- \* At Nashville, Tennessee, there was floating ice on the *Cumberland River* on the 9<sup>th</sup> and 10<sup>th</sup>.
- \* At Chattanooga, Tennessee, there was floating ice on the *Tennessee River* on the 8<sup>th</sup> and 9<sup>th</sup>. On the 9<sup>th</sup>, heavy floating ice impeded navigation, and the broken ice accumulated along the shore in large quantities.
- \* At Knoxville, Tennessee, the *Tennessee River* froze over one mile above the city on the 7<sup>th</sup>.
- \* At Montgomery, Alabama, on the 30<sup>th</sup>; it is reported that more ice formed in the *Tallapoosa River* than has been known for many years.
- \* In Tennessee, the *Forked Deer River* was reported frozen over at Dyersburg on the 5<sup>th</sup>; ice remained until the 24<sup>th</sup>. The *Elk River* was frozen over near Fayetteville on the 7<sup>th</sup>, sufficient for skating. The *Ocoee River* froze over on the 7<sup>th</sup> and 8<sup>th</sup>.
- \* At Shreveport, Louisiana, there was floating ice on the *Red River* on the 8<sup>th</sup>.
- \* At El Paso, Texas: the *Rio Grande River* froze over on the 1<sup>st</sup>.
- \* At Fort Smith, Arkansas, on the 11<sup>th</sup> an ice dam, which had formed on the *Arkansas River* broke, and resulted in the sinking of the steamer *Fort Smith*, and caused other damage.
- \* At Little Rock, Arkansas, the *Arkansas River* was frozen from the 7<sup>th</sup> to 13<sup>th</sup>.
- \* At Lynchburg, Virginia, ice on the streams in this vicinity was four inches thick on the 9<sup>th</sup>.
- \* At Brevard, North Carolina, the creeks in this vicinity were frozen on the 6<sup>th</sup>.

Durango, Colorado in the *United States* was entirely cut off from communications with other points by snow-blockades from 5-18 February 1884. On 18 February, the snow was 2½ feet deep on the level. In the canyon above Elk Falls, four miles away, the snow averaged fifty-feet deep, and at Barker's Park, it was reported to have been six feet deep on the level.<sup>126</sup>

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**1884 A.D.** The storm of 9 January 1884 caused very high tides and extensive damage along the Eastern Seaboard of the *United States*. At Narragansett Pier in Rhode Island, 20-30 large bathing houses were damaged; McSparran hotel grounds and dock were almost completely washed away. The engine house

on Lucker's dock was also washed away and the wharf badly damaged. The sea broke over the banks from the mouth of Narragansett Bay to Point Judith, causing great damage to roadways and fencing. At New London, Connecticut, the high tides submerged the Shore Line railroad tracks and caused numerous washouts. This is the first time, since the railroad was built in 1853, that the tracks were submerged by a high tide. Several wharves in this vicinity were carried away and completely wrecked. Osprey Beach, a summer resort, received great damage. The total damage at New London, Connecticut is estimated at \$150,000 [approximately \$3.6 million in present dollars using the Consumer Price Index (CPI)]. At Block Island, Rhode Island, the water washed over the seawall and the tides ran into Great Pond. The Shore Line railroad at West Haven, Connecticut was two feet underwater and the flooring of the bridge over Oyster River was covered. The long wharf roadbed at New Haven was badly washed. At Portland, Maine, the high tides broke completely over the breakwater and many vessels in the harbor were damaged. In New York City, the Manhattan Beach Marine railroad sustained \$70,000 in damage; Engeman's Pier sustained \$10,000; and property owners along the beach from \$6,000 to \$7,000 in damage. At Atlantic City, New Jersey, nearly 4 miles of the coast telegraph lines were carried away.<sup>126</sup>

On 23-24 January 1884, violent southwest gales [in *Great Britain*] caused destruction of life and property. Then on 26-27 January 1884, very severe gales caused many disasters.<sup>90</sup>

On 30 January 1884, a cyclone struck Bowen, *Australia*, unroofing almost all the houses in the city.<sup>101</sup>

On 30 January 1884, a cyclone struck Bowen in Queensland, *Australia*. Almost the entire town of Bowen was unroofed. The cyclone caused a 10-foot (3 meter) storm surge at Poole Island.<sup>99</sup>

During 1883 a drought prevailed in the Red Bluff area of California in the *United States*. The rains of 31 January 1884 brought this drought to an end. Before the rains many farmers had stopped plowing and seeding. And sheep raisers had been compelled to kill their young lambs because there was insufficient water for both their sheep and lambs. Analysis of the rainfall in the Sacramento area since 1849 showed that every sixth or seventh year, drought conditions prevail.<sup>126</sup>

About 7 February 1884, there was a great inundations in Ohio and Pennsylvania in the *United States*. The flood caused about 15 deaths and made 5,000 people homeless.<sup>90</sup>

During the flood of February 1883, in the Ohio River in the *United States*, the water rose above the highest watermarks of any previous record in the vicinity of Cincinnati, Ohio and at points southward. But the flood of February 1884, in the Ohio River, even surpassed that of February 1883. At Pittsburg, Pennsylvania, the highest stage of water was five feet, ten inches above that of 1883; at Cincinnati, Ohio it was four feet, eight and three-fourths inches; at Louisville, Kentucky, it was two feet, two inches. While the Mississippi river at Cairo, Illinois, during 1883, was four inches higher than the highest point of February 1884; and at Memphis it was six inches higher. In the lower Mississippi, the water rose to a greater height than was attained in February 1883. At Vicksburg, the river was still rising at the close of February but was nearly three feet higher than the highest stage of February 1883, and at New Orleans it was one foot, seven inches higher.<sup>126</sup>

The flood of February 1884 affected many communities along the rivers. Pittsburg and Allegheny City, Pennsylvania were flooded. Both cities were without gas, and railroad communication was cut off. As a result of this flood over five thousand people were rendered temporarily homeless, and property valued at more than \$2 million was destroyed [approximately \$48 million in present dollars using the Consumer Price Index (CPI)]. At Wellsburg, West Virginia on the 7<sup>th</sup>, the Ohio River reached the greatest height ever known at this point, when it was thirty-three inches higher than the great flood of 1883. The loss of property, distress, and destitution resulting from the flood were very great. There were only three or four houses in the main part of the town that were not partly underwater. At Marietta, Ohio, on the 10<sup>th</sup>, about

three-fourths of town was inundated and a large number of houses had been swept away. Of the houses that remained 450 houses and barns had been moved from their foundations. At Parkersburg, West Virginia for three days this city was entirely cut off from outside communication. Thousands of people were rendered homeless and were quartered in the churches and the public buildings. More than one hundred houses were carried away and many others were undermined. Thirty-seven cars of the Ohio River Railroad Company were swept away. It was estimated that the losses sustained at Parkersburg would aggregate \$750,000 [\$18 million in today's dollars]. At Belpre, Ohio forty-nine houses floated away and the entire business district was submerged. At Pomeroy, Ohio, the yards of the Columbus, Hocking valley and Toledo Railroad Company was covered with five feet of water. At Catlettsburg, Kentucky, every business house in town and four fifths of the residences were flooded. The damage was greater than \$100,000. At Ashland, Kentucky, one half of the city was underwater and hundreds of families were driven from their homes. At Ironton, Ohio, telegraph and railroad communications was cut off from the 7<sup>th</sup> to the 15<sup>th</sup>. At its height, the flood covered four-fifth of the city. Many houses were swept away or moved from their foundations. At Portsmouth, Ohio, nearly the entire city was underwater and many houses near the river were washed away. About 200 families in Maysville, Chester and Aberdeen, Kentucky were driven from their homes. At Ripley, Ohio, on the 14<sup>th</sup>, fully four-fifths of the town was submerged. On all of the principal streets, the water was from five to fifteen feet deep. On Front Street, the houses were abandoned, and underwater to the second stories. Many houses were swept from their foundations, and about two hundred families were rendered homeless. At Dayton, Kentucky, two-thirds of the town was underwater, about four hundred and fifty houses were submerged and about six hundred families were dependent on charity. It was estimated that this town suffered \$75,000 in damages.<sup>126</sup>

Cincinnati, Ohio sustained the brunt of the damage from the February 1884 flood. The highest flood stage was reached at 11.30 a.m. on the 14<sup>th</sup>, when the water was seventy-one feet and three-fourths of an inch above the low water mark (the highest stage ever known), and was four feet, eight and three-fourths inches above the great flood of 1883. The cold weather with the increasing flood caused intense and widespread suffering among those rendered homeless. At Cumminsville, the water extended from the stockyards to Grear's Turf Exchange on Spring Grove Avenue. At Linwood, the levee was entirely covered with water and Mount Washington and Newton were completely cut off from the city. All passengers leaving the city were conveyed in boats to various points where connection could be made with the railroads. With the increasing flood the condition of Newport grew worse. A large majority of the population of the city was rendered homeless and destitute. Numerous brick houses caved in because their foundations were washed out, while many frame houses floated away. On the corner of Third and Ludlow Streets, foundations of several buildings were undermined and collapsed, which resulted in the loss of ten lives. The Signal Service observer at Cincinnati reported: at Covington, Kentucky (on the opposite shore of Cincinnati), the water invaded four hundred houses, and about 3,000 people received assistance from the relief committees. One-third of Newport, Kentucky was underwater, and 13,000 out of a population of 20,400 were seriously affected by the flood. Navigation on the river was entirely suspended; the high water did not permit the passage of boats under the bridges. Travel on all railroads entering the Cincinnati was interrupted. All of the engines in the city water-works were stopped, which drove fears of a lack of drinking water. It is not possible at the present time to give an accurate estimate of the damage resulting from the flood, but it is variously estimated at from \$10 to \$25 million [approximately \$240 to \$600 million in present dollars using the Consumer Price Index (CPI)]. In February 1883, the river was above the danger-line from the 8<sup>th</sup> to the 23<sup>rd</sup>; during 1884 it was above the danger-line from February 4<sup>th</sup> to the 23<sup>rd</sup>.<sup>126</sup>

At Lawrenceburg, Indiana on 6 February 1884, the track of the Ohio and Mississippi railroad, both east and west of the city, was washed away. East of Lawrenceburg, as far as the eye could reach, there was nothing visible but a broad expanse of water covering thousands of acres of valuable land. About fifteen hundred of the population left the city. Out of four thousand inhabitants of Old Town, all with the



exception of about one hundred, left the place. Many barns and outbuildings in the hundreds were undermined or floated away. In one locality in German town an entire square of buildings was carried away. At Aurora, Indiana on the 6<sup>th</sup>, the floor of the iron bridge west of the city was three feet under water. The greater part of the Ohio and Mississippi railroad track, between this city and Lawrenceburg, was underwater. On the 12<sup>th</sup>, nearly all houses east of George Street were abandoned, and many buildings that withstood the flood of 1883 were raised from their foundations. At Vevay, Indiana, many buildings had only the foundations remaining after the flood. Huge piles of debris had accumulated, fragments of furniture and the bodies of dead animals were scattered around. The floodwaters had deposited 10 to 18 inches of soil across the town. At Carrollton, Kentucky, about seventy-five dwellings and all of the sawmills and distilleries were flooded. At Madison, Indiana, all houses along Front Street were abandoned and the Jeffersonville, Madison and Indianapolis depot was entirely surrounded by water. The town of Milton, Kentucky (opposite Madison, Indiana) was almost entirely inundated, and most of the buildings were flooded. At Louisville, Kentucky, the flood submerged five hundred houses on the "Point," three hundred in Shippingport and Portland, and one hundred on the banks of the Beargrass creek. The total losses sustained are estimated at about \$100,000. At New Albany, Indiana, the flood submerged several hundred houses in the northwestern part of the city. Lower Albany was under from ten to twenty feet of water. The damage to property was estimated at from \$200,000 to \$300,000 [\$4.8 to \$7.2 million in today's dollars]. At Laconia, Indiana, the bottomlands were overflowed, the water reaching the second floors of many of the houses, some of which were washed away. At Paducah, Kentucky, on the 19<sup>th</sup>, the town was completely surrounded by water and one-half of the city was inundated. The damage was estimated at \$200,000 [\$4.8 million in today's dollars]. At Shawneetown, Illinois, the entire town was submerged to a depth averaging eight feet on the 15<sup>th</sup>. Not more than one-fourth of the two thousand inhabitants remained in the town. On the 19<sup>th</sup>, one half of the frame buildings in the city had been moved from their foundations.<sup>126</sup>

The flood of February 1884 in the *United States* affected many other rivers and streams including: Allegheny river, Conodoquinet Creek, French Creek, Maumee River, Sandusky River, Blanchard River, Cuyahoga River, Hockhocking River, Scioto River, Paint River, Muskingum River, Mahoning River, Miami River, Wabash River, Cumberland River, Tennessee River, White River, Alabama River, Raritan River, James River, Arkansas River, and Red River.<sup>126</sup>

On 9 February 1884, tornados struck Missouri, Illinois, Kentucky, Tennessee, Mississippi, Georgia, the two Carolinas and Virginia in the *United States*, in which the aggregate loss was 800 lives and 10,000 houses. In the region covered, there were sixty different tornadoes on that day. The loss of life in the aggregate was greater on that day than was ever known before in wind storms in the United States.<sup>197</sup>

On 14 February 1884, the Susquehanna River in Bradford County, Pennsylvania in the *United States* was the highest that it had been since December 1878, when the high-water mark at Towanda was put on a stone at the foot of Park Street. During this flood the river was nearly one-fourth mile [0.4 km] wide. In 1884, the oldest inhabitant in Bradford County sought in vain for a match for the eight hot September days beginning on the 4<sup>th</sup> and ending on the 11<sup>th</sup>. The records failed to show in any previous year, eight consecutive autumn days when the thermometer stood at 90° F [32° C] in the shade every day. On 27 September, a tornado ¼ mile [0.4 km] wide struck in the vicinity of Ulster.<sup>178</sup>

Floods also occurred in California in the *United States* during February 1884. Heavy rains produced floods and caused a dam to break on the Los Angeles River during the night of the 17<sup>th</sup> – 18<sup>th</sup>. This produced the most disastrous flood ever experienced. The lower part of the city was completely inundated and forty buildings were swept away. Hundreds of families were obliged to abandon their homes and seek shelter on the hills. From Los Angeles to Mojave, a distance of one hundred miles, scarcely a mile of the Southern Pacific railroad track remained in place, and from Los Angeles eastward to San Geronio the destruction was equally great. The California Southern railroad, from Colton to San

Diego, was also washed out. Reports from towns in the southern part of San Joaquin valley stated that the floods in that section were the heaviest ever experienced. Los Angeles estimated the damage at \$750,000 [\$18 million in today's dollars]. Reports from San Bernardino, on the 21<sup>st</sup>, stated that the streets were covered with water to a depth of three feet, and that the houses were flooded. The town of Fallbrook was entirely washed away. Many of the inhabitants were missing and were supposed to have been drowned. Numerous orange groves and vineyards in the San Gabriel Valley were completely destroyed. In Ventura County, California, the storm produced 9.6 inches of rainfall. Several bridges were washed away on the Santa Clara River and in some places landslides occurred on the railroads.<sup>126</sup>

Around 18 February 1884, tornadoes struck in the southern states of the *United States* killing about 600 people.<sup>90</sup>

On the afternoon of 19 February 1884, several of the Southern states in the *United States* were visited by violent tornadoes. They were most destructive in Alabama, Georgia, and the Carolinas. Reports from Atlanta, Georgia stated that about three hundred persons were killed, nine hundred were injured, and that \$2 million worth of property had been destroyed in that state alone [approximately \$48 million in present dollars using the Consumer Price Index (CPI)]. At Cross Plains, Alabama, eight persons were killed and several wounded. At Leeds, fifteen miles east of Birmingham, Alabama, a tornado swept over the town, destroying everything in its path. Houses were blown away and not even their foundations remained; horses, mules, and cattle were killed, and in some instances missiles were driven through the bodies. In Leeds and vicinity, eleven persons were killed instantly and thirty-one were wounded, many of the latter being fatally injured; twenty-seven dwellings were entirely destroyed together with many barns and other out buildings. In the vicinity of Ladiga and Amberson, Alabama, a large number of houses were blown down and fourteen persons were reported killed. Twenty-six persons in the immediate vicinity of Rock Run, Alabama, were killed and many others were injured. At Philadelphia, North Carolina (2 miles from Rockingham), the entire settlement containing about 25 cabins were destroyed and 11 occupants killed. At Chester, South Carolina, forty houses and two churches were blown down, and a number of people killed. At Chappell, South Carolina, not a house was left standing. At Darlington, South Carolina, six persons were killed and 20-30 injured. At Andersonville, South Carolina, five persons were killed.<sup>126</sup>

At Ogreeta, North Carolina in the *United States* on 25 March 1884, a hailstorm dropped very large hailstones weighing as much as a pound. The hailstones fell with such force that they were driven into the earth several inches. The hailstones damaged crops and livestock.<sup>126</sup>

At Vicksburg, Mississippi in the *United States*, the Mississippi River reached a high water mark of forty-nine feet on 23 March 1884. At Rodney, Mississippi, the Kemp levee broke on the night of the 24<sup>th</sup>-25<sup>th</sup>, and Tensas parish was entirely submerged making 20,000 people destitute. At Yuma, Arizona, on 11 March, floods on the Gila River broke through the levee and flooded the town; many families were compelled to vacate their homes, and numerous buildings were undermined. Several miles of the Southern Pacific railroad track were washed away. Damage was estimated at \$250,000 [\$6 million in today's dollars]. Heavy rains caused a levee to break at Robert's Island near Stockton, California during the night of 18/19 March destroying about 27,000 acres of growing wheat. This caused a loss of \$500,000 [\$12 million in today's dollars].<sup>126</sup>

On 15 April 1884, destructive tornados damaged parts of Georgia in the *United States*. At Chipley, forty buildings were destroyed and seven persons were killed. At Meriwether, a large amount of property was destroyed and six persons killed. At Sandtown, ten people were killed and much property destroyed.<sup>126</sup>

From 28 to 31 May 1884, destructive frosts occurred in the Great Lake region, New England and the northern portions of the Mid-Atlantic States in the *United States*. In Connecticut, crop damage from the frost was estimated at \$1 million [\$24 million in today's dollars]. In Illinois, the severe frost destroyed



garden vegetables, corn, potatoes and fruit trees buds. At Woodstock, Illinois, the ice formed to a thickness of 1/8 inch. In Indiana at Fort Wayne, South Bend, La Fayette and Angola, the frost damaged early vegetation. The frost was very severe in the Turkey River Valley in Iowa, destroying corn, potatoes and other vegetables. At Manchester, Preston, Dubuque and Brooklyn, Iowa, similar damage was reported. At Louisville, Kentucky, the cold weather injured the tobacco crop. At Gardiner and Portland, Maine, the frost badly damaged vegetation. At Ocean City, Maryland, the corn and sweet potatoes were damaged by the frost. In Bristol County, Massachusetts, frost damage was estimated at \$100,000. At Athol, Massachusetts, ice formed to a thickness of ¼ inch on the morning of the 30<sup>th</sup>. At Boston, Massachusetts during the night of 29/30 May, the ground froze to a depth of ¼ to ½ inch throughout New England. At Great Barrington, Massachusetts, the temperature fell to 22° F. Incalculable damage was done to crops in Massachusetts. The frost in Michigan seriously injured fruit and vegetables throughout the state. New Hampshire also incurred similar damage. The crops at Cape May, New Jersey were also destroyed by the frost. Many regions of New York sustained great frost damage. At Poughkeepsie, the thermometer fell to 25° F. In Dutchess and Ulster Counties, one half of the grape crop was destroyed. The loss was estimated at \$100,000. In Troy, ice formed to a thickness of ¾ of an inch. At Menand's Station near Albany, the frost of the 30<sup>th</sup> was the severest known to occur in May for the last 40 years; fruits and vegetables in many localities were entirely destroyed. Damage to the strawberry crop at Sag Harbor on Long Island was estimated at \$50,000. Many areas of Ohio sustained frost damage. The frost caused a large amount of damage in Canada in the Province of Ontario. Similar crop damage was reported in Pennsylvania, Rhode Island, Vermont, and West Virginia.<sup>126</sup>

On 25 May 1884, severe hailstorms struck Texas in the *United States*. At Mobeetie, a few miles from Fort Elliott, the hailstones perforated the sheet iron roofs of the buildings. At Fort Davis, the hailstones varied in size from hickory nuts to 5 inches in circumference and fell with such force as to perforate roofs of corrugated iron and tin.<sup>126</sup>

Reports from all portions of the Texas in the *United States* show the rains of the 20<sup>th</sup> and 21<sup>st</sup> of May 1884, to have been the heaviest ever known in Texas, and that the damage to agricultural interests was very great. The flood damage to railroad property was estimated at \$2 million [approximately \$48 million in present dollars using the Consumer Price Index (CPI)], and the combined losses sustained by farmers and railroad companies would reach \$5 million [\$120 million in today's dollars]. Hundreds of culverts and small bridges were washed away. Large numbers of cattle were drowned and the inhabitants were driven to the highlands.<sup>126</sup>

At the end of May 1884, there was a disastrous flood in eastern *Spain*.<sup>90</sup>

About 23 June 1884, there were floods in *Galicia*. A new railway bridge over the Vistula River was destroyed. 20 lives were lost.<sup>90</sup> [Galicia is a historical region in Eastern Europe, currently divided between *Poland* and *Ukraine*. The Vistula River is entirely in *Poland*.]

The following are the highest temperatures observed during July 1884 in the *United States*:<sup>126</sup>

Montgomery, Alabama	( 95° F, 35.0° C)
Mobile, Alabama	( 96° F, 35.6° C)
Fort McDowell, Arizona	(116° F, 46.7° C)
Fort Apache, Arizona	(102° F, 38.9° C)
Texas Hill, Arizona	(118° F, 47.8° C)
Little Rock, Arkansas	(101° F, 38.3° C)
Fort Smith, Arkansas	(104° F, 40.0° C)
Los Angeles, California	( 99° F, 37.2° C)
Fort Bidwell, California	( 97° F, 36.1° C)
Mammoth Tank, California	(126° F, 52.2° C)
West Las Animas, Colorado	(104° F, 40.0° C)

Pike's Peak, Colorado	( 54° F, 12.2° C)
New Haven, Connecticut	( 87° F, 30.6° C)
New London, Connecticut	( 83° F, 28.3° C)
Delaware Breakwater, Delaware	( 80° F, 26.7° C)
Washington, D.C.	( 96° F, 35.6° C)
Pensacola, Florida	( 97° F, 36.1° C)
Jacksonville, Florida	( 96° F, 35.6° C)
Atlanta, Georgia	( 90° F, 32.2° C)
Savannah, Georgia	( 96° F, 35.6° C)
Coeur d'Alene, Idaho	( 88° F, 31.1° C)
Lewiston, Idaho	( 94° F, 34.4° C)
Chicago, Illinois	( 89° F, 31.7° C)
Cairo, Illinois	( 92° F, 33.3° C)
Indianapolis, Indiana	( 90° F, 32.2° C)
Spiceland, Indiana	( 93° F, 33.9° C)
Des Moines, Iowa	( 95° F, 35.0° C)
Davenport, Iowa	( 88° F, 31.1° C)
Leavenworth, Kansas	(101° F, 38.3° C)
Dodge City, Kansas	( 98° F, 36.7° C)
Louisville, Kentucky	( 94° F, 34.4° C)
Bowling Green, Kentucky	( 91° F, 32.8° C)
New Orleans, Louisiana	( 95° F, 35.0° C)
Shreveport, Louisiana	(104° F, 40.0° C)
Eastport, Maine	( 81° F, 27.2° C)
Portland, Maine	( 87° F, 30.6° C)
Baltimore, Maryland	( 95° F, 35.0° C)
Boston, Massachusetts	( 90° F, 32.2° C)
Thatcher's Island, Massachusetts	( 82° F, 27.8° C)
Marquette, Michigan	( 86° F, 30.0° C)
Detroit, Michigan	( 89° F, 31.7° C)
Saint Vincent, Minnesota	( 83° F, 28.3° C)
Saint Paul, Minnesota	( 88° F, 31.1° C)
Vicksburg, Mississippi	( 99° F, 37.2° C)
Saint Louis, Missouri	( 94° F, 34.4° C)
Poplar River, Montana	( 93° F, 33.9° C)
Fort Shaw, Montana	( 85° F, 29.4° C)
North Platte, Nebraska	( 97° F, 36.1° C)
Omaha, Nebraska	( 97° F, 36.1° C)
Winnemucca, Nevada	(105° F, 40.6° C)
Hot Springs, Nevada	( 95° F, 35.0° C)
Mount Washington, New Hampshire	( 67° F, 19.4° C)
Little Egg Harbor, New Jersey	( 90° F, 32.2° C)
Atlantic City, New Jersey	( 90° F, 32.2° C)
Fort Craig, New Mexico	(107° F, 41.7° C)
Rochester, New York	( 89° F, 31.7° C)
New York City, New York	( 90° F, 32.2° C)
Scott's Hill, North Carolina	( 93° F, 33.9° C)
Kitty Hawk, North Carolina	( 97° F, 36.1° C)
Bismarck, North Dakota	( 89° F, 31.7° C)
Fort Buford, North Dakota	( 95° F, 35.0° C)
Sandusky, Ohio	( 91° F, 32.8° C)
Cleveland, Ohio	( 86° F, 30.0° C)
Fort Sill, Oklahoma	(107° F, 41.7° C)
Fort Reno, Oklahoma	(105° F, 40.6° C)
Roseburg, Oregon	( 86° F, 30.0° C)
Ashland, Oregon	(100° F, 37.8° C)

Pittsburg, Pennsylvania	( 97° F, 36.1° C)
Philadelphia, Pennsylvania	( 92° F, 33.3° C)
Narragansett Pier, Rhode Island	( 85° F, 29.4° C)
Charleston, South Carolina	( 95° F, 35.0° C)
Anderson, South Carolina	(104° F, 40.0° C)
Fort Bennett, South Dakota	( 97° F, 36.1° C)
Nashville, Tennessee	( 94° F, 34.4° C)
Chattanooga, Tennessee	( 92° F, 33.3° C)
El Paso, Texas	(111° F, 43.9° C)
Dallas, Texas	(105° F, 40.6° C)
Salt Lake City, Utah	( 93° F, 33.9° C)
Charlotte, Vermont	( 93° F, 33.9° C)
Lynchburg, Virginia	( 96° F, 35.6° C)
Cape Henry, Virginia	( 96° F, 35.6° C)
Dayton, Washington	( 96° F, 35.6° C)
Port Angeles, Washington	( 73° F, 22.8° C)
Helvetia, West Virginia	( 92° F, 33.3° C)
Milwaukee, Wisconsin	( 90° F, 32.2° C)
La Crosse, Wisconsin	( 91° F, 32.8° C)
Cheyenne, Wyoming	( 90° F, 32.2° C)

The *United States* was struck by numerous strong hailstorms in July 1884. On the 21<sup>st</sup> in the vicinity of Carthage, South Dakota, the storm produced hailstones of a remarkable size. These hailstones fell with sufficient force to penetrate the roofs of buildings and to break ordinary weatherboarding. On the 23<sup>rd</sup> in Hand, Spink and Sully counties in South Dakota, the hailstorm destroyed crops, entailing losses estimated at \$50,000. [In present currency, that would be equivalent to \$1.2 million in damages based on the Consumer Price Index (CPI) inflation rates.] In Hamilton County, Iowa, on the 11<sup>th</sup>, the storm produced hailstones half the size of hens' eggs. The storm only lasted from 5 to 10 minutes but left the ground covered with hailstones to a depth of from three to six inches. All windows on the north and east sides of buildings were broken. The total losses from the hailstorm were estimated from \$75,000 to \$125,000. [In present currency, that would be equivalent from \$1.8 million to \$3 million.] In Westmoreland, Kansas on the 24<sup>th</sup>, a storm produced hailstones as large as hen's eggs that broke glass in many windows and badly damaged growing crops. At Fort Assinaboine, Montana on the 15<sup>th</sup>, a hailstorm killed many birds and small animals. At Omaha, Nebraska on the 13<sup>th</sup>, a hailstorm struck with such force that the roofs of buildings were reduced to splinters; many small animals were killed. In Fremont, Nebraska on the 20<sup>th</sup>, the storm produced hailstones as large as hens' eggs. The crops were entirely ruined. The aggregate losses from the storm were estimated at \$100,000. [In present currency, that would be equivalent to \$2.4 million.] In Claremont, New Hampshire on the 19<sup>th</sup>, the hailstones were as large as hens' eggs and accumulated to a depth of two feet on the ground. In Eau Claire, Wisconsin on the 25<sup>th</sup>; hogs, sheep and cattle were killed by hailstones, some of which weighed several ounces.<sup>126</sup>

On 25 July 1884, a waterspout struck Saint Louis, Missouri in the *United States*:<sup>126</sup>

“The storm late yesterday afternoon showed many of the characteristics, in it's coming, of the approach of a tornado. The clouds seemed to approach from the southeast and also from the southwest, but the greatest force was from the former direction. At 4.30 the sky was filled with clouds, but beneath them there appeared a separate installment of lighter colored clouds assuming all kinds of fantastic shapes. They moved to a centre north and west of the city, where they seemed to lose energy, as the agitation and fantastic motion apparently decreased. Passengers on the ferryboats about 5 o'clock, when the rain had begun to fall, saw the most interesting manifestation of the storm. The water opposite the foot of Anna street became violently agitated, and while spectators were wondering what caused the disturbance, a cloud, shaped like an inverted cone, moved over it, and the water rose in a cone to meet it, but as the two cones came together the oblique lines of the two sides became nearly vertical. It was a water-spout, and its movement was very rapid in a northeasterly direction. Opposite the foot of Choteau Avenue the spout left the

river near the Pittsburg dike, and added to its bulk a large amount of sand from the shore. It passed over the Pittsburg Transfer Stables, the east end of which was torn from its foundation and thrown through the engine house. The roof of the engine house was taken off and many pieces were carried to the Little Rolling Mills, a mile away. Here the column lost its force and power of motion. It was precipitated in a torrent of rain, which covered the streets. An eyewitness reports that it appeared to be about five hundred feet in diameter and had a rapid rotary motion, producing a sound like distant thunder. For a few seconds the air seemed to be motionless, when suddenly the column swept across toward the Pittsburg engine house and stables, damaging them as described above.”

Destructive frost occurred on 25 August 1884 in New England, New York, northeastern Pennsylvania and northern New Jersey in the *United States*.<sup>126</sup>

On 29 August 1884, a violent storm struck Evansville, Indiana in the *United States*. A transfer steamer, *Belmont*, plying between Evansville, and Henderson, Kentucky, was capsized and sunk near Stanley's Landing. The number of lives lost is reported to have been from twelve to fifteen. The steamer had in tow a barge containing two passenger coaches with about sixty passengers, all of whom were saved. At Evansville, the storm caused damage estimated at \$250,000 [approximately \$6 million in present dollars using the Consumer Price Index (CPI)]. Hundreds of houses were damaged and a large number of trees were destroyed. One person was killed by the falling wall of a building that was demolished by the storm, and the steamers *Joseph V. Throop* and *Silver Horn* were badly damaged.<sup>126</sup>

On 9 September 1884, a tornado struck White Bear Lake, Minnesota in the *United States*. The sheds of the Saint Paul and Duluth railroad company were demolished, and hundreds of trees were blown across the railroad between White Bear Station and Dellwood. The length of path was one hundred and thirty miles, and its width 2,640 feet. The storm was very destructive to both life and property. Six persons were killed, and seventy-five wounded. Three hundred buildings were destroyed, and much livestock killed. The total valuation of property destroyed is estimated at \$4 million [approximately \$100 million in present dollars using the Consumer Price Index (CPI)]. On the same day, a tornado struck Clear Lake, Wisconsin that left the greater part of the town in ruins and killed three persons. The damage caused by the storms is estimated at about \$150,000. About forty buildings in Clear Lake and vicinity were destroyed.<sup>126</sup>

In September due to heavy rainfall, floods struck Eau Claire, Wisconsin in the *United States*. All of the bridges over the Chippewa River, ten in number, were washed away. It is estimated that the damage in the vicinity of Chippewa Falls and Eau Claire will reach \$1.5 million [approximately \$36 million in present dollars using the Consumer Price Index (CPI)]. Business houses on either side of both rivers were submerged. In Eau Claire nearly four hundred houses were either swept away or wrecked, and 2,000 persons were rendered dependent for shelter upon those living in the higher localities.<sup>126</sup>

On 6-8 October 1884, a hurricane struck *Jamaica* drowning at least 8 people.<sup>141</sup>

On 7 October 1884, storm struck Catania, *Sicily*.<sup>90</sup>

In November 1884, there was a great inundation caused by heavy rains in eastern *Spain*. There was much distress in Alicante, Almeria and Valencia.<sup>90</sup>

*Also refer to the section 1880 A.D. – 1886 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1884 / 1885 A.D.** In the *United States*, the weather was very severe during the last half of the December 1884 from Minnesota westward to the Pacific coast, attended in Oregon and Washington Territory by unusually heavy snowfalls, causing much loss of life and property. At Denver, Colorado on

the 26<sup>th</sup>, continued storms and increasing drifts were reported from many points in the mountains. Leadville was nearly buried in the snow. The stores were reached by deep cuts through the drifts. The main floors of buildings had the character of cellars in their relation to the level outside. Railway communication with the city was kept open only by the constant use of snow plows and an army of shovelers, while the [railroad] branches from that city were buried and the points to which they run are completely isolated. In the Monarch District of Chaffee County, near Marshall Pass, the average depth of snow was at ten feet, with many drifts of greater depth. Families were buried in their houses with limited food supplies.<sup>126</sup>

The winter of 1884-85 in Bradford County, Pennsylvania in the *United States* was a cold. There was a total snowfall of 67 inches [1.7 m]. Generally the sleighing was good from the latter part of December until March. February and March were notably cold months. On February 11<sup>th</sup>, thermometers in the county ranged from -13° F to -24° F [-25° C to -31° C]; and on February 22<sup>nd</sup>, -25° F [-32° C] was reported. March cold records were on the 13<sup>th</sup>, -18° F [-28° C]; 17<sup>th</sup>, -16° F [-27° C]; 18<sup>th</sup>, -22° F [-30° C]; 20<sup>th</sup>, -14° F [-26° C]; 21<sup>st</sup>, -16° F [-27° C]; 22<sup>nd</sup>, -13° F [-25° C]; 23<sup>rd</sup>, -6° F [-21° C] and on the 24<sup>th</sup>, thermometers still indicated zero. The ice, which was of unusual thickness, broke up and passed out of the Susquehanna River on March 31 without doing any damage.<sup>178</sup>

The following are the lowest temperatures observed during January 1885 in the *United States*:<sup>113</sup>

Montgomery, Alabama	( 19.2° F, -7.1° C)	
Mobile, Alabama	( 19.9° F, -6.7° C)	
Prescott, Arizona	( -4.0° F, -20.0° C)	
Fort Apache, Arizona	( -4.0° F, -20.0° C)	
Little Rock, Arkansas	( 9.6° F, -12.4° C)	
Fort Smith, Arkansas	( 2.4° F, -16.4° C)	
San Francisco, California	( 43.0° F, +6.1° C)	
Red Bluff, California	( 33.0° F, +0.6° C)	
Denver, Colorado	(-10.9° F, -23.8° C)	
Pike's Peak, Colorado	(-29.4° F, -34.1° C)	
West Las Animas, Colorado	(-25.9° F, -32.2° C)	
New Haven, Connecticut	( -0.9° F, -18.3° C)	
New London, Connecticut	( 1.0° F, -17.2° C)	
Fort Buford, Dakota	(-45.5° F, -43.1° C)	[now Fort Buford, Montana]
Fort Totten, Dakota	(-37.0° F, -38.3° C)	[now Fort Totten, North Dakota]
Huron, Dakota	(-33.0° F, -36.1° C)	[now Huron, South Dakota]
Delaware Breakwater, Delaware	( 12.1° F, -11.1° C)	
Washington, D.C.	( 10.2° F, -12.1° C)	
Pensacola, Florida	( 24.3° F, -4.3° C)	
Key West Florida	( 59.3° F, +15.2° C)	
Atlanta, Georgia	( 13.7° F, -10.2° C)	
Augusta, Georgia	( 22.0° F, -5.6° C)	
Boise City, Idaho	( -7.3° F, -21.8° C)	
Coeur d'Alene, Idaho	(-22.5° F, -30.3° C)	
Chicago, Illinois	(-12.9° F, -24.9° C)	
Cairo, Illinois	( -4.0° F, -20.0° C)	
Indianapolis, Indiana	(-11.3° F, -24.1° C)	
Monticello, Indiana	(-29.5° F, -34.2° C)	
Fort Reno, Indian Territory	( -2.5° F, -19.2° C)	[now Fort Reno, Oklahoma]
Dubuque, Iowa	(-22.5° F, -30.3° C)	
Des Moines, Iowa	(-20.2° F, -29.0° C)	
Muscatine, Iowa	(-34.5° F, -36.9° C)	
Leavenworth, Kansas	(-10.8° F, -23.8° C)	
Dodge City, Kansas	(-18.2° F, -27.9° C)	
Louisville, Kentucky	( -5.0° F, -20.6° C)	

New Orleans, Louisiana	( 27.7° F, -2.4° C)	
Shreveport, Louisiana	( 13.0° F, -10.6° C)	
Eastport, Maine	(-11.0° F, -23.9° C)	
Portland, Maine	( -3.2° F, -19.6° C)	
Baltimore, Maryland	( 10.2° F, -12.1° C)	
Boston, Massachusetts	( -1.7° F, -18.7° C)	
Escanaba, Michigan	(-26.1° F, -32.3° C)	
Mackinaw City, Michigan	(-34.2° F, -36.8° C)	
Saint Vincent, Minnesota	(-40.0° F, -40.0° C)	
Duluth, Minnesota	(-41.0° F, -40.6° C)	
Saint Paul, Minnesota	(-35.6° F, -37.6° C)	
Tower, Minnesota	(-46.0° F, -43.3° C)	
North Pacific Junction, Minnesota	(-48.0° F, -44.4° C)	
Vicksburg, Mississippi	( 19.0° F, -7.2° C)	
Saint Louis, Missouri	( -9.7° F, -23.2° C)	
Fort Benton, Montana	(-37.9° F, -38.8° C)	
Poplar River, Montana	(-63.1° F, -52.8° C)	
Helena, Montana	(-15.5° F, -26.4° C)	
North Platte, Nebraska	(-26.8° F, -32.7° C)	
Omaha, Nebraska	(-18.4° F, -28.0° C)	
Winnemucca, Nevada	( 8.9° F, -12.8° C)	
Mount Washington, New Hampshire	(-50.0° F, -45.6° C)	
Sandy Hook, New Jersey	( 6.6° F, -14.1° C)	
Barnegat City, New Jersey	( 8.6° F, -13.0° C)	
Santa Fe, New Mexico	( -3.2° F, -19.6° C)	
Albany, New York	(-10.5° F, -23.6° C)	
Rochester, New York	( -5.3° F, -20.7° C)	
Charlotte, North Carolina	( 10.8° F, -11.8° C)	
Kitty Hawk, North Carolina	( 21.6° F, -5.8° C)	
Cincinnati, Ohio	( -8.5° F, -22.5° C)	
Columbus, Ohio	( -8.1° F, -22.3° C)	
Roseburg, Oregon	( 27.3° F, -2.6° C)	
Portland, Oregon	( 17.0° F, -8.3° C)	
Pittsburg, Pennsylvania	( 1.7° F, -16.8° C)	
Philadelphia, Pennsylvania	( 5.6° F, -14.7° C)	
Block Island, Rhode Island	( 5.5° F, -14.7° C)	
Narragansett Pier, Rhode Island	( 0.0° F, -17.8° C)	
Charleston, South Carolina	( 28.0° F, -2.2° C)	
Nashville, Tennessee	( -2.2° F, -19.0° C)	
Memphis, Tennessee	( 2.7° F, -16.3° C)	
Fort Elliott, Texas	( -6.0° F, -21.1° C)	
Fort Concho, Texas	( 1.6° F, -16.9° C)	
Salt Lake City, Utah	( 4.8° F, -15.1° C)	
Lynchburg, Virginia	( 12.0° F, -11.1° C)	
Norfolk, Virginia	( 19.9° F, -6.7° C)	
Olympia, Washington Territory	( 28.0° F, -2.2° C)	[now Olympia, Washington]
Spokane Falls, Washington Territory	(-14.0° F, -25.6° C)	[now Spokane Falls, Washington]
Milwaukee, Wisconsin	(-21.5° F, -29.7° C)	
La Crosse, Wisconsin	(-25.1° F, -31.7° C)	
Cheyenne, Wyoming	(-18.6° F, -28.1° C)	

During the winter of 1884-85, the temperature at Fort Benton, Montana fell to -56.5° F in December and -20.8° F in February. The temperature at Fort Assiniboine (near Havre, Montana) fell to -50.0° F in December and -16.7° F in February. The temperature at Fort Buford (near Williston, North Dakota) fell to -39.8° F in December and -32.0 in February. The temperature at Fort Bennett (now located under the



waters of the Oahe Reservoir in South Dakota) fell to  $-41.3^{\circ}\text{F}$  in December. The temperature at Saint Vincent, Minnesota fell to  $-47.8^{\circ}\text{F}$  in December and  $-39.2^{\circ}\text{F}$  in February. The temperature at Saint Paul, Minnesota fell to  $-27.0^{\circ}\text{F}$  in December and  $-24.5^{\circ}\text{F}$  in February. The temperature at Pike's Peak, Colorado fell to  $-20.0^{\circ}\text{F}$  in December and  $-24.0^{\circ}\text{F}$  in February. The temperature at La Crosse, Wisconsin fell to  $-26.0^{\circ}\text{F}$  in December and  $-22.0^{\circ}\text{F}$  in February. The temperature at Milwaukee, Wisconsin fell to  $-21.6^{\circ}\text{F}$  in December and  $-23.6^{\circ}\text{F}$  in February. The temperature at Mount Washington, New Hampshire fell to  $-42.0^{\circ}\text{F}$  in December,  $-30.8^{\circ}\text{F}$  in February and  $-47.8^{\circ}\text{F}$  in March. The temperature at Dayton, Washington fell to  $-26.0^{\circ}\text{F}$  in December. The temperature at Yankton, South Dakota fell to  $-18.2^{\circ}\text{F}$  in February. The temperature at Chicago, Illinois fell to  $-13.7^{\circ}\text{F}$  in February. The temperature at Greencastle, Indiana fell to  $-13.1^{\circ}\text{F}$  in February. The temperature at Dubuque, Iowa fell to  $-20.0^{\circ}\text{F}$  in February. The temperature at Davenport, Iowa fell to  $-17.3^{\circ}\text{F}$  in February. The temperature at Leavenworth, Iowa fell to  $-16.2^{\circ}\text{F}$  in February. The temperature at Escanaba, Michigan fell to  $-25.0^{\circ}\text{F}$  in February. The temperature at Omaha, Nebraska fell to  $-17.9^{\circ}\text{F}$  in February. The temperature at North Platte, Nebraska fell to  $-22.2^{\circ}\text{F}$  in February. The temperature at Toledo, Ohio fell to  $-15.5^{\circ}\text{F}$  in February.<sup>113, 126</sup>

The depth that rivers and lakes froze in January 1885 in the *United States*:<sup>113</sup>

- \* At Sherlock, Kansas, on the *Arkansas River*, the ice was of sufficient thickness to bear the weight of [wagon] teams during the latter part of January.
- \* At Portland Maine, in the *Casco Bay*, the harbor was filled with floating ice. On the 22<sup>nd</sup> the steamer *Popham* was cut through by the ice and sank on Phippsburg flats.
- \* At Chincoteague, Virginia, the *Chincoteague Bay* froze over on the 23<sup>rd</sup>.
- \* At Hartford, Connecticut, the *Connecticut River* was frozen for the third time during the winter on the 21<sup>st</sup> and 22<sup>nd</sup>. The river was frozen for a distance of 500 miles and within 5 miles of Long Island Sound.
- \* At Traverse City, Michigan, the *Grand Traverse Bay* froze on the 26<sup>th</sup>.
- \* At Albany, New York, the *Hudson River* froze on the 3<sup>rd</sup>.
- \* At Port Huron, Michigan, *Lake Huron* on the 19<sup>th</sup> was covered with ice as far as the eye could reach.
- \* At Traverse City, Michigan, *Lake Michigan* on the 28<sup>th</sup> was frozen over as far as the eye could reach. At Manistique, Michigan, the ice on the lake extended beyond the range of vision. At Grand Haven, Michigan, the harbor was closed several times during January because it was blocked by the ice. At Milwaukee, Wisconsin, the ice in *Lake Michigan* was unusually heavy. Navigation was suspended. The propeller *Oneida* was caught in the ice fields off Grand Haven on the 20<sup>th</sup> and drifted with the ice being unable to reach either shore for the rest of the month.
- \* At Duluth, Minnesota, *Lake Superior* on the 16<sup>th</sup> was frozen and the ice extended as far as could be seen.
- \* At Keokuk, Iowa, the *Mississippi River* was frozen from Keokuk northward throughout the month.
- \* At Leavenworth, Kansas, the *Missouri River* was frozen throughout January and at all points northward.
- \* At New Haven, Connecticut, the harbor froze over on the 23<sup>rd</sup>.
- \* At Buffalo, New York, the *Niagara River* was frozen throughout the month.
- \* At Washington, D.C., the *Potomac River* froze several times during January.
- \* At Port Huron, Michigan, the *Saint Clair River* was frozen on the 29<sup>th</sup>.
- \* At Tiffin, Ohio, the *Sandusky River*, the ice was 7 inches thick on the 22<sup>nd</sup>.
- \* At Columbia, Pennsylvania, the *Susquehanna River* froze over on the 23<sup>rd</sup>.
- \* At Port Deposit, Maryland, the *Susquehanna River* on the 23<sup>rd</sup> formed an ice dam that extended from Garret's Island three miles south and several miles northward. As a result, by the afternoon, ice accumulated to a depth of fifteen feet on the opposite side of the river. This caused the river to overflow the entire southern portion of the town.
- \* At Toledo, Ohio, the ice in the *Maumee River* was 8 inches thick on the 21<sup>st</sup>.
- \* At New Haven, Connecticut, the ice on *Lake Whitney* was 10 inches thick on the 28<sup>th</sup>.

Portland, Oregon in the *United States* reports on 28 January 1885 "During the past six weeks heavy storms have prevailed throughout eastern Oregon and Washington Territory. And the loss of livestock is reported as very heavy. The latest reports for the settled regions east of the Cascades are that large numbers of persons froze to death during the late cold and protracted snowstorm. A number of persons during the continuance of the storm are known to have wandered off and perished. Most of the bodies of

such persons have been recovered since the snow disappeared. It is reported that many persons are still missing, and it is supposed that they have perished.<sup>113</sup>

Bozeman, Montana in the *United States* on 2 January 1885 reports that snow in the various livestock ranges was more than two feet deep on the level and that cattle were starving. In the Yellowstone region, the snow was reported to be of great depth. At Fort Canby, Washington Territory on the 8<sup>th</sup>, it was reported that the weather during the past three weeks was the severest ever experienced in the Columbia valley and throughout Oregon and Washington Territory; no trains arrived from the east from 16 December 1884 until 8 January 1885.<sup>113</sup>

Severe snowstorms struck the Midwest and Northeast in the *United States* in January 1885. Hillsborough, Illinois reports on the 16<sup>th</sup>, the snow covered the ground to a depth of nearly two feet. Quincy, Illinois reported one foot of snowfall. Kankakee, Illinois reported on the 28<sup>th</sup>, snow was two feet deep. Pana, Illinois reported that on the 28<sup>th</sup>, the snow was 20 inches deep on the level and in some places the drifts covered the fences. All railroads were delayed and there was much suffering experienced by livestock. At Troy, New York, on the 28<sup>th</sup>, more than a foot of snow fell.<sup>113</sup>

Heavy snowstorms struck the *United States* during February 1885. At Grand Haven, Michigan on the 9<sup>th</sup>, snowdrifts were 1 to 7 feet. At Jackson, Michigan on the 10<sup>th</sup>, snow was three feet deep on the level. At Grand Rapids, Michigan on the 10<sup>th</sup>, the snow was 3 feet deep. Snow blockades halted railroad traffic in the upper Midwest at many locations. At Des Moines, Iowa on the 9<sup>th</sup>, the snow drifted to depths from four to five feet. At Cape May, New Jersey on the 13<sup>th</sup> through 15<sup>th</sup>, and the snow was 12 inches on the level and drifts were from seven to nine feet deep. At Plymouth, New Hampshire during the night of the 16<sup>th</sup>/17<sup>th</sup> snow fell to a depth of eighteen inches. At Troy, New York, the country roads were obstructed by snowdrifts twenty feet deep. At Bangor, Maine, snow fell to a depth of 12 inches on the 17<sup>th</sup>.<sup>113</sup>

During the night of the 13<sup>th</sup>/14<sup>th</sup> February 1885, the village of Alta, Utah in the *United States*, about forty miles southeast of Salt Lake City, was nearly buried beneath an immense snow slide. It had been snowing for nearly a week and the snow had accumulated to great depths. The snow slide occurred about 8 p.m., burying about three-fourths of the place. In the buildings under the snow were twenty-eight persons, some of whom were killed. The damage is estimated at more than \$40,000. [In present currency, that would be equivalent to \$1 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>113</sup>

On 18 March 1885 at Kitty Hawk, North Carolina in the *United States*, one of the heaviest snowfall at this place occurred. In places along the beach, the snow drifted to depths from two to four feet; the average was six inches. Reports from Roanoke Island stated that the snow fell to a depth of two feet. The snowflakes, which were very moist, stuck to the sides of buildings and weighed down trees and shrubbery. During the storm, there was an almost incessant display of lightning.<sup>113</sup>

On 18 March 1885, the minimum temperature at Northfield, Massachusetts in the *United States* was -20° F.<sup>138</sup>

Heavy snowfalls struck Colorado in the *United States* in April 1885. At Denver, Colorado, on 23 April twenty-three inches of snow fell. The snow was very moist and heavy and as a result the snow caused significant damage to roofs of buildings, trees, etc., which were broken down under its weight. The damage caused by this storm is estimated at \$60,000. [\$1.4 million in today's dollars.] At Georgetown, Colorado on the 23<sup>rd</sup>, the snowstorm was of great severity producing three feet of snow. At Idaho Springs, Colorado, the snowstorm began at noon on the 22<sup>nd</sup> and continued for twenty-four hours. Snow fell to a depth of thirty-two inches.<sup>113</sup>

On 16 January 1885, destructive snowstorms struck Piedmont, *Italy*.<sup>90</sup>

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**1885 A.D.** On the 21 January 1885, a remarkable rainstorm entered western New South Wales, *Australia* not far from Milparinka, and travelled slowly (about 7 miles per hour), straight across country to the sea. The country around Wilcannia received from 10-11 inches of rain during 40 hours. Even though the Darling River had been very low for months before, this heavy rainfall produced a flood. The peak river height recorded on the Darling River at Wilcannia was 28 feet (8.5 meters) above the summer level. This flood did not subside to the old level until February 26. On 25 January, the Melbourne-Sydney Express crashed near Bethungra, where the Clay Creek Bridge had been washed away, along with the rails. Seven people were killed and over 20 injured in the derailment.<sup>99</sup>

At Steelville, Missouri in the *United States*, an unusual electrical phenomenon occurred at the Palmer lead mines, twenty-five miles southeast of this place, during the night of the 8<sup>th</sup>/9<sup>th</sup> of February 1885. A vivid flash of lightning, accompanied by a deafening peal of thunder, struck a large oak tree which was shattered to pieces, the fragments flying in every direction to a distance of three hundred yards; a piece of the tree, weighing three hundred pounds, was hurled through the roof of a barn which stood near; the roots of the tree were also torn out of the ground.<sup>113</sup>

Destructive floods occurred in the southeastern Kansas in the *United States* on 21 April 1885. Traffic on the *Missouri, Kansas and Texas* railroad for many miles both to the north and south of Parsons, Kansas was suspended, and a large number of hogs and cattle were drowned near Parsons. The Marmaton River overflowed and inundated a settlement of from six to eight hundred inhabitants, known as North Fort Scott, the water being from three to five feet deep in the houses. The *Missouri Pacific* railroad was badly washed near Fort Scott, causing suspension of travel. At Kingman, Kansas, a destructive flood occurred in the south fork of the Ne Ne Squaw River on the morning of the 21<sup>st</sup>, which was caused by a "cloud burst". Heavy rains cause the river to rise rapidly and it soon flooded the town. Fifteen dwellings were washed away and a number of persons drowned. At Medicine Lodge, Kansas, the water came down suddenly over the lowlands, flooding them to the depth of from five to twelve feet. In the Elk creek bottoms, east of the town, about a dozen houses were entirely destroyed and many of their occupants drowned, while many others were only saved by clinging to trees. North of Medicine Lodge whole families were drowned. A large number of cattle were also drowned and extensive fields of crops were ruined.<sup>113</sup>

At Montreal, Quebec, in *Canada* on 23 April 1885 the Saint Lawrence River rose and flooded the lower streets. A large part of the village of La Prairie was inundated. The village of Saint Gabriel was submerged in many places to depths of from six to eight feet. The reported damage caused by the freshet at Montreal was estimated at \$100,000 [\$2.4 million in current dollars].<sup>113</sup>

In May 1885, phenomenally large masses of ice, both field and icebergs, were observed in the *Atlantic Ocean*. The region most thickly studded with icebergs and field ice was between 42° and 48° N and from 48° to 51° W. This trend continued into June 1885. The region with icebergs were concentrated between 41° and 44° N and from 47° to 50° W.<sup>113</sup>

There was a destructive forest fire in Sugar Valley and in the White Deer Mountains near Williamsport, Pennsylvania in the *United States* in the week prior to 23 May 1885. An area of 25 miles square was in flames, destroying about \$1 million worth of property [In present currency, that would be equivalent to \$24 million in damages based on the Consumer Price Index (CPI) inflation rates.] During the same month forest fires were reported near Bethlehem, Wilkes-Barre, and Easton, Pennsylvania; East Saginaw, Marquette, Ludington, Edmore and East Tawas, Michigan; Milwaukee and Green Bay, Wisconsin; Lynchburg, Virginia; Riverhead (Long Island), New York; Middletown, Maryland; Mount Washington, New Hampshire; and Quebec, Canada. In the prior month, April, at Huntingdon, Pennsylvania, forest

fires burned an area of about 3,500 acres in Diamond Valley, causing a large amount of damage. In July 1885, drought conditions were reported in many parts of Pennsylvania in the *United States*.<sup>113</sup>

In May 1885, great floods struck Texas in the *United States*. At Laredo, Texas, heavy rains on the 7<sup>th</sup> and 8<sup>th</sup> caused numerous washouts on the railroads. A large part of the town was inundated, the water being four feet deep in some places. At Rio Grande City, Texas on the 8<sup>th</sup>, the streets were flooded in some places to a depth of 2½ feet. The Rio Grande River rose twenty feet, overflowing the lowlands south of the city. Serious washouts occurred on the railroads to the north, completely cutting off communication. By the 9<sup>th</sup> the width of the Rio Grande River was about 5 miles across, extending from the plaza in Rio Grande City to Camargo, Mexico. More than two thousand acres of growing crops between Rio Grande City and Camargo were inundated. At Austin, Texas, a freshet occurred during the night of the 25<sup>th</sup>/26<sup>th</sup> causing much damage. Bouldin and Barton Creeks overflowed; the former being higher than ever before known. Two bridges over Bouldin Creek, near Austin, were washed away. Onion Creek, a large tributary to the Colorado River, reached its highest stage since 1809, and overflowed a number of farms along its banks. At Navasota, Texas, the heaviest rain for many years fell during the night of the 25<sup>th</sup>/26<sup>th</sup>. Two bridges at Navasota, over Cedar Creek, were washed away. At Dallas, Texas, the heavy rains of the 26<sup>th</sup> caused the Trinity River to overflow, submerging the turnpike to the west of the city. At Mexia, Texas on the 26<sup>th</sup>, the Navasota River was reported to have been higher than known for several years. At Valley Mills, Texas, a remarkably heavy rainfall occurred during the night of the 27<sup>th</sup>/28<sup>th</sup>. Two thousand feet of railroad track and two culverts were washed away between Valley Mills and Clifton. The Bosque River rose to a greater height than ever before known, overflowing farms along its banks and causing a large amount of damage. Several families were compelled to abandon their houses. Reports placed the flood damage in Bosque County at \$100,000. [In present currency, that would be equivalent to \$2.4 million based on the Consumer Price Index (CPI) inflation rates.] At Waco, Texas, the most destructive flood ever known occurred on the 28<sup>th</sup>. Fine cotton plantations along the banks of the Brazos River were completely submerged. By the evening of the 30<sup>th</sup>, even though the Brazos River had fallen seven feet, there were still about one hundred and fifty dwellings and business houses submerged. Seventeen bridges in McLennan County were washed away by the flood. It is estimated that the damage, independent of that sustained by the railroads, aggregates to \$100,000 [\$2.4 million in current dollars]. At Longview, Texas, the upper Sabine River overflowed on the 29<sup>th</sup>. At Laredo, Texas on the 29<sup>th</sup>, the Rio River was six feet higher than ever before known. At Marlin, Texas on the 30<sup>th</sup>, the surrounding country for a distance of several miles from the Brazos River was entirely submerged, resulting in great damage to all kinds of crops and the loss of much stock. At Calvert, Texas on the 31<sup>st</sup>, the Brazos River was five feet higher than any previous flood mark, and thousands of acres of land under cultivation were flooded.<sup>113</sup>

In 1885, the Brazos River in Texas in the *United States* flooded. On 26-29 May 1885, heavy rains fell over the central and northern portions of the Brazos drainage basin. The heaviest rainfall reported was 8.38 inches at Hewett, in McLennan County, Texas. Floods were reported from McLennan, Bosque, Falls, and Robertson counties on 29 May 1885. In Falls County the Brazos was five miles out of its banks, and all the bottomlands in the county were inundated. The loss at Waco on 29 May 1885 was placed at \$103,000. The crest of the flood reached the vicinity of Hearne on May 31; between the main Brazos and Little Brazos everything was submerged, and water was higher than anytime since 1852. The crest of the flood reached Austin County on 4 June 1885, and reached Columbia, in Brazoria County on 12 June. The water was within four inches of the highest water of the 1852 flood at Columbia. North of Brazoria County the overflow of 1885 was not as high as that of the flood of 1899 by four to six feet.<sup>123</sup>

A strong Atlantic storm struck Nova Scotia and Cape Breton Island in *Canada* on 1 & 2 June 1885 and caused considerable damage to shipping and other property. A second Atlantic storm passed eastward off the New Jersey coast of the *United States* on 5 June 1885, and thence eastward to the Grand Banks by the 7<sup>th</sup>. This storm was especially severe along the Newfoundland coast in *Canada*, and was considered the

most disastrous that had visited the island in forty years. It was estimated that more than fifty vessels were totally wrecked, while a large number were driven ashore and seriously damaged.<sup>120</sup>

On 3 June 1885 a destructive cyclone near Aden, *Yemen*. About 50,000*l.* damages reported. Ships sunk.<sup>90</sup>

On 5 June 1885, a most destructive storm moved eastward from the New Jersey coast in the *United States* and passed eastward to the Grand Banks in *Canada* by the 7<sup>th</sup>. This storm was considered the most disastrous that had ever visited Newfoundland coast during the previous 40 years. It was estimated that more than 50 vessels were totally wrecked, while a large number were driven ashore and more of less damaged.<sup>119</sup>

On the night of 7 June 1885, the Leon River rose and entered the eastern part of Leon, *Mexico*. Two persons were drowned, the Central railway track was washed away and the crops destroyed. Then on the next night, a tremendous waterspout broke a few miles above the town of Paso de Cuarenta, situated twenty miles from Lagos City. The flood was great and sudden, and practically annihilated Cuarenta. One hundred and seventy bodies were recovered. But many bodies at the time of the report had washed several miles down the valley and were still being discovered in the fields. The waterspout also struck Guanajuato where the damage was estimated at \$300,000 [\$7 million in today's dollars].<sup>113</sup>

The observer on the [14,110 foot] summit of Pike's Peak, Colorado in the *United States* reported the following, "during a thunderstorm, on the afternoon of the 28<sup>th</sup> [of June 1885], unusual electrical manifestations were observed. All pointed objects, even the tips of one's fingers and eyebrows, produced a buzzing noise, resembling the sound made by bees."<sup>113</sup>

At Wytheville, Virginia in the *United States* during the night of 30 June and 1 July 1885, a heavy frost prevailed. Then on the morning of 2 July, ice formed at Crockett's Depot, Virginia. This was the first time in the recollection of anyone here that ice has been known to form in Virginia during the month of July.<sup>113</sup>

On July 9<sup>th</sup> a fire started in the great cranberry belt of Burlington County, New Jersey, swept over hundreds of acres of valuable bogs. The continued drought made the grass and vines very flammable and the fire spread with lightning-like speed. Thousands of dollars of cranberries, nearly ripe for market, was destroyed. All the inhabitants of the vicinity were fighting the flames by building backfires and digging ditches. The fires could only be extinguished by heavy rainfall, as the bogs were honeycombed with fire. By the 24<sup>th</sup> it was reported, "The Jersey forest fires are now assuming most alarming proportions, and unless a heavy rain soon quenches the flames, they will accomplish the destruction of a number of towns and small settlements among the pines of Camden, Burlington, and Atlantic counties. They have never before burned so fiercely, and not since 1838 has the country been so dry and favorable for the spread of flames." And by the 25<sup>th</sup>, "The flames are still sweeping through the timber and bog lands of south Jersey, and a great and despairing cry for rain is going up from the people, who have been fighting the fires for the past two weeks. Should the wind change to the south or southwest, nothing can save the villages of Atco and Jackson from destruction. Late yesterday the fires reached the Maple Island district and came rapidly westward toward the *New Jersey Southern* railroad. A great effort was made to keep the flames from crossing the railroad track, and all the able-bodied men of Atco and Jackson, recruited with two car loads of section hands sent by the railroad company, ranged themselves along the track, at intervals, for eight miles, to fight the fast advancing flames. They were finally successful in confining the fire to the eastern side of the road."<sup>113</sup>

The following are the highest temperatures observed during the month of July 1885 in the *United States*:

<sup>113</sup>



Montgomery, Alabama	( 98.0° F, 36.7° C)	
Mobile, Alabama	( 94.0° F, 34.4° C)	
Prescott, Arizona	( 98.5° F, 36.9° C)	
Little Rock, Arkansas	(100.0° F, 37.8° C)	
Fort Smith, Arkansas	( 98.6° F, 37.0° C)	
San Francisco, California	( 78.0° F, 25.6° C)	
San Diego, California	( 81.8° F, 27.7° C)	
Denver, Colorado	( 97.3° F, 36.3° C)	
West Las Animas, Colorado	(105.2° F, 40.7° C)	
Pike's Peak, Colorado	( 57.0° F, 13.9° C)	
New Haven, Connecticut	( 93.5° F, 34.2° C)	
New London, Connecticut	( 92.4° F, 33.6° C)	
Fort Buford, Dakota	( 96.0° F, 35.6° C)	[now Fort Buford, Montana]
Fort Sully, Dakota	(104.5° F, 40.3° C)	[now Fort Sully, South Dakota]
Yankton, Dakota	(100.7° F, 38.2° C)	[now Yankton, South Dakota]
Cape Henlopen, Delaware	( 98.0° F, 36.7° C)	
Washington, D.C.	( 99.1° F, 37.3° C)	
Jacksonville, Florida	( 94.8° F, 34.9° C)	
Key West Florida	( 93.5° F, 34.2° C)	
Atlanta, Georgia	( 91.2° F, 32.9° C)	
Savannah, Georgia	( 95.2° F, 35.1° C)	
Boise City, Idaho	( 98.5° F, 36.9° C)	
Lewiston, Idaho	( 99.3° F, 37.4° C)	
Chicago, Illinois	( 93.9° F, 34.4° C)	
Cairo, Illinois	( 95.8° F, 35.4° C)	
Indianapolis, Indiana	( 94.5° F, 34.7° C)	
Greencastle, Indiana	( 92.4° F, 33.6° C)	
Fort Supply, Indian Territory	( 96.0° F, 35.6° C)	[now Fort Supply, Oklahoma]
Fort Sill, Indian Territory	(100.0° F, 37.8° C)	[now Fort Sill, Oklahoma]
Dubuque, Iowa	( 97.1° F, 36.2° C)	
Des Moines, Iowa	(100.1° F, 37.8° C)	
Keokuk, Iowa	( 99.0° F, 37.2° C)	
Leavenworth, Kansas	( 98.0° F, 36.7° C)	
Dodge City, Kansas	( 97.3° F, 36.3° C)	
Louisville, Kentucky	( 97.2° F, 36.2° C)	
New Orleans, Louisiana	( 92.5° F, 33.6° C)	
Shreveport, Louisiana	( 99.7° F, 37.6° C)	
Eastport, Maine	( 77.0° F, 25.0° C)	
Portland, Maine	( 86.8° F, 30.4° C)	
Baltimore, Maryland	( 98.7° F, 37.1° C)	
Boston, Massachusetts	( 92.8° F, 33.8° C)	
Marquette, Michigan	( 88.8° F, 31.6° C)	
Detroit, Michigan	( 89.5° F, 31.9° C)	
Saint Vincent, Minnesota	( 91.1° F, 32.8° C)	
Saint Paul, Minnesota	( 94.7° F, 34.8° C)	
Vicksburg, Mississippi	( 98.7° F, 37.1° C)	
Saint Louis, Missouri	( 96.6° F, 35.9° C)	
Fort Assiniboine, Montana	( 96.0° F, 35.6° C)	
Fort Custer, Montana	(100.0° F, 37.8° C)	
North Platte, Nebraska	( 97.6° F, 36.4° C)	
Omaha, Nebraska	( 97.8° F, 36.6° C)	
Winnemucca, Nevada	( 92.4° F, 33.6° C)	
Mount Washington, New Hampshire	( 69.4° F, 20.8° C)	
Sandy Hook, New Jersey	( 96.7° F, 35.9° C)	
Cape May, New Jersey	( 88.5° F, 31.4° C)	
Santa Fe, New Mexico	( 88.5° F, 31.4° C)	



Buffalo, New York	( 87.4° F, 30.8° C)
New York City, New York	( 95.9° F, 35.5° C)
Albany, New York	( 96.6° F, 35.9° C)
Charlotte, North Carolina	( 95.0° F, 35.0° C)
Smithville, North Carolina	( 89.9° F, 32.2° C)
Cincinnati, Ohio	( 96.6° F, 35.9° C)
Cleveland, Ohio	( 90.1° F, 32.3° C)
Roseburg, Oregon	(100.8° F, 38.2° C)
Portland, Oregon	( 99.0° F, 37.2° C)
Erie, Pennsylvania	( 89.8° F, 32.1° C)
Philadelphia, Pennsylvania	( 97.0° F, 36.1° C)
Block Island, Rhode Island	( 87.8° F, 31.0° C)
Charleston, South Carolina	( 94.5° F, 34.7° C)
Nashville, Tennessee	( 96.1° F, 35.6° C)
Knoxville, Tennessee	( 94.0° F, 34.4° C)
Fort Davis, Texas	( 96.7° F, 35.9° C)
Galveston, Texas	( 91.5° F, 33.1° C)
Salt Lake City, Utah	( 99.7° F, 37.6° C)
Lynchburg, Virginia	( 97.0° F, 36.1° C)
Norfolk, Virginia	( 98.8° F, 37.1° C)
Olympia, Washington Territory	( 97.0° F, 36.1° C) [now Olympia, Washington]
Dayton, Washington Territory	(102.6° F, 39.2° C) [now Dayton, Washington]
Milwaukee, Wisconsin	( 92.8° F, 33.8° C)
La Crosse, Wisconsin	( 92.0° F, 33.3° C)
Cheyenne, Wyoming	( 88.2° F, 31.2° C)

On 5 July 1885, a severe hailstorm struck many areas of New York in the *United States*. At Chatham, New York, the hailstones measured from one to three inches in diameter, fell thickly and banked up along fences like winter snowdrifts. Roofs were damaged, windows destroyed, trees stripped of their foliage, and small animals killed. The damage to roofs and windows was estimated at \$2,000. Total damage was estimated at \$50,000 [\$1.2 million in today's currency]. The hailstorm struck all parts of the Mohawk Valley at Canajoharie, New York causing great damage to windows and crops. At Oswego, New York, hailstones as large as pigeon's eggs fell, causing great damage to growing crops. At Port Jervis, New York, the hailstorm devastated a section, fifteen miles in length and ten miles in width, of grain, grass and vegetation. Hail fell to a depth of one foot.<sup>113</sup>

On 15 July 1885, a hailstorm struck an area four miles wide from Niagara to Reynolds, Dakota, in the *United States*. The damage to the wheat crop was estimated at \$200,000 [\$4.8 million in today's currency].<sup>113</sup>

On 24-25 August 1885, a hurricane struck South Carolina, Georgia and offshore North Carolina in the *United States* causing 25 deaths.<sup>141</sup>

On 23-25 August 1885, a storm of great strength moved along east Florida and south Atlantic coasts of the *United States*, causing great destruction on the south Atlantic coast, where the damage was estimated at \$1,500,000. [In present currency, that would be equivalent to \$36 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>119, 120</sup>

A storm [hurricane] passed over Charleston, South Carolina in the *United States* on 23-24 August 1885, where damage to the extent of nearly two millions of dollars was done, and twenty-one lives were lost. [In present currency, that would be equivalent to \$48 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>120</sup>

On 8 September 1885, a devastating tornado struck Washington Court House, Ohio in the *United States* almost completely destroying the city. The path of the tornado was about 250 feet in width. Of forty business establishments fronting Central Square, not one escaped destruction; besides these, about two hundred residences were demolished. (Another observer stated the tornado destroyed 300 buildings including many business houses, four railroad depots, three churches, and the gas works.) Six persons were killed, and more than one hundred seriously injured. Washington Court House is the county seat of Fayette County. Being the center of a rich agricultural district, with excellent railroad facilities, it had during the previous fifteen years, grown to be a business place of considerable importance. Its residents had beautified the town with tasteful dwellings, and its recently completed courthouse was one of the best in the state at that time. The damage caused by the tornado was about \$500,000. [In present currency, that would be equivalent to \$12 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>113</sup>

On 11 October 1885, a hurricane struck the coast of Labrador in Newfoundland, *Canada*. The storm extended over the whole length of coast from Battle Harbor, north to Cape Harrison. Eighty vessels were wrecked or driven ashore, and at least seventy men from the crews of the vessels lost their lives. (Another report estimated 300 lives lost to the storm.) Two thousand persons are now ashore in a destitute condition. Steamers were immediately dispatched to the scene of the disaster, with provisions, clothing and other comforts for the use of the castaways.<sup>113</sup>

On 12-15 October 1885, heavy storms struck the Labrador coast in *Canada* wrecking about 80 craft with about 300 lives lost.<sup>90</sup>

In 1885, Charleston, South Carolina in the *United States* was struck by a destructive hurricane.<sup>124</sup>

On 31 October 1885, a flood occurred at Charleston, West Virginia in the *United States* when the Kanawha River rose rapidly, sweeping away a large number of loaded barges along the river, causing the loss of about 500,000 bushels of coal. The losses are estimated at \$150,000 (approximately \$3.6 million in today's currency).<sup>113</sup>

On 6 November 1885, a tornado passed through Orrville, Frog Level, Logan's, and ended near Plantersville, Alabama in the *United States*. Thirty houses along with several mills and stables were destroyed, and the forests were leveled for miles. The path of the tornado was about one-half mile wide. Thirteen persons were killed and from forty to fifty injured. The storm appears to have been most severe in the vicinity of Plantersville, where a dwelling was blown to pieces with such violence that not even its foundation was left.<sup>113</sup>

On 27 November 1885, nineteen islanders from the island *Tristan da Cunha* set off in a boat in rough and stormy seas to intercept an iron barque *West Riding*, as it passed near the remote island. The settlement was low on supplies and at the verge of starvation and was hoping to obtain provisions from the ship. But a violent squall caused the boat to sink and 15 souls were lost at sea. The loss of these able bodied men (over 50%) to the small colony of 107 had a dramatic effect on the survival of this settlement. This was compounded by the fact that the following year, 1886, produced very poor crop yields driving the islanders to the brink of famine.<sup>105</sup>

Towards the end of November 1885, major floods occurred across almost the entire state of California in the *United States*. At San Luis Obispo, the storm produced heavy rainfall totaling 10.04 inches. All the bridges on the creek running through town, with one exception, were washed away. The city's water works was seriously damaged. In Los Angeles, washouts occurred on the *Southern Pacific* railroad, portions of the San Fernando tunnel caved in, the railroad bridge at Cajon Pass was carried away and it caused serious damage to other property. At Red Bluff, California, a portion of the track of the *California*

and Oregon railroad was washed away and the heavy rain dissolved 120,000 bricks in a kiln. Many bridges and other buildings were washed away at Santa Rosa, California. Then the heavy rainfall of 21 December caused parts of San Francisco to be underwater four feet deep. Cellars in the business part of the city were flooded damaging thousands of dollars of goods stored there.<sup>113</sup>

On 2 December 1885, a gale struck Colon, *Panama*, and its harbor. Approximately 100 lives were lost.<sup>197</sup>

A hurricane struck Colón, *Panama* in Central America on the 2<sup>nd</sup> and 3<sup>rd</sup> of December 1885. The damage to property was very heavy and the loss of life most serious. The following vessels were sunk with their crews: *Holden*, *Karnan*, *Blanche*, *Oataton*, *Atwood*, *Ariel*, *Veteran*, *Ocean*, *Lynton*, *Avelina*, *Stella*, *Catatina*, *Figri*, *Douglas*, and two others whose names could not be ascertained. The rain poured down in torrents, and there was a terrible gale of wind. The *Royal Mail's* new freight office was destroyed by the storm. Wharf number four, belonging to the *Panama* railroad, was almost demolished, the rails having been torn up and the earthworks destroyed by the force of the tornado.<sup>113</sup>

On 2 December 1885, a storm off Colon, *Panama* wrecked 15 vessels with 50 lives lost.<sup>90</sup>

In 1885 during the period between 13 June and 11 July, floods struck Shantung (now Shandong province) on the east coast of *China* at Hui-min and Chan-hua. Then during the period between 8 August and 8 November, a drought engulfed Hopei (now Hebei province) in northern *China* at Tung-kuang.<sup>153</sup>

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**Winter of 1885 / 1886 A.D.** On 1-3 March 1886, heavy snowstorm struck northeast *England*. The storm stopped locomotion [made travel impossible].<sup>90</sup>

In the Atlantic Ocean, icebergs were very numerous together with thick field ice in April 1866 from N. 42° to N. 43°, between W. 49° and W. 50°. The icebergs, as a rule, were small. The southernmost iceberg was reported in N. 40° 51', W. 46° 59'. One iceberg was observed as far eastward as W. 30°; this is the most eastern limit of icebergs ever reported to this office during the month of April.<sup>134</sup>

The winter of 1885-86 in Bradford County, Pennsylvania in the *United States* was a peculiarly unseasonable one. During the last week of August, there was a light snowstorm at Barclay. On October 15<sup>th</sup>, the highlands were covered by a light fall of snow. On 23-25 November, snow fell to a depth from two to three feet [0.6 – 0.9 m]. But this snow soon disappeared. December was mild and New Year's was a beautiful summer-like day (but not so warm as 1 January 1876). It turned cold the second week in January and on the 13<sup>th</sup>, thermometers registered -12° F [-24° C]. The cold weather prevailed about two weeks with good sleighing. Most of February and March were mild. April was warm and spring remarkably early. By Easter time (25<sup>th</sup> April), cherry and peach trees were in bloom.<sup>178</sup>

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**1886 A.D.** A destructive tornado struck Sauk Rapids, Saint Cloud, and Rice Station, Minnesota, and vicinity, on 14 April 1886. An eyewitness at Saint Cloud provided an account of the tornado formation: "The tornado must have formed rapidly, and just about over the lake, as it was there when first noticed. It was very black, and seemed to be constantly in motion. It was moving rapidly across the lake when first seen, was flat and oval in shape, with a sort of spiral at each of the extremities, one extending upward and the other downward. It was peculiar in appearance, and I watched it closely. After having passed across the lake it seemed to stop. The movement resembled that of a fan opening and closing, and it remained stationary for some seconds. Almost instantly the form changed. Instead of lying flat, it seemed to turn on end and the spirals that ran up from the other end formed a part of a big double spiral. It had a movement that was peculiar, as if there was a commotion within it. The course was rapid and as soon as the big spiral was formed it began moving at a terrific rate in a course that was somewhat zigzag. It dropped down to the ground, and I saw the entire work of ruin. The course of the tornado after crossing the river was rather sinuous, though hardly as much so as before. It swept across the country, and in five minutes from the time

of reaching Sauk Rapids the work of destruction was done. There were two clouds at first that came together directly over the lake, and then turned on end and swept onward.”

In the track of the tornado at Sauk Rapids, stood the Manitoba freight house and cars filled with freight. The tornado lifted the heavy cars from the tracks, and cast them in shapeless masses. The freight house was totally wrecked. Iron rails were torn from the track and twisted like wires; \$3,000 worth of freight was whirled through the air and thrown into heaps and scattered by piecemeal over an area of a quarter of a mile. Fifteen freight cars were demolished. Operators in the telegraph office and employees at the freight depot saw the tornado coming and fled to the cellars and thus escaped. Sauk Rapids was almost completely destroyed. Not a single business house was left standing in the main street, and many dwellings were demolished. The courthouse was left a heap of ruins, and several of the county officers killed. The Union School House, two churches, the post-office, a flourmill, and a large machine shop were completely destroyed in about forty seconds. The tornado caused 250 buildings to be destroyed; 74 persons killed and 133 wounded. The loss of property was estimated at \$400,000. [In present currency, that would be equivalent to \$10 million in damages based on the Consumer Price Index (CPI) inflation rates.] A heavy iron truss bridge across the Mississippi at Sauk Rapids was wrecked, and parts of it carried in the cloud a considerable distance before being dropped. Men, women, and children, as well as horses and cattle, were lifted into the air and dashed to the ground. Many of the bodies had a blackened appearance, as if they had been scorched, while frequently the clothing was completely torn from them. Every description of this tornado speaks of it as being accompanied by a roaring and peculiar crackling sound, which became deafening as it approached, also that the black, oval-shaped cloud with a tube turning on the ground was seen by a number of persons, whose lives were saved by retreating to cellars and other underground apartments. The track of the tornado was about twenty miles long and twenty rods (330 feet) wide; immense damage was done to farm property, orchards, forests, and stock. During the passage of the tornado, and afterwards, rain fell in torrents.<sup>134</sup>

Very heavy rainfalls occurred in the Southern States and Ohio Valley in the *United States* from the 26 March to 2 April 1886. The rains were excessively heavy in eastern Tennessee and northern Alabama, and caused unusually destructive floods:<sup>134</sup>

— At Montgomery, Alabama, the flood of the latter part of March and first of April is considered the most disastrous that has ever occurred in this vicinity. The Alabama River, its tributaries, and all of the numerous rivers and creeks of this state overflowed. On the 1<sup>st</sup> the city was completely surrounded by water, and all the low-lying part flooded. Much property was destroyed. Thousands of cattle, horses, mules, and hogs were swept away and corn, cottonseed, and provisions were destroyed. Nearly all the factories in the city stopped work on account of the flood. The only illumination in the city was by candles and oil. Viewed from the dome of the Capitol, the highest point in the city, was a lake of water to the north and west, fully seven miles square.

— In the Birmingham, Alabama region, the greatest disaster by flood in this state was along the Alabama and Coosa Rivers, in Coosa, Elmore, Montgomery, Autauga, and Dallas Counties. At Wetumpka, the county seat of Elmore County, the water was four feet deep in the business houses of the town, and the occupants were driven out of many of their residences. Many bridges and mills were destroyed in Elmore County, and large areas of the best farming country were underwater.

— At Augusta, Georgia, the river attained its maximum height at noon of April 1<sup>st</sup>. Hamburg, South Carolina, on the opposite side of the river, was entirely surrounded by water; railroad travel over the bridge crossing the Savannah was suspended; all the lower portions of the city were underwater. The railroad companies sustained heavy losses, while the damage suffered by the factories and other property in Augusta exceeded \$20,000.

— At Rome, Georgia, the gas-works were submerged on April 2<sup>nd</sup>. The estimated damage from this flood is placed at \$500,000. [In present currency, that would be equivalent to \$12 million in damages based on the Consumer Price Index (CPI) inflation rates.] The entire town, except on the hills, was underwater from one to eleven feet, and fifteen dwellings were washed away. The water came so rapidly that it was impossible for people to save furniture, and belongings.

— At Columbus, Georgia, the Chattahoochee River began falling on the April 1<sup>st</sup>, leaving behind mud throughout the city. Columbus received around \$50,000 damage from the flood. [\$1.2 million in today's currency] Plantations below [downstream of] Columbus were reported covered with water from five to eight feet deep.

— At Chattanooga, Tennessee: the river rose steadily on April 1<sup>st</sup>. The city was surrounded by water, the fifth ward being almost submerged; the water-works shut down owing to the flood extinguishing the fires. Several persons were drowned and many on the outskirts of the city had their homes washed away. On the 2<sup>nd</sup>, the water was fifty-three feet above low-water mark. At other places along the Tennessee River, the damage is reported very serious; more than fifty houses floated past Whitesburg, Alabama.

— At Nashville, Tennessee, the Cumberland River reached its highest stage on April 10<sup>th</sup>. The river-gauge marked forty-nine feet, being five feet below the high-water mark of 1882. Great loss was suffered by farmers; the destruction of the wheat crop in the Cumberland lowlands was estimated at half a million dollars [\$12 million in today's currency], necessitating a second plowing of the ground and the planting of corn or some other grain.

— At Cairo, Illinois, the Ohio River was very high from April 1<sup>st</sup> to the 27<sup>th</sup>, causing great suffering and loss of property. In Cairo, the *Illinois Central* Railroad was damaged by the track, near the river, being undermined and torn away. Traffic was suspended on this railroad for several days. Many families, between Cairo, Illinois and Paducah, Kentucky, were compelled to move their goods to the second story for safety. The backwater from the Ohio River inundated the land on the Missouri side for a distance of five miles, causing great loss to the farmers, their livestock being drowned, growing crops buried in mud, and fences carried away. Between Cairo, Illinois and Memphis, Tennessee, the country resembled a lake, the water spreading for miles through the bottoms, with all landings submerged, and at some points only roofs of houses being visible. At Metropolis, Illinois, many houses were submerged, being accessible only by water; the lowlands were flooded from ten to twenty feet.

— At Louisville, Kentucky during the first week of April, the Ohio River at all points was above the flood-line, caused by melting snow and continuous heavy rains. In the lowlands many houses were abandoned. Wharf boats were moored to brick houses that stand two hundred feet back from the wharf, and craft floated within a stones' throw of Main Street.

— At Montreal, *Canada*, floods struck the city from April 18-20. Businesses were at a complete standstill. Hundreds of wholesale and retail houses were closed, being inaccessible except by boats. The suffering of the residents in the flooded part of the city was intense. In the neighborhood of Griffintown, thousands of persons were forced to the upper part of their houses by the water. Twenty-four streets were reported covered with water to the depth of five feet.

On 17-18 April 1886, there was a great inundation of lower town of Montreal, *Canada*. The flood produced about 500,000 *l.* damage and much privation.<sup>90</sup>

On 12 May 1886, a storm struck Madrid, *Spain*. Approximately ninety lives were lost.<sup>197</sup>

On 12 May 1886, a destructive hurricane struck Madrid, *Spain*. Thirty-two lives were lost and 320 people were wounded.<sup>90</sup>

On 12-15 May 1886, destructive tornadoes struck southern Ohio, Indiana, and Illinois in the *United States*.<sup>90</sup>

On 16 June 1886 at Alexandria, Louisiana in the *United States*, 22.27 inches of rain fell.<sup>116</sup>

On 17-24 June 1886, a hurricane struck *Cuba*. Those that drowned were not a few.<sup>141</sup>

On 28-29 June 1886, a hurricane struck *Jamaica* and *Cuba*. At least 18 lives were lost in *Jamaica*. In *Cuba*, some people died at sea and others on land.<sup>141</sup>

In July 1886 two West Indies storms [hurricanes] advanced northward from the vicinity of *Cuba*, neither of which were very destructive in their character.<sup>120</sup>

On 10 August 1886, violent storm struck northeast *France*. The storm caused much damage at Rheims and Nancy.<sup>90</sup>



In August 1886, two severe storms of great strength moved northwest over the Caribbean Sea, one recurving northward over *Cuba* and the *Bahamas*, and the other passing into the Gulf of Mexico.<sup>119, 120</sup>

In August 1886, a storm [hurricane] appeared to the eastward of the *Barbados* on the 15<sup>th</sup>, and thence passed westward over the Caribbean Sea to about N. 14°, W. 76°, and during the 22<sup>nd</sup> passed northward over *Cuba*, in about W. 81°; it then moved northeastward along the course of the Gulf Stream to Newfoundland, *Canada* by the 28<sup>th</sup>. This storm was particularly severe, causing loss of life and destroying crops and property of immense aggregate value.<sup>121</sup>

On 16 August 1886, a hurricane struck at St. Vincent in the *Caribbean*. The hurricane caused great loss of life and property.<sup>90</sup>

On 16 August 1886, there was an inundation of Mandalay in central *Burma* from the Irrawaddy River. There was great loss of life and property. By 25 August, the waters were subsiding.<sup>97</sup>

On 18 August 1886, there was a great inundation at Mandalay, *Burma*.<sup>90</sup>

On 17-20 August 1886, a hurricane struck *Cuba* and Indianola, Texas in the *United States*. Some accounts claim more than 20 deaths, while others cite more than 28.<sup>141</sup>

On 19-20 August 1886, a very destructive storm in the west Gulf. At Indianola, Texas in the *United States*, not a building was left standing, and the barometer fell to about 28.00 inches (711 millimeters). [According to the barometric pressure, this hurricane would have been rated at least a Category 3 hurricane at this location.]<sup>119, 120</sup>

On 19-20 August 1886, a storm completely destroyed Indianola, Texas in the *United States* (which was nearly swept away in September, 1875 by an earlier hurricane). Not a house was left standing, and over twenty lives were lost. Galveston, Texas also suffered great damage.<sup>120</sup>

On 19-20 August 1886, the town of Indianola, Texas, in the *United States* was entirely destroyed by storm waves from the Gulf of Mexico.<sup>124</sup>

On 21-26 August 1886, a hurricane struck *Cuba*, crushing many of its inhabitants.<sup>141</sup>

In September 1886, a storm [hurricane] off the west Gulf coast moved northward to the middle Texas coast of the *United States* from the 22<sup>nd</sup> to 24<sup>th</sup>.<sup>120</sup>

In October 1886 a storm of pronounced strength advanced from the Caribbean Sea over the Gulf of Mexico, west of the 90<sup>th</sup> meridian.<sup>119</sup>

On 8-12 October 1886, a very destructive storm [hurricane] moved from south of *Cuba* to the west Gulf coast of the *United States*, and dissipated over the west Gulf states.<sup>120</sup>

On 12 October 1886, a violent gale struck Texas, in the *United States*. This gale caused an inundation in which over 250 persons were drowned.<sup>90</sup>

On 12-13 October 1886, a hurricane struck eastern Texas in the *United States* causing between 126 and 150 deaths.<sup>141</sup>

On 15-16 October 1886, severe gale [in *Great Britain*] caused very great destruction on sea and land.<sup>90</sup>



A great cyclone struck Bengal [*India and Bangladesh*] on October 31. A tidal wave (storm surge), extending, it was estimated, over 3,000 square miles, being in many places more than 20 feet deep. The loss of life was estimated at 215,000, while the destruction of property was incalculable.<sup>47</sup>

On 2 December 1886, a storm was central south of Nova Scotia, *Canada*, and moved thence to the British Isles by the 8<sup>th</sup>, on which latter date it was central near Aberdeen, *Scotland*. The fall of the barometer over England was probably without a parallel in the history of that country, the barometric minimum reported being 27.45 inches (697 millimeters) at Orme's Head, *Wales* and a reading of 27.48 inches (698 millimeters) was noted at Liverpool, *England*. At Leith, *Scotland*, the barometer fell with great rapidity during the day, reaching 27.65 inches (702 millimeters) at 19 hours 30 minutes. This was reported as being by far the lowest barometer reading that occurred at Leith since January 26, 1884, on which date the lowest reading ever made at that place, 27.45 inches (697 millimeters) was recorded at 10 p.m.<sup>120</sup>

On 8-9 December 1886, destructive gale and storm struck, especially in southern and western *England*. The storm caused many wrecks and loss of life.<sup>90</sup>

*Also refer to the section 1880 A.D. – 1886 A.D. for information on the drought in Australia during that timeframe.*

**Winter of 1886 / 1887 A.D.** On 26-27 December 1886, a destructive snowstorm struck, especially in eastern and southern *England*. The snowstorm caused many wrecks; stopped telegraphic and railway communications; and blew down trees.<sup>90</sup>

The following are the lowest temperatures observed during January 1887 in the *United States*:<sup>114</sup>

Montgomery, Alabama	( 12.9° F, -10.6° C)	
Mobile, Alabama	( 15.9° F, -8.9° C)	
Prescott, Arizona	( 11.2° F, -11.6° C)	
Fort Apache, Arizona	( 10.5° F, -11.9° C)	
Little Rock, Arkansas	( 7.0° F, -13.9° C)	
Fort Smith, Arkansas	( -4.0° F, -20.0° C)	
San Francisco, California	( 41.5° F, +5.3° C)	
San Diego, California	( 38.0° F, +3.3° C)	
Denver, Colorado	(-17.6° F, -27.6° C)	
Pike's Peak, Colorado	(-20.7° F, -29.3° C)	
New Haven, Connecticut	( -5.4° F, -20.8° C)	
New London, Connecticut	( -0.1° F, -17.8° C)	
Fort Buford, Dakota	(-45.2° F, -42.9° C)	[now Fort Buford, Montana]
Yankton, Dakota	(-29.1° F, -33.9° C)	[now Yankton, South Dakota]
Washington, D.C.	( 6.2° F, -14.3° C)	
Jacksonville, Florida	( 21.9° F, -5.6° C)	
Key West, Florida	( 50.2° F, +10.1° C)	
Atlanta, Georgia	( 9.0° F, -12.8° C)	
Savannah, Georgia	( 16.0° F, -8.9° C)	
Boise City, Idaho	( 15.7° F, -9.1° C)	
Chicago, Illinois	(-15.3° F, -26.3° C)	
Cairo, Illinois	( -1.1° F, -18.4° C)	
Indianapolis, Indiana	(-11.8° F, -24.3° C)	
Fort Sill, Indian Territory	( 0.2° F, -17.7° C)	[now Fort Sill, Oklahoma]
Dubuque, Iowa	(-31.5° F, -35.3° C)	
Des Moines, Iowa	(-24.5° F, -31.4° C)	
Leavenworth, Kansas	(-15.5° F, -26.4° C)	
Dodge City, Kansas	(-17.0° F, -27.2° C)	
Wellington, Kansas	(-20.0° F, -28.9° C)	
Louisville, Kentucky	( -4.7° F, -20.4° C)	
New Orleans, Louisiana	( 21.4° F, -5.9° C)	

Shreveport, Louisiana	( 12.0° F, -11.1° C)	
Eastport, Maine	(-13.4° F, -25.2° C)	
Portland, Maine	(-14.7° F, -25.9° C)	
Baltimore, Maryland	( 7.3° F, -13.7° C)	
Cumberland, Maryland	( -6.0° F, -21.1° C)	
Boston, Massachusetts	( -5.0° F, -20.6° C)	
Marquette, Michigan	(-20.6° F, -29.2° C)	
Grand Haven, Michigan	( -2.1° F, -18.9° C)	
Saint Vincent, Minnesota	(-42.2° F, -41.2° C)	
Saint Paul, Minnesota	(-35.7° F, -37.6° C)	
Vicksburg, Mississippi	( 9.6° F, -12.4° C)	
Saint Louis, Missouri	( -9.6° F, -23.1° C)	
Fort Assiniboine, Montana	(-35.0° F, -37.2° C)	
Helena, Montana	(-25.3° F, -31.8° C)	
North Platte, Nebraska	(-21.4° F, -29.7° C)	
Omaha, Nebraska	(-21.9° F, -29.9° C)	
Winnemucca, Nevada	( 7.5° F, -13.6° C)	
Mount Washington, New Hampshire	(-35.4° F, -37.4° C)	
Atlantic City, New Jersey	( 7.0° F, -13.9° C)	
Santa Fe, New Mexico	( 6.0° F, -14.4° C)	
Buffalo, New York	( -1.7° F, -18.7° C)	
New York City, New York	( 6.0° F, -14.4° C)	
Charlotte, North Carolina	( 8.2° F, -13.2° C)	
Wilmington, North Carolina	(14.6° F, -9.7° C)	
Cincinnati, Ohio	( -5.2° F, -20.7° C)	
Sandusky, Ohio	( -8.0° F, -22.2° C)	
Roseburg, Oregon	(23.2° F, -4.9° C)	
Portland, Oregon	(29.3° F, -1.5° C)	
Pittsburg, Pennsylvania	( 4.0° F, -15.6° C)	
Philadelphia, Pennsylvania	( 8.1° F, -13.3° C)	
Block Island, Rhode Island	( 1.8° F, -16.8° C)	
Charleston, South Carolina	(16.7° F, -8.5° C)	
Memphis, Tennessee	( 4.3° F, -15.4° C)	
Knoxville, Tennessee	( 5.4° F, -14.8° C)	
Fort Elliott, Texas	( -4.4° F, -20.2° C)	
Brownsville, Texas	(27.8° F, -2.3° C)	
Salt Lake City, Utah	(11.9° F, -11.2° C)	
Lynchburg, Virginia	( 6.1° F, -14.4° C)	
Norfolk, Virginia	(12.6° F, -10.8° C)	
Olympia, Washington Territory	(26.0° F, -3.3° C)	[now Olympia, Washington]
Spokane Falls, Washington Territory	( 9.3° F, -12.6° C)	[now Spokane Falls, Washington]
Milwaukee, Wisconsin	(-13.9° F, -25.5° C)	
La Crosse, Wisconsin	(-28.9° F, -33.8° C)	

The depth that rivers and lakes froze in January 1887 in the *United States*:<sup>114</sup>

\* At Cairo, Illinois, the *Mississippi River* was frozen over from the 1<sup>st</sup> to the 19<sup>th</sup> with ice sufficiently firm to allow heavy wagons to cross. At La Crosse, Wisconsin; and Dubuque, Davenport and Keokuk, Iowa; and intervening points, the *Mississippi River* was frozen solid throughout the month.

\* At Cairo, Illinois and points north, heavy floating ice rendered navigation on the *Ohio River* impossible on the 2<sup>nd</sup>.

\* At Baltimore, Maryland, the harbor was covered with ice 2 to 5 inches thick on the 4<sup>th</sup>.

\* At Lynchburg, Virginia, the *James River* was frozen over on the 3<sup>rd</sup>.

\* At Leavenworth, Kansas, and points north, the *Missouri River* was frozen over the entire month.

The winter of 1886-87 in Bradford County, Pennsylvania in the *United States* was moderate. A total of

77 inches [2.0 m] of snow fell in many light storms. But there was little good sleighing, except for the first part of January. On November 12<sup>th</sup> snow fell to the depth of several inches but quickly disappeared. The coldest day was January 4<sup>th</sup>, when the temperature fell to -15° F [-26° C]. Bluebirds and robins appeared in the end of February. There were many warm days in February and March but most of April was cold with many showers and snow squalls. On April 18<sup>th</sup>, there was a big storm, snow falling to the depth of 14 inches [36 cm]. May began with warm temperatures.<sup>178</sup>

In northeastern and central Texas, southern and western Louisiana, southern Mississippi, southwestern Alabama, and the southwestern part of the Indian Territory in the *United States*, the rainfall during 1886 was over ten inches below the normal. This drought was especially severe in central Texas, and inflicted large losses on the agricultural and cattle interests. During the summer of 1886, when other parts of Texas were suffering from drought, copious rainfalls occurred at San Antonio, Texas and over the surrounding country, but since the first of October, 1886, very little rain fell at that station, the total precipitation of the four months from 1 October 1886, to 31 January 1887, being only 1.36 inches. Water pools have dried up and ranchmen were forced to drive their stock five to ten miles for water. Grass in some sections has become parched and innutritious. Cattlemen say that but for the abundant growth of cactus, large numbers of cattle would have starved. At Fort Elliott, in the "Panhandle" district, one of the great cotton and cattle-raising sections of the state, during the months of November, December, and January only 0.28 inch of rain fell. Reports from Dallas, Fort Worth, Sherman, and Waco, situated in the midst of the grain-growing districts of Texas, said the wheat fields were dry and dusty. The observer at Rio Grande City stated that a severe drought prevailed in that district during January. In some places the ground was entirely bare and very dusty, and during high winds which occurred there on the 17th, 19th, 20th, 21st, 23d, and 27th, very heavy clouds of dust and sand filled the atmosphere.<sup>114</sup>

At Fort Assiniboine, Montana in the *United States* on the night of the 2<sup>nd</sup> / 3<sup>rd</sup> of February 1887, the minimum thermometer registered -55.4° F (-48.6° C). Reports from the cattle ranges state that many cattle were dying from the effects of extreme cold weather. Stagecoaches were delayed three or four days on account of deep snow drifts. At Fort Maginnis, Montana, during the same night, the temperature fell to -42.0° F (-41.1° C). In the vicinity of Fort Maginnis, and over the entire territory, large numbers of cattle perished from cold and starvation. At Poplar River, Montana, the temperature on the February 2<sup>nd</sup> was -26.0° F (-32.2° C) and on the 3<sup>rd</sup> -44.6° F (-42.6° C). Numbers of cattle in that vicinity perished from the extreme cold. Fort Buford, North Dakota reported heavy snows and gale force winds on 1 February caused deep snowdrifts, which blockaded all roads. This was also true at Fargo and Jamestown, North Dakota and numerous other places throughout the territory. Great losses were incurred by cattlemen, the livestock perished from the effects of cold and lack of food, the dead grass upon which they feed during the winter being covered to a greater depth than usual with crusted snow. There was a continued succession of blizzards, deep snows and very low temperatures in this region during February. Around 17 February 1887, a large snow slide occurred in Las Animas Cañon between Durango and Silverton, Colorado, which completely filled the canyon and a railroad train passing through it under more than seven hundred feet of snow. At Marquette, Michigan, during the afternoon of the 17<sup>th</sup> and night of the 17-18<sup>th</sup> a heavy snowstorm, accompanied by high wind, prevailed. This was one of the worst storms of the winter, the snow drifting in places to a depth of from six to twelve feet. In Minnesota on the 26<sup>th</sup>, nearly all railroad lines in the state were blockaded by snow. At Roseburg, Oregon, cattlemen in the Umpqua Valley and surrounding country suffered considerable loss in sheep and cattle during February on account of the heavy snowfall, the total depth for the month at Roseburg being 27.2 inches which was abnormal for this area.<sup>114</sup>

Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>

The extremely low temperatures that prevailed in the Southern States of the *United States* on the March 18-19<sup>th</sup> and 29-30<sup>th</sup> were accompanied by frosts, which were destructive to vegetables and blossoms of fruit trees. South Carolina reported that the first frost did considerable damage to early vegetables and fruits, while the freeze on the 29-30<sup>th</sup> caused the fruit, which survived the first frost to succumb to the second. All the early varieties of peaches were killed. Plums and cherries suffered severely. Strawberries were set back two weeks. In some cases potatoes were injured, while beans, cucumbers and squashes were killed. The frost affected Georgia, North and South Carolina, Kentucky, Arkansas and Illinois. Also spotty frost damage was observed as far south as Manatee, Florida. "Several farmers have informed me of queer streaks in which frost is appearing. In one field, where tomatoes were planted, every plant was killed, excepting two rows in about the middle of the field. Another farmer noticed in a field of beans that frost killed in spots." <sup>114</sup>

A snowstorm on March 29-30<sup>th</sup>, 1887 dumped 12.4 inches of snow on Louisville, Kentucky in the *United States*. At Lexington, Kentucky the weight of the snow causes several roofs to cave in. <sup>114</sup>

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### **1887 A.D. – 1889 A.D. China and Asia Minor. Famine**

In 1887-89, there was a famine in *China*.<sup>90</sup>

In 1887, there was a famine in *Asia Minor*.<sup>90</sup>

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**1887 A.D.** On 5 March 1887, a cyclone struck the Gulf of Carpentaria off the coast of Queensland and Northern Territory in *Australia*. The cyclone flooded most of Burketown, where 7 of its 138 residents died. The cyclone caused an 18-foot (5.5 meter) storm surge at Albert River Heads.<sup>99</sup>

A protracted drought continued in Texas and other states in the *United States* during March 1887. <sup>114</sup>

— At New Ulm, Texas, the total precipitation for January, February, and March 1887, was 4.36 inches, which was 9.39 inches below the average of the same months during the past fifteen years.

— San Antonio, Texas reported that the drought in this section continued, little rain had fallen since the first frost which occurred 18 November 1886; cattle and horses were dying in large numbers, chiefly from want of water. Market reports indicate that the number of fallen hides (or hides from cattle that have died on the range) handled this year was unprecedentedly large. Several cattle owners in Atascosa and Frio Counties were shipping their herds to the Indian Territory for pasturage. The agricultural outlook for this section was decidedly gloomy. Corn was coming up slowly, but if rain did not fall soon it could not make a stand, while oats, barley, and all small grain were regarded as complete failures.

— Fort Grant, Arizona reported the total rainfall of the month was a few drops on March 22<sup>nd</sup>. The soil at the end of the month was exceptionally dry for the season and rain was badly needed. This section of the territory depends, from spring until early autumn, for its supply of water on the melted snow from the Graham Mountains, about five miles to the northeast. These mountains were usually covered with snow at this season of the year. The absence of unmelted snow in this range during March indicates a severe drought for the coming summer, which will greatly damage the extensive cattle interests of this vicinity.

— At Fort Smith, Arkansas at the end of the March and also throughout Arkansas and the Indian Territory, vegetation of all kinds was suffering from lack of rain. Farmers stated that the ground was too hard to plow, and that crops already planted would be a failure unless rain fell shortly. The Arkansas River was very low and the cotton and lumber industries of this town were at a standstill, awaiting a rise in the river. Navigation was practically closed at all river ports above this place. The Canadian River in the Indian Territory, a tributary of the Arkansas, was lower than it has ever been before within the memory of the oldest settlers.

— At Wellington, Kansas, March was exceedingly dry, the total precipitation being only 0.22 inch. The growth of vegetation of all kinds was greatly delayed by want of moisture. At Salina, Kansas, the total rainfall during March was only 0.01 inch, and crops were beginning to feel the effects of the drought.

— On 12 March 1887 at Key West, Florida a thunderstorm produced 1.36 inches of rainfall, which ended a drought that had prevailed for several months and relieved the people of many inconveniences and discomforts. It was the only heavy rainfall since 26 October 1886, and the majority of the cisterns of the town had become dry.

In April 1887, very little rain fell in the southeastern quarter of the *United States*. The region of greatest deficiency extended from central Texas eastward to the south Atlantic coast. Although a rainstorm crossed Texas, the Indian Territory, and Kansas on the April 18<sup>th</sup>, yet at the end of the month, the long drought was practically unbroken, except in Kansas, where the rainfall of the 18<sup>th</sup> was quite heavy. In Texas the drought extended from the western grazing country eastward to Louisiana, but decreased in severity as it approached the eastern boundary. In central and eastern Texas, embracing the principal cotton-growing counties of the state, only a few light showers fell during the month. Reports from places in Missouri, Iowa, and northern Illinois state that crops were suffering from the lack of rain; in central Missouri considerable rain fell during the latter half of the April.<sup>114</sup>

— At San Antonio, Texas, although light rain fell on several occasions, the total precipitation for the month was only 0.60 of an inch. Reports from adjoining counties indicate that their condition was even worse than the country immediately adjacent to San Antonio. The dry grass from last year was exhausted, and as none grew during the spring, the only forage for cattle was the prickly pear. Livestock were dying rapidly. Numbers of families deserted their homes and farms in search of a more favored locality. All hopes of making the usual grain crop that season were abandoned.

— New Ulm, Texas reported that all interests were suffering from the drought; cattle were in need of grass and water: corn and cotton were in bad condition and would have to be replanted if rain fell. The normal April rainfall for this section, as deduced from the observations of the past fifteen years, was 3.84 inches; the total of April 1887 was only 0.17 inch, and was the least that has fallen in any April up to that time. The normal rainfall of the seven months ending April 30<sup>th</sup> was 31.70 inches; the total amount of the corresponding months in 1886-'87 was 7.92, a deficiency of 23.78 inches.

— Belleville, Kansas reported that the first seventeen days of April were remarkable for dry weather and the frequency and force of dust storms. On the 3<sup>rd</sup> and 9<sup>th</sup>, during windstorms, dust filled the air to such an extent that buildings one hundred feet distant were visible only at intervals.

— Independence, Kansas reported that the first heavy rain in this section since 4 September 1886, fell on the 16<sup>th</sup> and 17<sup>th</sup>. They also reported that on the 3<sup>rd</sup> that during a windstorm, the sky was obscured by dust.

— Salina, Kansas reported April was unusually dry. The total precipitation, 2.06 inches, was the least that had fallen in any April during the past five years.

— Grand Coteau, Louisiana reported that the total amount of rainfall for the five months from December 1886 to April 1887, inclusive was 12.20 inches, less than one-half of the normal amounts. The soil was dry and crops late.

— At Tucson, Arizona cattle were dying in large numbers from want of water and food; the Rillito River was dry for the first time in many years.

[In general, I have excluded meteors from this weather chronology because basically they are not weather phenomena. But I felt inclined to make an exception in this case because the account was really rather remarkable. Captain. C. D. Swart, of the Dutch bark *J. P. A.*, made the following report observed by him at 5 p.m. on 19 March 1887, in the Atlantic Ocean at 37° 39' N., and 57° 00' W. “During a severe storm saw a meteor in the shape of two balls, one of them very black and the other illuminated. The illuminated ball was oblong, and appeared as if ready to drop on deck amidships. In a moment it became as dark as night above, but below, on board and surrounding the vessel, everything appeared like a sea of fire. The ball fell into the water very close alongside the vessel with a roar, and caused the sea to make tremendous breakers, which swept over the vessel. A suffocating atmosphere prevailed, and the perspiration ran down every person's face on board and caused everyone to gasp for fresh air. Immediately after this solid lumps of ice fell on deck, and everything on deck and in the rigging became iced, notwithstanding that the thermometer registered 19° Centigrade [66° F]. The barometer during this time oscillated so as to make it impossible to obtain a correct reading. Upon an examination of the vessel and rigging no damage was noticed, but on that side of the vessel where the meteor fell into the water the ship's side appeared black and the copper plating was found to be blistered. After this phenomenon the wind increased to hurricane force.”]<sup>114</sup> {I would interpret these observations as follows: As the fragment from a comet struck Earth's outer atmosphere, it exploded into two masses, the fast moving leading fragment which appeared as a bright ball of fire and the trailing slower moving debris field. The leading fragment struck first, causing impact effects by producing a blast of light and thermal radiation (heat), tsunami type waves and an atmospheric blast wave. This caused scorching on one side of the ship, waves that washed over the ship



and hurricane force winds. The trailing debris field was large enough and dense enough to block out light (dark as night) near the vicinity of the ship. When the comet debris field struck the ship, it caused clumps of ice to fall on the ship's deck and ice the rigging. Comets are composed of water ice and volatile ices including carbon monoxide, carbon dioxide, methane and ammonia. The volatile ices would sublimate and quickly transition from ice to gas and essentially disappear. The blast wave and reflected blast waves from the atmospheric and ocean impacts would register as pressure waves causing the ship's barometer to oscillate wildly.}

On 21 April 1887, a severe hailstorm struck Yazoo, Mississippi in the *United States*. Hailstones fell for a few minutes as large as hens' eggs, breaking windows and beating leaves and young fruit from trees. Much damage was done to growing crops. At Rolling Fork, Mississippi, several hailstones were found that measured five inches in circumference. Holes were broken in roofs, and trees were partly stripped of foliage.<sup>114</sup>

On 22 April 1887, a cyclone struck off the coast of *Western Australia*. The cyclone struck a pearling fleet off what was then called Ninety Mile Beach. It killed 140 people, and destroyed four schooners and eighteen luggers.<sup>99</sup>

On 23 May 1887, a destructive cyclone at Calcutta [now Kolkata], *India*.<sup>90</sup>

The following are the highest temperatures observed during July 1887 in the *United States*:<sup>114</sup>

Montgomery, Alabama	(100.4° F, 38.0° C)
Mobile, Alabama	( 97.5° F, 36.4° C)
Fort Grand, Arizona	( 98.5° F, 36.9° C)
Yuma, Arizona	(114.0° F, 45.6° C)
Little Rock, Arkansas	(100.0° F, 37.8° C)
Fort Smith, Arkansas	(103.8° F, 39.9° C)
Lead Hill, Arkansas	(109.0° F, 42.8° C)
San Francisco, California	( 69.9° F, 21.1° C)
Los Angeles, California	( 98.1° F, 36.7° C)
Red Bluff, California	(112.0° F, 44.4° C)
Denver, Colorado	( 92.1° F, 33.4° C)
Pike's Peak, Colorado	( 54.8° F, 12.7° C)
New Haven, Connecticut	( 90.2° F, 32.3° C)
Washington, D.C.	(102.8° F, 39.3° C)
Cedar Keys, Florida	( 92.1° F, 33.4° C)
Pensacola, Florida	( 98.6° F, 37.0° C)
Atlanta, Georgia	(103.8° F, 39.9° C)
Boise City, Idaho	(100.3° F, 37.9° C)
Chicago, Illinois	( 99.8° F, 37.7° C)
Cairo, Illinois	( 97.5° F, 36.4° C)
Sandwich, Illinois	(103.0° F, 39.4° C)
Indianapolis, Indiana	(100.8° F, 38.2° C)
Vevay, Indiana	(105.0° F, 40.6° C)
Terre Haute, Indiana	(102.0° F, 38.9° C)
Fort Sill, Indian Territory	(105.2° F, 40.7° C) [now Fort Sill, Oklahoma]
Dubuque, Iowa	(100.6° F, 38.1° C)
Clinton, Iowa	(104.0° F, 40.0° C)
Des Moines, Iowa	(101.7° F, 38.7° C)
Leavenworth, Kansas	(101.7° F, 38.7° C)
Dodge City, Kansas	( 99.4° F, 37.4° C)
Louisville, Kentucky	(101.7° F, 38.7° C)
New Orleans, Louisiana	( 95.8° F, 35.4° C)
Shreveport, Louisiana	(103.8° F, 39.9° C)



Eastport, Maine	( 83.8° F, 28.8° C)	
Portland, Maine	( 95.8° F, 35.4° C)	
Baltimore, Maryland	(101.8° F, 38.8° C)	
Boston, Massachusetts	( 95.1° F, 35.1° C)	
Marquette, Michigan	( 97.0° F, 36.1° C)	
Grand Haven, Michigan	( 89.7° F, 32.1° C)	
Saint Vincent, Minnesota	( 88.6° F, 31.4° C)	
Saint Paul, Minnesota	( 93.9° F, 34.4° C)	
Vicksburg, Mississippi	( 95.3° F, 35.2° C)	
Saint Louis, Missouri	(100.0° F, 37.8° C)	
Fort Assiniboine, Montana	( 93.1° F, 33.9° C)	
Helena, Montana	( 91.5° F, 33.1° C)	
North Platte, Nebraska	( 99.4° F, 37.4° C)	
Omaha, Nebraska	(103.3° F, 39.6° C)	
Winnemucca, Nevada	( 95.2° F, 35.1° C)	
Mount Washington, New Hampshire	( 66.0° F, 18.9° C)	
Atlantic City, New Jersey	( 97.0° F, 36.1° C)	
Santa Fe, New Mexico	( 86.8° F, 30.4° C)	
Buffalo, New York	( 92.1° F, 33.4° C)	
New York City, New York	( 94.0° F, 34.4° C)	
Charlotte, North Carolina	(102.2° F, 39.0° C)	
Wilmington, North Carolina	(100.0° F, 37.8° C)	
Kitty Hawk, North Carolina	(107.0° F, 41.7° C)	
Bismarck, North Dakota	( 95.6° F, 35.3° C)	
Cincinnati, Ohio	(101.2° F, 38.4° C)	
Sandusky, Ohio	( 98.0° F, 36.7° C)	
North Lewisburg, Ohio	(102.0° F, 38.9° C)	
Roseburg, Oregon	( 93.1° F, 33.9° C)	
Portland, Oregon	( 93.0° F, 33.9° C)	
Pittsburg, Pennsylvania	(101.1° F, 38.4° C)	
Philadelphia, Pennsylvania	( 99.9° F, 37.7° C)	
Block Island, Rhode Island	( 83.4° F, 28.6° C)	
Charleston, South Carolina	( 97.9° F, 36.6° C)	
Columbia, South Carolina	(104.0° F, 40.0° C)	
Deadwood, South Dakota	( 89.8° F, 32.1° C)	
Memphis, Tennessee	( 99.0° F, 37.2° C)	
Knoxville, Tennessee	(100.2° F, 37.9° C)	
Fort Elliott, Texas	( 98.7° F, 37.1° C)	
Brownsville, Texas	( 91.6° F, 33.1° C)	
Salt Lake City, Utah	( 97.9° F, 36.6° C)	
Lynchburg, Virginia	(101.8° F, 38.8° C)	
Norfolk, Virginia	(102.5° F, 39.2° C)	
Olympia, Washington Territory	( 86.2° F, 30.1° C)	[now Olympia, Washington]
Spokane Falls, Washington Territory	( 94.2° F, 34.6° C)	[now Spokane Falls, Washington]
Milwaukee, Wisconsin	( 99.9° F, 37.7° C)	
La Crosse, Wisconsin	( 98.4° F, 36.9° C)	
Cheyenne, Wyoming	( 89.5° F, 31.9° C)	

On 11-15 June 1887, a hurricane struck *Cuba*. Some people drowned.<sup>141</sup>

On 12 June 1887, a severe 3-hour hailstorm struck Nicolaus, California in the *United States*. Whole fields of barley were stripped entirely clean of the heads, and nothing was left standing but the bare straw. With wheat fields the effect was the same, except that the destruction was not quite so complete, owing, most likely because it was not as advanced as the barley. Any fruit that was not pounded off the trees was picked full of holes, so that it resembled the effect of a charge of [buck]shot. Corn was stripped as with a

knife, and every sort of vegetable suffered. Chickens, birds, rabbits, gophers, young pigs, etc., were found lifeless in quantities after the storm. The hail was 3 inches thick on the ground. It varied in size from peas to walnuts, and was of all shapes, and generally bearing the characteristic, noticed before, of being frozen solid on one side and imperfectly congealed on the other. Damage was estimated at \$50,000. [In present currency, that would be equivalent to \$1.2 million in damages based on the Consumer Price Index (CPI) inflation rates.] The hailstorm was the product of two great clouds at different elevations merging, one on top the other.<sup>114</sup>

Destructive floods struck Pennsylvania in the *United States* during June 1887.<sup>114</sup>

— A very heavy rainfall occurred to the west of Hooversville, Pennsylvania on the June 7<sup>th</sup>. That village was entirely underwater and more than twenty residences were washed from their foundations. The flood reached Johnstown about noon, and during the afternoon the streets and a number of cellars were flooded. Much damage was done by the flood at Conemaugh, Morrillville, Grubtown, Cambria City, and Coopersdale, Pennsylvania and at Minersville, several bridges were washed away. The damage was estimated at \$150,000 (\$3.6 million in today's dollars).

— Very heavy rain storm occurred at Nanticoke and vicinity, in Pennsylvania, on the afternoon of the 9<sup>th</sup>, flooding the streets and cellars and causing a large amount of damage. The first floors of a number of houses were submerged, and in some instances the buildings were undermined. Considerable injury was also done to the railroads in this vicinity. The losses were estimated at \$100,000 (\$2.4 million in today's dollars).

On 14 June 1887, a heavy gale struck Atlantic City, New Jersey in the *United States*. But the weather was so dry that the wind caused the sand to form deep drifts, resembling snow drifts; at some street corners the sand accumulated to such a depth as to impede travel.<sup>114</sup>

The high temperatures experience in the *United States* in July 1887 caused hardship. Several towns reported cases of heat stroke (prostration of heat) or sunstroke, many proved fatal including at Cairo, Illinois; Davenport, Iowa; Louisville, Kentucky; Saint Louis, Missouri; Baltimore, Maryland; Charleston, South Carolina; Columbus, South Carolina; Norfolk, Virginia; and Cincinnati, Ohio.<sup>114</sup>

In July 1887, several areas in the *United States* reported a severe drought. These included:<sup>114</sup>

— Forty localities in Illinois reported a severe drought, including Greenville, Xenia, Chatham, Centralia, Charleston, Mattoon, Riley, Sandwich, and Windsor. The terrific heat of the sun, burning day after day from an almost cloudless sky, and the short nights that bring no dew, destroyed the hopes of the farmers. Some areas of Illinois received heavy rainfall on the 21<sup>st</sup>, the first rain in 50 days, that helped but it was feared that the early crop was blighted beyond saving. In Henry County on the 26<sup>th</sup>, it was reported that farmers had disposed of their livestock at great sacrifice [monetary loss], on account of poor pasturage and scarcity of feed. At Windsor on the 31<sup>st</sup>, they reported that wells that never failed before were becoming dry

— Many areas of Indiana were affected by the drought. These included Huntington, Wabash, Laconia, and Terre Haute. The Eel River Valley district in the northern part of Wabash County on the 29<sup>th</sup> reported that the corn was burning up from the excessive hot weather and long continued drought. This area was the most fertile district in the county. The Eel River had not been so low in 25 years and watermills had to cease operations because of lack of water.

— Many areas of Iowa were affected by the drought including: Independence, Carson, Hamburg, McGregor, New Hampton, Dubuque, Fort Madison, Cedar Rapids, Oskaloosa and Des Moines. New Hampton reported on the 22<sup>nd</sup> that due to the drought, only 1/3 of the average crop of hay was produced. Dubuque reported on the 25<sup>th</sup>, fruit and potatoes were a complete failure and grass was dead. Fort Madison reported on the 31<sup>st</sup>, that the month was the driest ever known there. Des Moines on the 31<sup>st</sup> reported that wells and small rivers had dried up.

— Many areas of Kansas were affected by the drought including: Manhattan, Leavenworth, Wellington, Independence, Parsons, Salina, Wakefield, Topeka, Elk Falls, and East Norway. Manhattan on the 15<sup>th</sup> reported wells and creeks were drying up. Wakefield and Topeka on the 31<sup>st</sup> reported that farmers were cutting up their corn for fodder, the ears being shriveled. Elk Falls reported on the 31<sup>st</sup> that cattle had to be driven long distances for water.

— A drought prevailed in the Southern parts of Michigan. It injured corn and potatoes beyond the hope of recovery. In many locations corn was being cut and either being fed to livestock or cured for winter fodder. In Michigan the

areas around Battle Creek, Kalamazoo, Thornville, Swartz Creek, Hudson, Mottville and Birmingham were affected by the drought.

— In Wisconsin a very severe drought prevailed in the Counties of Fond du Lac, Winnebago, Green Lake, Marquette, Dodge and Columbia. The vegetation over open prairies was literally burned up. The marshes and beds of creeks were completely dry.

At Palo Alto, Mississippi in the *United States*, a violent lightning storm struck on the afternoon of July 10<sup>th</sup>. The electrical display was remarkable. Three miles southwest of Palo Alto, over a small area of two acres (0.8 hectares), about one hundred large trees were struck by lightning.<sup>114</sup>

The Saint Louis *Globe-Democrat* reported that on 14 July 1887 “A terrific cloud-burst occurred in Tucker Canyon, near Golden [Colorado in the *United States*], twenty miles from Denver, this afternoon. The canyon was full of campers, ore-haulers, etc. A slight rain storm succeeded peals of thunder, and suddenly a wave nearly twenty feet high swept down the narrow canyon, which for weeks had been completely dry. Everything was swept before it. The sides of the gulch, which is only sixty feet wide, were swept away, as were also the trail and carriageway for miles up the canyon. Those who were caught out, so far as is known, left their teams and fled to the mountains. All the latter part of the afternoon people have been walking into Golden from the hills. They report the loss of their teams and vehicles, and all give exciting accounts of their narrow escapes from death. They fear that many lives have been lost, as many people who went up into the mountains have not yet been heard from. The huge wave in the canyon was the result of a cloud-burst, which may have occurred far up in the canyon. The loss to ranchmen in the valley has been heavy.”<sup>114</sup>

On 16 July 1887, the temperature reached 103° F [39° C] in Bradford County, Pennsylvania in the *United States*. On 26 July, the inhabitants of Wysox valley who live between Rome and the mouth of the creek experienced the highest water known there since the flood of 1865. So rapid was the rise of water that many were of the opinion that a cloud burst or the meeting of two storms up the valley towards Rome must have occurred. The rapidity with which the waters came up over the flats was unprecedented. Rome reported that the main streets were navigated by boats; cellars were flooded; nearly every bridge in this section of the county swept away; the county iron bridge known as Gillett's bridge was carried away; the Rome township voting place was swept down the creek a distance of half a mile [0.8 km] and was crushed. The Wysox, Bullard, Bear and Johnson creeks were the highest ever known. Cattle, sheep and poultry were swept away. The losses in the vicinity of Myersburg and North Orwell were also very heavy.<sup>178</sup>

In Wabash, Indiana in the *United States* during the night of July 18<sup>th</sup>/19<sup>th</sup>, a severe hailstorm passed through the county doing immense damage. The hailstones were unusually large, and fell in great quantities. Apples, melons, grapes, and all small fruit and vegetables were cut to pieces. The damage is estimated at \$50,000.<sup>114</sup> [In present currency, that would be equivalent to \$1.2 million using CPI inflation.]

The hurricane of July 1887 advanced from *Barbados Island* westward over the Caribbean Sea and thence northward over the Gulf of Mexico to the east Gulf States of the *United States* from the 20<sup>th</sup> to the close of the month. This storm was very severe at Barbados Island on the 20<sup>th</sup>, and several vessels were wrecked. Several vessels were wrecked on the west coast of Florida and the north Cuban coast, and very heavy rainfall occurred in the Gulf States, in connection with high winds and swollen rivers, caused great destruction to the growing crops and the public highways.<sup>120</sup>

At Philadelphia, Pennsylvania in the *United States*, the heavy rainfall on July 23<sup>rd</sup> and 24<sup>th</sup> (around 4 inches) caused much damage to city streets and sewers. The heavy rainfall on the night of the 26-27<sup>th</sup> caused a heavy damage at Falls of the Schuylkill, where, on many streets, the lower floors of houses were

submerged. The damage was estimated at \$100,000 (approximately \$2.4 million in today's dollars). At Manayunk, the streets were washed out and houses and mills were flooded.<sup>114</sup>

In July 1887, there were great floods in southern *United States*.<sup>90</sup>

Towards the end of July 1887, Georgia and Alabama in the *United States* experienced heavy rainstorms and floods.<sup>114</sup>

— At Augusta, Georgia, the heavy rains at the close of the month caused the Savannah River to rise to a height, which has not been equaled since 1865; the river reached its greatest height, 34.5 feet, about 9 a.m. on the 31<sup>st</sup>. A considerable portion of the city was inundated, and in some places the water was ten feet deep. Travel on railroads was interrupted and the operations of mills were suspended. The rainfall on the 29<sup>th</sup> amounted to 4.50 inches, which was the largest daily rainfall on the records of the Signal Office at this place. In but three instances since 1840 has the river reached a greater height than during the freshet of July 1887, viz.: in 1840, 37.3 feet; 1852, 36.8 feet; and 1865, 36.4 feet. During the freshet of 1864, the river reached a height of 33.8 feet.

— At Milledgeville, Georgia, the precipitation for the month, 16.09 inches, was unprecedented at this station for the month of July; the first rainy season occurred from the 4<sup>th</sup> to the 12<sup>th</sup>, when 5.75 inches of rain fell; and the second from the 27<sup>th</sup> to the 31<sup>st</sup>, when 9.98 inches of rain fell. This latter rainfall caused a freshet similar to that in 1840. Great damage was done in this county to crops, bridges, fences, etc.

In August 1887, two energetic and destructive storms moved from the vicinity of the Windward Islands, north of the *West Indies*, to the *Bahamas*, where they recurved north and northeast.<sup>119, 120</sup>

On 16 August 1887, a destructive hurricane struck Bordeaux and southern *France* causing loss of life.<sup>90</sup>

On 17 August 1887, beginning about 5.30 p.m., a violent thunderstorm struck London, *England*, causing destruction of property. Several persons were killed. The thunderstorm lasted about 4 hours. On that day there were many storms throughout the country.<sup>90</sup>

On 18 August 1887, there was a windrush from the southwest, or a western tornado which struck Northfield, Massachusetts in the *United States*.<sup>138</sup>

On 9 September 1887, heavy rains struck Tucson, Arizona in the *United States* causing floods on the Santa Cruz and Rillito Rivers. Several miles of the *Southern Pacific* Railroad track and some bridges in the vicinity of Pantano, Arizona were washed away. The extent of the destruction to the railroad by the washouts was very great. One filling fifty-feet high on the Dragoon grade was washed out for eight miles. It took approximately three weeks to repair the washed out places between Benson and Tucson so that trains could pass over the road. This was the most destructive washout yet suffered by the *Southern Pacific* Road, and costs exceeded \$200,000 to repair the damage (\$4.8 million in today's dollars). Heavy rains on 12 September extended into Sonora, where five miles of track and three bridges were washed out on the Sonora Road. The streets of Tucson, Arizona were flooded along with perishable freight for the eastern market.<sup>114</sup>

In September 1887, one storm [hurricane] advanced from east of the *Windward Islands* on the 11<sup>th</sup> westward over the Caribbean Sea and northwest over the Gulf of Mexico to the Texas coast of the *United States* by the 21<sup>st</sup>, and another one moved northeast from the western extremity of *Cuba* over the *Bahamas*.<sup>120</sup>

A hurricane struck near the *Mexico / United States* border on 21 September 1887.<sup>114</sup>

— A great storm [hurricane] struck Matamoras, *Mexico* on the night of the September 21<sup>st</sup> and the morning of the 22<sup>nd</sup>. This storm caused extensive damage in Matamoras and for twenty miles south and forty miles west along the Rio Grande. Telegraph wires were prostrated, preventing early accounts of the storm. The wind reached the velocity of a hurricane, blowing eighty-five miles an hour, as registered at the headquarters of the Mexican troops

located there. The hurricane drove the sea into the mouth of the Rio Grande, causing it to overflow its bank on the Mexican side for a distance of nearly a hundred miles from its mouth. The principal streets in Matamoras were submerged to a depth of three feet. Many old houses in the city collapsed and were carried away by the wind and flood. Notwithstanding the great destruction to property, no lives were yet known to have been lost, but many people were wounded by flying debris and falling houses. Narrow escapes from death were recounted by hundreds. The hurricane was so powerful that not a single metal roof remains in the city. They were all curled up like so much paper and hurled to the ground. All fences in the city and for miles surrounding disappeared. In many instances not a single board was left on the ground—nothing but the naked posts. It was thought that every frame house in the city was moved more or less from its foundation or otherwise damaged.

— During, and immediately following, the progress of the storm rescuing parties were organized and sent out to relieve people in the lagoon districts of Matamoras, where the flood was dangerously deep. The rain poured down in blinding sheets for several hours, adding terror to the hurricane and the raging river. The government troops were all called out to assist the police in the work of rescue. The public school and government buildings were crowded with refugees, whose homes had disappeared. Not less than a hundred small houses (jacals) were destroyed, while all of the larger buildings and residences were damaged. The *Matamoras and Rio Grande* Railroad sustained serious loss. Its tracks were swept away for many miles along the river, and its depots demolished. The federal and state authorities feed the homeless victims of the storm.

— In the *United States*, the greatest damage reported occurred from the effects of the heavy rains and the flooding of the Rio Grande River. The riverbanks were overflowed and the flats and bottoms filled with water, although the streets were not flooded. The roads leading into Brownsville, Texas became impassable and remained so till after October 6<sup>th</sup>. At Point Isabel the sloop *Romp*, the schooner *Mignonette*, and the yacht *Maud B* were lost sight of and had not been heard from since. The *Mignonette* was a Government lighthouse boat, and had a crew of fourteen persons. Around and about Brownsville no great damage was sustained either to property real or personal, and this fact was largely due to the warnings issued by the Signal Service, as the inhabitants were busily engaged in nailing up their windows and fences, bracing their houses, and taking other precautions against damage, when the storm was reported as coming toward southwest Texas. The greatest damage especially from Brownsville eastward on the Rio Grande River to the coast, however, was probably due to the heavy rains and the floods in the river and adjacent lowlands, which destroyed cattle and other livestock and materially injured cotton, sugar cane, and exposed products.

In September 1887, several areas in the *United States* reported severe drought conditions. These included:<sup>114</sup>

— In Illinois, the drought conditions of July and August carried over into September. These conditions prevailed until the daily rainfalls began on September 26<sup>th</sup>. Tolono, Illinois reported on the 16<sup>th</sup> that nearly all wells were exhausted, and farmers were compelled to haul water for livestock. At Philo, Sadorus, and other towns in Champaign County, the same conditions exist. Hillsborough and Galesburg reported severe drought conditions and a great scarcity of water on the 16<sup>th</sup>. Monmouth, Illinois reported on the 16<sup>th</sup> that nearly half of the wells in the county had failed, and there was but one running stream left in the county.

— Many of the interior towns in Iowa, Missouri, and Illinois were suffering from an inadequate water supply. The continued prevalence of the drought dried up the creeks and wells. Until there was a rainfall in the middle of September, there had been no rain for six or seven weeks and water was at a decided premium. Crops were damaged, the meadows parched by the sun, and livestock suffered. Relief was afforded for a short time by the limited rainfalls, but then the supply again became almost exhausted. The creeks and small streams in southwestern Iowa were nearly dry by September 24<sup>th</sup>. At Pella, Iowa on the Rock Island Road, the water supply was nearly gone, and water was hauled on the trains from Keokuk, Iowa. Within a radius of ten miles of Keokuk the water supply was short in several localities and insufficient for livestock.

— Many other states suffered similar drought conditions, partially relieved by September rainfalls. These included: Indiana, Kentucky, Mississippi, Ohio, West Virginia and Tennessee. But in some places the drought continued unabated including San Antonio, Texas; Newport, Vermont; Virginia; and Milledgeville, Georgia.

In September, the Yellow River (Huang He River) in *China* overflowed its dikes and caused a massive flood. Floodwaters covered an estimated 50,000 square miles of land in Northern China. The flood killed 900,000 people and left 2 million people homeless. Following the flood, the resulting pandemic and lack of basic essentials claimed as many lives as those lost directly by the flood itself.<sup>45</sup>



In September-October 1887, there was a great overflow of the Hoang-Ho or Yellow River in *China*.<sup>90</sup> [During this catastrophic flood event, between 900,000 to 2 million people died.]

In 1887 during the period between 19 August and 16 September, a drought engulfed Kansu (now Gansu province) in northwest *China* at Ching-yüan and Hopei (now Hebei province) in northern *China* at Tung-kuang. During the period between 8 August and 8 November, floods struck Hopei province at Luan and Kansu province at Lin-t'an.<sup>153</sup>

A severe gale started rolling through the Great Lakes region of the *United States* on 2 October 1887.<sup>114</sup>

— At Lansing, Michigan, the high smokestack of the State Printing House was blown over.

— At Buffalo, New York on the 3<sup>rd</sup>, the lake at this port was very rough, submerging both breakwaters, and at times the water was forced above both lighthouses; the breakwaters sustained heavy injuries. Buffalo River rose seven feet during the storm, flooding a number of houses, and on the island and along the waterfront numerous families were obliged to vacate their homes. The *New York Central* Railroad was compelled to keep trucks on the tracks in order to protect them from destruction. The barge *C. L. Hutchinson* ran ashore about ten miles from Buffalo with a cargo of 35,000 feet of lumber. The vessel was a total wreck, but the crew was saved. Considerable damage was done to trees, signs, fences, cornices, chimneys, and roofs, which were carried away by the wind. Sea captains stated that this was the most severe and destructive storm that has ever visited the Lake region so early in the season.

— The schooners *City of Green Bay* and *Havannah*, from the port of Escanaba, Michigan, were lost in the gale on the 4<sup>th</sup>, along with nine seamen. The vessels and cargo was valued at \$30,000 (\$700,000 in today's dollars).

— The propeller ship *California* bound from Chicago, Illinois to Montreal, Canada foundered off the island of Saint Helena on the 4<sup>th</sup>. She was laden with 700 barrels of pork and 20,000 bushels of corn, and went down in about fifty feet of water. Nine lives were lost. The vessel broke in pieces.

— On the 4<sup>th</sup> a coal-laden schooner *Pulaski* traveling between Sandusky, Ohio and Manitowoc, Wisconsin went ashore during the storm and was a total loss. The schooner had been run close to shore and anchored, but the heavy wind dragged her ashore, where the heavy seas soon tore her to piece.

— Near Erie, Pennsylvania, a two-masted schooner went ashore at Ripley shortly before dark on the 4<sup>th</sup>. When last seen, there were six men in the rigging of the schooner. Other ships were unable to go to its immediate rescue because of the severe weather and darkness.

In 1887, a very serious drought prevailed from May to October in the *United States* in Michigan, Wisconsin, Iowa, Ohio, Indiana, Illinois, Kentucky, and Missouri and parts of Minnesota and Dakota, and eastern Nebraska and southeastern Kansas.<sup>114</sup>

— The drought began in April, when less than 50% of the average precipitation fell in southern Michigan and Wisconsin, northern Illinois, the southwestern part of Iowa, and the northwestern part of Missouri.

— During May, a precipitation slightly above the average fell over a belt of country about sixty miles wide, extending from Cincinnati, Ohio, and Frankfort, Kentucky, westward to Indiana and Illinois, including the Missouri River valley as far as Jefferson City; elsewhere in the states previously named, the precipitation was largely deficient, especially in Iowa, Illinois, and the northern half of Michigan, which saw only 20% to 60% of the average rainfall.

— In June the area over which less than half the usual rain fell comprised Iowa, Illinois, southern Wisconsin, southwestern Michigan, and northwestern Indiana. Throughout the section many areas saw only 10% to 20% of the usual rainfall for June.

— During July a slight excess of rainfall fell over the northern half of the lower peninsula of Michigan and central Wisconsin, but throughout the rest of the drought-stricken states, the precipitation generally ranged from 50% to 80% of average, except in Ohio, southern Indiana, southeastern Illinois, and the western parts of Iowa and Missouri, where the amount of rain in some cases was only from 15% to 30% of the mean.

— During August slight excesses fell in western Iowa, western Wisconsin, and the northern part of Illinois: throughout the rest of the drought district the rainfall was generally from 50% to 75% of average, but in the greater part of Michigan, as well as in the southern part of Illinois, the amount was less than 50%.

— In September the greater part of Iowa, Wisconsin, and northern Illinois, and the extreme southern part of Michigan, was relieved by rainfall slightly in excess of the average, but the remaining states still suffered from a deficiency, which in the northern part of Michigan ranged from one-sixth to one-half the usual amount.

— The condition had improved in Wisconsin during October, where a slight excess of precipitation has fallen. But in Michigan, Iowa, the greater part of Illinois, and Indiana the drought remains, as the precipitation has only been



from one-third to three-fourths of the usual amount, while in the valley of the Ohio and of the Mississippi, from Cairo to Quincy, the amount of rainfall has been exceedingly small, not averaging more than 20% for those districts.

The following drought conditions in the *United States* were noted in October 1887:<sup>114</sup>

— At Wash Woods, North Carolina on the 9<sup>th</sup>, the wells were drying up, cisterns had long been exhausted, and cattle were suffering for water. There was a great deal of sickness prevailing at this locality, which was attributed to the long and severe drought.

— At Huntington, Indiana on the 15<sup>th</sup>, farmers were compelled to go great distances for water both for cattle and domestic use.

— At Charleston, Illinois on the 31<sup>st</sup>, creeks were all dry, and stock suffering for water.

— Garrettsville, Ohio reported on the 31<sup>st</sup>, most of the brooks and swamps were dry and water in wells was at a lower stage than at any previous time this year.

— Elyria, Ohio reported on the 31<sup>st</sup>, the severe drought, which prevailed since June, continues and its effects were becoming more alarming. Streams were all dry, many wells have failed, and farmers have to haul water for stock.

— Indiana reported a scarcity of water. "Creeks and surface wells have become dry; wheat either has not come up at all or has turned yellow in many fields, and cattle were suffering from want of water, which had to be brought to many farms from great distances. The observer at Vevay reports that the Ohio River had been lower than noted for many years."

On 11 October 1887, a storm [hurricane] was central over the Caribbean Sea, whence it moved to the west Gulf by the 17<sup>th</sup>; recurved to the Gulf coast of the *United States* near New Orleans, Louisiana; thence moved to the south Atlantic states, skirted the middle Atlantic and New England coasts, and reached the Saint Lawrence Valley in *Canada* the night of the 23<sup>rd</sup>, attended throughout by gales of great violence and general and heavy rain.<sup>120</sup>

In October 1887 a storm of pronounced strength advanced from the Caribbean Sea over the Gulf of Mexico, west of the 90<sup>th</sup> meridian.<sup>119</sup>

On 30 October 1887 there was a west gale, which caused destruction of life and property in *France*, the *English Channel*, and southern *England*. Another gale on 31 October - 1 November struck on the west coast of *Great Britain* causing destruction at Holyhead, Liverpool and in the Bristol Channel. Then another gale on 3 November 1887 struck the southeast coast of *Great Britain*.<sup>90</sup>

The following drought conditions in the *United States* were noted in November 1887:<sup>114</sup>

— Little Rock, Arkansas reported on the 4<sup>th</sup> that rain was badly needed in all sections of the state; wells were becoming dry and cattle suffered for water.

— Paris, Missouri reported that light rains on the 9<sup>th</sup>. Streams were nearly dry and water was very scarce. The typhoid fever that prevailed in this section was attributed to the use of impure water.

— Marshall, Missouri reported that the heavy rain on the 9<sup>th</sup> was greatly needed throughout this county. Ponds were nearly dry, and stock suffered for water.

— Carbondale, Illinois reported that the rain of the 9<sup>th</sup> broke the drought and put out the forest fires, which had been burning in this and adjoining counties for several days.

— Centralia, Illinois reported that the protracted drought was broken by the rain of the 9<sup>th</sup>; the scarcity of water caused much inconvenience.

— Nashville, Tennessee reported on the 18<sup>th</sup> that a severe drought prevailed over the entire state; only 0.45 inch of rain fell at this station since October 25<sup>th</sup>.

— Sunman, Indiana reported: "The rains from the 22<sup>nd</sup> to the 27<sup>th</sup> terminated the severest drought of the last fifty years."

— Charleston, Illinois reported on the 22<sup>nd</sup> that the creeks were all dry, cisterns and wells nearly exhausted, and cattle suffering for water; on that date rain began and continued until the 27<sup>th</sup>; during the last two days of the storm 5.21 inches of rain fell.

— Milan, Tennessee reported the protracted drought was broken on the 23<sup>rd</sup>; streams and wells had dried up, and water had to be hauled long distances.

- Laconia, Indiana reported that the rain of the 23<sup>rd</sup> replenished cisterns, ponds, etc. The Ohio River at Laconia was lower than known for past forty years.
- Tiffin, Ohio reported: "The long and memorable drought was broken by the rains from the 24<sup>th</sup> to 27<sup>th</sup>. A special feature of the drought of November 1887 was that old settlers say that it was the most severe of any in their recollection. Wheat has suffered severely; many wells, which were never dry before and cisterns, which were never empty, failed, so that farmers were obliged to dig their wells much deeper or drive their stock three to five miles for water. A water train loaded at the *Baltimore and Ohio* Railroad well connecting with the Sandusky River was run from this city to different points, almost daily, to supply engines, or for household use."
- Mottville, Michigan reported that the drought was partly relieved by the rains from the 24<sup>th</sup> to the 27<sup>th</sup>; winter wheat was greatly retarded.
- Wauseon, Ohio reported that the long and disastrous drought was broken by the rains from the 24<sup>th</sup> to the 27<sup>th</sup>.
- Elgin, Illinois on the 24<sup>th</sup> reported the entire season of 1887 throughout the dairy district of this portion of Illinois had been unfavorable not only regarding dairy, but general farming. The fall of rain was light and winter set in without the usual fall rains, consequently, in many instances, there was a scarcity of water for livestock. Again, owing to the drought, all kinds of grain were a light crop, and hay a complete failure. Farmers had to buy more or less grain for their dairy cattle each year, but this season many had to buy all their feed.
- Hermann, Missouri reported on 24 November that the drought very injured the wheat crop. Last Saturday, the 19<sup>th</sup>, Hermann experienced a northern blizzard, very cold, and the wind traveling at a fearful velocity, which was more detrimental to the wheat than the drought. Stock water, and with many families, water for ordinary and other purposes, had to be hauled from the river or some creek and had caused the farmers great inconvenience. The drought so completely withered and dried up the grass and the deposit of leaves from the trees was so heavy that forest fires prevailed and inflicted great damage.
- Carmi, Illinois reported the rain of the 26<sup>th</sup> ended the protracted drought and extinguished the forest fires, which had been burning in that vicinity.
- Windsor, Illinois reported on the 27<sup>th</sup> that the drought, which prevailed during the past two months, was broken by three days of rain.
- Cairo, Illinois reported on the 28<sup>th</sup> that the late rains broke the drought in that vicinity, which had become very severe. Over a large area there was little or no rain since the beginning of July. The rivers continued at a low stage longer than ever known since any systematic gauging of the western rivers was begun. The Ohio River was so low that navigation, except for the smallest of boats (which were ordinarily used on the small tributaries), was practically suspended. The crops were below the average and the supply of water scant, the bad condition of the latter caused much sickness.
- Livingston, Alabama reported that November was one of the driest months on record at Livingston, the total precipitation, 0.35 inch, fell on one day, the 28<sup>th</sup>.
- Middlebrook, West Virginia reported on the 30<sup>th</sup> that the drought continued, though somewhat relieved by the November rains. The watermills were still without water.
- Dale Enterprise, Virginia reported on the 30<sup>th</sup> that the effect of the drought was severely felt in the lack of water for livestock; the streams were very low.
- Elk Falls, Kansas reported on 30 November that the month was very dry and water was scarce, the main supply had to be hauled in from the Elk River.
- Mattoon, Illinois reported on 10 December 1887 that from 1 June to 23 November (175 days), they had 145 dry days and the rest only produced 9½ inches of rain. With the exception of August 4<sup>th</sup> and 11<sup>th</sup> which produced 2¼ inches of rain and the last week of September which produced 2¾ inches of rain, the rest of the period produced a total of 4¾ inches of rain. These minor rainfalls were spread out on 30 different occasions producing showers with only a few drops and never over ½ inch. The temperature in the shade during the summer season of 1887 was above 100° F on 17 different days, and above 90° F on 59 different days. The highest being 108° F on July 29<sup>th</sup> and 30<sup>th</sup>. The season was only about 18 per cent, cloudy. In contrast, the rainfall during one-half of the 11 days immediately following November 23<sup>rd</sup> was nearly equal to the entire rainfall of the previous 175 days, being 8½ inches (of which 5 inches fell on November 26<sup>th</sup>).
- Sunman, Indiana reported that the severity of the drought was not altogether due to the deficiency of the rainfall, but was in a great measure intensified by the high temperature of the three summer months and the unusual very light rainfalls that could not penetrate the soil to any considerable depth but was solely confined to the surface, and was quickly evaporated by the intense heat.

Owing to the dry weather of November and previous months in the Mississippi, Missouri, and Ohio valleys in the *United States*, forest fires became very prevalent, especially during November. This

resulted in loss of much property and at times navigation on rivers had been rendered dangerous on account of the prevalence of dense smoke. The following were some of the many reports received: <sup>114</sup>

— Butlerville, Indiana reported extensive forest fires in this county from the 3<sup>rd</sup> to the 8<sup>th</sup>, doing much damage to fences and timber.

— Little Rock, Arkansas reported very extensive forest fires raging throughout the State from the 5<sup>th</sup> to 7<sup>th</sup>, 12<sup>th</sup> to 15<sup>th</sup>, and from the 18<sup>th</sup> to 22<sup>nd</sup>, causing much damage to crops and fences; the smoke was so dense that at times it was impossible to see objects one hundred yards distant.

— Cairo, Illinois reported dense smoke overspread this region during the 5<sup>th</sup>, caused by extensive fires in what was known as the "cypress swamps" in Missouri. The fires reached from Commerce, Missouri, thirty-five miles north of Cairo, Illinois to New Madrid, Missouri, seventy-five miles to the south. In the surrounding country the fires had spread rapidly through "Cashé" bottom until the greater part of its area was swept by the flames. The smoke was so dense after 6 p.m. that the navigation on the rivers was partially suspended for a distance of forty miles along the Ohio River and for one hundred miles along the Mississippi River. Similar conditions prevailed on the 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup>; on the last date the fires reached what was known as the "Island," to the northeast of the city, and extended along the trestle of the *Mobile and Ohio* Railroad. On the 11<sup>th</sup> the forest fires were still burning in many places, though not so widespread as previously, rains having checked them somewhat, and the smoke did not interfere with navigation. On the 16<sup>th</sup> the fires again increased and light smoke prevailed during the entire day and night; on this date the transfer steamers were retarded in making their trips on account of smoke, and like conditions prevailed on the 16<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, 21<sup>st</sup>, and 22<sup>nd</sup>. The forest fires were extinguished by the snow on the 28<sup>th</sup>.

— Bismarck, North Dakota reported that extensive prairie fires were observed in the north on the 4<sup>th</sup> and 6<sup>th</sup>, and in the northeast and south on the 6<sup>th</sup>.

— Fort Yates, North Dakota reported that extensive prairie fires occurred to the west and northwest on the 5<sup>th</sup>, 6<sup>th</sup>, and 16<sup>th</sup>.

— Fort Supply, Indian Territory [now Oklahoma] reported large prairie fires raging to the south on the 6<sup>th</sup>.

— Valentine, Nebraska reported large prairie fires about ten miles to the southwest on the evening of the 6<sup>th</sup>.

— Middlebrook, West Virginia reported the atmosphere was very smoky on the 7<sup>th</sup>, due to extensive forest fires, which were burning about six miles to the west.

— Erie, Pennsylvania reported that the forest fires in this section were extinguished by the rain of the 10<sup>th</sup>, on which date the air was filled with smoke from the smothered fires.

— Memphis, Tennessee reported that during the 15<sup>th</sup>, 16<sup>th</sup>, and 17<sup>th</sup> the atmosphere was filled with dense smoke from forest fires in Arkansas; the rain of the 25<sup>th</sup> was reported to have subdued the fires.

— Milan, Tennessee reported on the 16<sup>th</sup> that the surrounding country has been enveloped in smoke since the 4<sup>th</sup> caused by fires; farmers sustained heavy losses.

— Grand Haven, Michigan reported several forest fires started to the east on the 16<sup>th</sup> and made considerable progress; by the 18<sup>th</sup> the fires were burning fiercely over an area of about three miles, but the rain and snow on the 19<sup>th</sup> quenched the flames.

— Shreveport, Louisiana reported extensive forest fires prevailed in Bosier Parish, northeast of the city, on the 18<sup>th</sup>; reports from the burning district received on the 19<sup>th</sup> stated that several houses and barns had been destroyed.

— Nashville, Tennessee reported on the 18<sup>th</sup> that destructive forest fires prevailed in southwest Tennessee and Arkansas during the past five days, and on that date were still raging fiercely; many houses and much valuable livestock and timber were destroyed by the flames.

— Louisville, Kentucky reported the atmosphere was filled with smoke during the 18<sup>th</sup>, caused by forest fires, which were burning to the south of the city. On the morning of the 19<sup>th</sup>, it was so dark as to render artificial light necessary.

— Laconia, Indiana reported that the forest fires in various localities and the high westerly winds on the 19<sup>th</sup> resulted in the smoke becoming so dense as to cause darkness to such a degree that it was difficult to see even a short distance, and steamers on the Ohio River were compelled to stop running at midday. Forest fires were of almost daily occurrence prior to the 23<sup>rd</sup>; several houses, barns, fences, and much timber were burned. The rain, which fell on the 23<sup>rd</sup>, soon checked the progress of the fires.

— Lamar, Missouri reported forest fires on the 18<sup>th</sup> and 19<sup>th</sup> to the west; the telegraph poles were burned interrupting communication.

— Oxford, Mississippi reported on the 20<sup>th</sup> that the smoky condition of the atmosphere during the past few days was due to forest fires in western Tennessee and eastern Arkansas.

— Fort Smith, Arkansas reported the atmosphere on the 21<sup>st</sup> was filled with smoke from extensive forest fires in the adjoining states.

— Springfield, Missouri reported on the 22<sup>nd</sup> that dense smoke enveloped this section during the past few days, due to the extensive forest fires, which have prevailed south of this city.

— Lead Hill, Arkansas reported on the 30<sup>th</sup> that dense smoke from forest fires filled the air on the 5<sup>th</sup>, 13<sup>th</sup>, 18<sup>th</sup>, 21<sup>st</sup>, 22<sup>nd</sup> and 23<sup>rd</sup>; it was reported that several farm houses were burned and much other damage done by forest fires in various sections of the state.

— Wauseon, Ohio reported on the 30<sup>th</sup> that the prairies about five miles to the southwest were on fire during the greater part of the month; forest fires prevailed about the 15<sup>th</sup> in the timber lands fifteen miles to the northeast.

On 29-30 November 1887, the path of a depression was approximately located north of the *West Indies*, and from the 28<sup>th</sup> to 30<sup>th</sup> heavy gales, attaining hurricane force, were reported in that region.<sup>119, 120</sup>

During December 1887, severe weather prevailed over the *West Indies Islands* attending the passage of three cyclones. This was very unique for the month of December. Two of these moved northwest to the vicinity of Bermuda, and thence recurved northeastward, and one advanced westward over the Caribbean Sea.<sup>114</sup>

On 1 December 1887, a storm [hurricane] was central about midway between *Bermuda* and the *Windward Islands*, whence it moved irregularly northward to the Banks of Newfoundland, *Canada* by the 6<sup>th</sup>, attended by heavy gales. On the 4<sup>th</sup>, a depression [a second storm] was central east of the *Windward Islands*, whence it moved northeast and recurved to the northeastward north of the *Windward Islands* on the 5<sup>th</sup>. This storm, together with the depression which preceded it, was attended by a heavy "norther" over the *West Indies* during the first four days of the month, during which many vessels were wrecked. On the 4<sup>th</sup>, during a violent gale, an immense wave struck the beach at Baracoa, *Cuba*, broke and flowed inland, destroying nearly three hundred houses and huts without, however, an attendant loss of life.<sup>120</sup>

A heavy storm pounded Los Angeles, California in the *United States* on 13 and 14 December 1887. The storm produced winds with a peak velocity of 50 miles per hour. Although the damage in this city was slight, reports from the surrounding country state that the storm was very destructive, especially along the line of the Sierra Madre foothills, where many buildings were demolished and orchards in many places were badly injured. At La Crescenta & La Cañada, California, small towns twelve miles north, a hotel was destroyed, resulting in the death of two persons. At Glendora, several cottages were blown down; no one injured. At Paquima [Pacoima], in the San Fernando Valley, the new hotel was almost demolished; loss \$5,000. At Lordsburg [La Verne], the hotel recently erected was torn to pieces; loss \$10,000. At Rialto, three houses were destroyed. At Pasadena, several houses were blown down on exposed points, and quite a number of persons injured. At Cucamonga, the [railroad] depot was almost totally destroyed; also the new hotel and several stores and buildings; loss about \$50,000 (\$1.2 million in today's dollars). At San Bernardino, several cottages were wrecked. At San Fernando, the roof of the brick warehouse was blown off and deposited on the middle of the *Southern Pacific* track. Between Cucamonga and Colton the cab was blown off the engine of a special eastbound freight train. At Colton the channel of the water ditch was so filled with sand, which had drifted from the fierce winds and that it was impossible to obtain any water. At Riverside much damage was done in exposed districts.<sup>114</sup>

In 1887 in *Australia*, severe floods took place in Victoria.<sup>101</sup>

During the six years [1882-1887] at Colón, *Panama*, the highest observed temperature was 98.9° F (37.2° C) and the lowest was 57.6° F (14.2° C). During the same period at Gamboa, *Panama* [except the records of 1882-1883 were partial], the highest observed temperature was 98.9° F (37.2° C) and the lowest was 57.2° F (14.0° C). During the same period at Naos, *Panama*, the highest observed temperature was 98.9° F (37.2° C) and the lowest was 64.4° F (18.0° C).<sup>123</sup> [Colón is on the Caribbean Sea coast of *Panama*. Gamboa is in the Canal zone. Naos is near the Pacific entrance of the Panama Canal.]

Also refer to the section **1887 A.D. – 1889 A.D.** for information on the famine in China and Asia Minor during that timeframe.

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**Winter of 1887 / 1888 A.D.** In December 1887, heavy snowstorms of the 18-20<sup>th</sup> struck New York and Pennsylvania in the *United States*, and those of the 29-30<sup>th</sup> struck Illinois, Iowa, Dakota, Minnesota, Wisconsin, and Michigan, causing blockades on railroads. The snowstorms of the 15<sup>th</sup> and 24<sup>th</sup> in Texas were of unusual severity for that region, producing snowfalls of 6 to 9 inches.<sup>114</sup>

The winter of 1887-88 in Bradford County, Pennsylvania in the *United States* was noted for blizzards. There was good sleighing from the middle of December until the end of February. It was intensely cold during the middle of February then turned warm and the ice in the Susquehanna River passed out. Following the great blizzard of March 12 & 13, there were some warm days in March. On 16 April, 6 inches [15 cm] of snow fell on Barclay Mountain.<sup>178</sup>

The *Baltic Sea* froze.<sup>37</sup>

During the winter of 1887-88, the *Baltic Sea* was completely covered with ice.<sup>68</sup> January 1888 may be rated as an unusually cold month over the greater part of the *United States*, particularly on the Pacific coast, in the plateau region, and in all northern districts, the mean temperatures generally ranging from 6° F to 12° F below the normal.<sup>121</sup>

From 6-12 January 1888, low temperatures were experienced throughout California in the *United States*. Killing frosts occurred, and ice formed in some places to the thickness of four inches.<sup>121</sup>

On 12 January 1888, a strong blizzard with snow, winds between thirty and fifty miles per hour and a 24 hour temperature drop of 30° to 60° F struck Montana, the Dakotas and Nebraska in the *United States*. During this storm many lives were lost and large number of cattle perished. On the morning of the 13<sup>th</sup> the area spread farther to the southeast over Iowa, Missouri, and Kansas, carrying the cold wave with it. At midnight it had extended more to the northeast carrying with it the intensely cold wave, during which the fall in temperature in twenty-four hours was from 30° to 50° F over Minnesota, Wisconsin, Illinois, Indiana, and western Michigan.<sup>121</sup>

— At Helena, Montana on the 12<sup>th</sup>: between 2:30 a.m. and 7 a.m. the exposed thermometer read +40.5° F. At 10 p.m. the minimum thermometer reading was -26.0° F, making a total fall of 66.5° F in less than twenty-four hours.  
— At Poplar River, Montana on the 12<sup>th</sup>, cold, high northwest wind; snow all blown into drifts and temperature -22° F and falling.

— At Fort Custer, Montana on the 12<sup>th</sup>, the snow was accompanied by high northerly winds, which began at 2:42 a.m. and ended 9:30 a.m., with maximum velocity of forty-nine miles per hour. This storm, commonly known as a "blizzard," was the severest of the season. No lives in this immediate vicinity were reported lost. Travel on the *Northern Pacific* [railroad] was completely blocked, owing to the drifting snow and intense cold.

— At Bismarck, North Dakota on the 12<sup>th</sup>, northwest gale with winds as high as fifty-four miles per hour. Then the wind shifted direction and increased in force, drifting the snow which had already fallen and that which was falling to depths of five to twenty feet. This, with rapidly falling temperature, constituted a well-defined "blizzard". The trains on the *Northern Pacific Railroad* were delayed and travel in small conveyances suspended. On the 14<sup>th</sup>, the minimum temperature was -37° F.

— At Saint Vincent, Minnesota on the 12<sup>th</sup>, a blizzard struck with wind speeds between 36 and 48 miles per hour. On the 13<sup>th</sup>, temperatures fell to -40° F.

— At Crete, Nebraska on the 12<sup>th</sup>: light, moist snow commenced in the early morning, and at 9 o'clock heavy snow was falling, which continued till 4:30 p.m. There was but little wind. At 4:10 p.m. the wind suddenly sprang into a gale, shifting from south to northwest. The temperature fell 18° F in less than three minutes. The snow drifted so badly as to render all travel extremely difficult and dangerous.

— At Topeka, Kansas on the 12<sup>th</sup> from 6 to 10 p.m., the temperature fell from +84° F to +2° F.

— At Omaha, Nebraska on the 12<sup>th</sup>, the temperature fell 88° F in seven hours.



— At Denver, Colorado on the 12<sup>th</sup>, there was very high wind during the day, reaching a velocity of sixty miles per hour. The instrument shelter was blown down, tearing some of the roof with it.

— At Des Moines, Iowa on the 13<sup>th</sup>, the high wind during the night continued causing immense snowdrifts in the railroad cuts.

— At Saint Paul, Minnesota on the 13<sup>th</sup>, railway trains over the roads extending in every direction from here (except the *Wisconsin Central* to Chicago and the short line trains from here to Minneapolis) neither arrived nor departed during the day. On the 14<sup>th</sup>, the minimum temperature was -24° F.

The blizzard of 12 January 1888 was very memorable at Huron, South Dakota in the *United States*. The blizzard was preceded by unusually mild conditions, which tempted farmers to travel long distances to water stock and procure fuel and other necessities, after having been confined closely to home by preceding severe weather. The storm was accompanied by rapidly falling temperature that occurred so suddenly that those away from home in the country had no opportunity to seek shelter, even the nearest. Suddenly the air was at once filled with fine, dry and blinding snow, with a severe gale. At Huron, South Dakota on 12 January at 12:42 p.m. in the afternoon, the sky was obscured in patches by nimbus clouds and the air was perfectly calm for about one minute; the next minute the sky was completely overcast by heavy black clouds, which for a few minutes previously had hung along the western and northwestern horizon, and the wind veered to the northwest and blew with such force as to render the position of the observer on the roof unsafe. The air was immediately filled with snow as fine as sifted flour. In three minutes the wind attained gale force with a velocity of 40 miles an hour. At noon of the 12<sup>th</sup>, the temperature was 20° F and at 10 p.m. -17° F, and fell to -28° F during the night. The wind averaged from 45 to 50 miles and attained an extreme velocity of 60 miles per hour. The number of lives lost in Beadle County, South Dakota was 11, and a considerable number were injured.<sup>137</sup>

But this storm was more widespread and Huron was only a small piece of a storm that produced a great number of casualties in the Northwest. On the morning of the 12 January 1888, an area of high pressure appeared north of Montana. At the same time a well-defined area of low pressure central near Cheyenne, Wyoming, the subsequent course of which moved to the southeast until the center neared Concordia, Kansas at 3 p.m., then rapidly to the northeast. At 10 p.m. of the 12<sup>th</sup>, the area of high pressure had extended to the southeast over Montana, Dakota, and Nebraska, while the pressure at its center had increased to 30.60 inches, the center of the area of low pressure before mentioned being located at La Crosse, Wisconsin, and bounded by an isobar of 29.60 inches, there being a difference of pressure of 1.3 between the centers of the two areas, separated by about 1,200 miles. This marked difference in pressure caused winds of from 30 to 50 miles an hour, accompanied at some stations in Montana, Dakota, and Nebraska, by snow, which, with a fall of from 30° to 60° F in temperature during 24 hours helped to make a violent storm in which many lives were lost and large numbers of cattle perished.<sup>137</sup>

On 11-13 January 1888, a snowstorm (blizzard) struck the northwest of *United States*. About 235 persons perished along with many cattle. Another snowstorm struck New York on 26 January 1888.<sup>90</sup>

On the 14<sup>th</sup>, the cold wave extended over the southern slope of the Rocky Mountains and the west Gulf states of the *United States*.<sup>121</sup>

— At Fort Elliott, Texas on the 14<sup>th</sup>, a "norther" struck the [weather] station. Temperatures fell to -7° F, the coldest day on record. On the 15<sup>th</sup>, the "norther" continues. The cold wave produced the coldest temperature since the establishment of station, -14° F in the morning with a gale of forty miles per hour.

— At Abilene, Texas on the 15<sup>th</sup>, the temperature fell to -5° F, which was the coldest of which there is any record, and colder than the oldest residents have ever seen it.

— At Galveston, Texas on the 15<sup>th</sup>, a veritable "blizzard" was raging in Galveston. The temperature was below freezing, the wind blowing at the rate of 36-40 miles per hour, with fine snow, or frozen mist, which cuts like drifting sand. By the evening, every object out of doors coated with ice an inch thick.



— At Rio Grande City, Texas on the 15<sup>th</sup>, a terrific "norther" came on with freezing rain. On the 16<sup>th</sup>, the "norther" continued. All small receptacles filled with water froze solidly. There was general suffering and sickness among the Mexican inhabitants.

— At Brownsville, Texas on the 16<sup>th</sup>, there was a severe "norther" producing a minimum temperature of 21.4° F. Trees, houses, and fences covered with ice an inch thick; coldest weather since 31 December 1880 / 1 January 1881, when minimum temperature was 18° F. Cattle and people suffered greatly.

Unusually low temperatures were observed throughout California in the *United States* from the 14-18 January 1888, and frost and ice were formed at places where they are of very rare occurrence.<sup>121</sup>

— At Red Bluff, California on the 14<sup>th</sup>: clear weather, with high northwest wind; minimum temperature, 18° F, the lowest since the establishment of the [weather] station. On the 16<sup>th</sup>, light snow fell from 5 to 5:35 p.m., melting as soon as it reached the ground. On the 17<sup>th</sup>, a killing frost was observed in the morning.

— At Sacramento, California on the 14<sup>th</sup>: high northerly winds, clear and cold; minimum temperature in the morning was the lowest recorded by the Signal Service at this [weather] station since 1 July 1877, and the coldest known since 21 January 1854, when Dr. Logan recorded 19° F, which was the same as the minimum temperature today. Ice on water in a tub on the roof measured 1.1 inches in the center of the tub. The average temperature was 28° F, and ice was forming all day in the shade. Slush ice was floating down the Sacramento River, the first time since 1854 that such a thing had happened. On the 15<sup>th</sup>, clear and cold, minimum temperature being the same as yesterday. On a small pond back of the railroad company's roundhouse, ice was thick enough to bear a man weighing one hundred and eighty pounds, and boys were skating upon it. On the 16<sup>th</sup>, clear and cold; killing frost observed in the morning; ice on the roof was three inches thick; boys were still skating on the pond. On the 17<sup>th</sup>, clear and cold, with killing frost; China Slough partially frozen over. On the 18<sup>th</sup>, killing frost.

— At San Francisco, California on the 14<sup>th</sup>: weather continued clear and cold throughout the day, not a cloud being visible; the wind attained a velocity of forty miles per hour in the early morning, doing considerable damage to shipping and wharves in the northern section of city front; a pile-driver, valued at \$4,000, was capsized in Mission Bay; a number of vessels in different parts of the harbor parted their lines and coming into collision were damaged to some extent; water pipes were frozen in various parts of the city; ice in the gutters this morning was fully ½ inch in thickness. On the 15<sup>th</sup>, water in pipes frozen this morning, resulting in the usual damage by bursting; this was a thing of very rare occurrence in this city; the minimum thermometer read 29° F in the morning, being 4° F lower than any previous record since the establishment of the station in 1871; the bottle of water kept in the instrument shelter was frozen solidly and did not thaw out until after 3 p.m.; ice was seen this morning fully 4 inches in thickness. On the 16<sup>th</sup>, light snow began falling at 10:20 p.m. and continued till 11:40 p.m., at which time it was 0.1 inches deep. On the 17<sup>th</sup>, snow remained unmelted in the western part of the city until after 3 p.m.

— At Fresno, California on the 14<sup>th</sup>: no frost was visible as on other mornings but the ground was frozen hard. Orange growers in the country say it was the worst weather ever experienced here, but they did not think oranges were injured; a personal inspection of those in town showed no damage. Old residents say that nothing like this winter was ever known in the valley. On the 15<sup>th</sup> and 16<sup>th</sup>, killing frosts. On the 17<sup>th</sup>, water pipes in the building froze and burst; heavy frost in the morning; a light fog from 11 a.m. to 11:40 a.m. froze on the trees, presenting a beautiful appearance. On the 18<sup>th</sup>, killing frost.

— At San Diego, California on the 17<sup>th</sup>: light frost this morning, also a thin film of ice on shallow pools of water on the street; no damage done to vegetation.

— At Los Angeles, California on the 16<sup>th</sup>: minimum temperature 32° F; heavy frost and ice formed this morning. An individual who was duck shooting at Balona [Ballona], on the coast near Santa Monica, reported that ice formed on the sloughs was thick enough to bear the weight of a small dog he had with him, and the ice remained until midday before melting. On the 16<sup>th</sup>, very cold this morning, minimum temperature 31° F; heavy frost and ice formed; water pipes in many places froze solid. An eastern mail arrived today, the first received for a week, on account of the trains having been blockaded by snow in the mountains.

On 27-31 January 1888 at Upper Mattole, California in the *United States*, 31.68 inches of rain fell.<sup>116</sup>

The *United States* suffered from unusually cold temperatures during the winter of 1887-88. The following are the lowest temperatures observed during January 1888:<sup>121</sup>

Fort Keogh, Montana	(-65.0° F, -53.9° C)	(now Miles City, Montana)
Poplar River, Montana	(-56.8° F, -49.3° C)	
Saint Vincent, Minnesota	(-53.5° F, -47.5° C)	

Delano, Minnesota	(-52.0° F, -46.7° C)
Fort Custer, Montana	(-45.1° F, -42.8° C)
Fond du Lac, Wisconsin	(-44.0° F, -42.2° C)
Moorhead, Minnesota	(-44.0° F, -42.2° C)
Cresco, Iowa	(-43.0° F, -41.7° C)
La Crosse, Wisconsin	(-42.0° F, -41.1° C)
Fort Bridger, Wyoming	(-42.0° F, -41.1° C)
Fort Washakie, Wyoming	(-42.0° F, -41.1° C)
Minneapolis, Minnesota	(-42.0° F, -41.1° C)
Fort Totten, North Dakota	(-41.4° F, -40.8° C)
Saint Paul, Minnesota	(-41.2° F, -40.7° C)
Helena, Montana	(-41.0° F, -40.6° C)
Fort Maginnis, Montana	(-39.2° F, -39.6° C)
Fort Klamath, Oregon	(-39.0° F, -39.4° C)
Fort Assiniboine, Montana	(-38.0° F, -38.9° C)
Laramie, Wyoming	(-38.0° F, -38.9° C)
Fort Duchesne, Utah	(-37.6° F, -38.7° C)
Bismarck, North Dakota	(-37.0° F, -38.3° C)
Green Bay, Wisconsin	(-36.4° F, -38.0° C)
Huron, South Dakota	(-36.0° F, -37.8° C)
North Platte, Nebraska	(-34.6° F, -37.0° C)
Valentine, Nebraska	(-34.6° F, -37.0° C)
Fort Sherman, Idaho	(-34.0° F, -36.7° C)
Fort Yates, North Dakota	(-32.4° F, -35.8° C)
Fort Sully, South Dakota	(-31.7° F, -35.4° C)
Dubuque, Iowa	(-30.5° F, -34.7° C)
Spokane Falls, Washington	(-30.5° F, -34.7° C)
Escanaba, Michigan	(-29.0° F, -33.9° C)
Berlin Mills, New Hampshire	(-29.0° F, -33.9° C)
Winnemucca, Nevada	(-28.0° F, -33.3° C)
Boise City, Oklahoma	(-27.8° F, -33.2° C)
Yankton, South Dakota	(-27.5° F, -33.1° C)
Des Moines, Iowa	(-27.4° F, -33.0° C)
Cheyenne, Wyoming	(-27.2° F, -32.9° C)
Newport, Vermont	(-26.0° F, -32.2° C)
Omaha, Nebraska	(-25.2° F, -31.8° C)
Davenport, Iowa	(-24.5° F, -31.4° C)
Northfield, Vermont	(-24.1° F, -31.2° C)
Keokuk, Iowa	(-23.0° F, -30.6° C)
Pike's Peak, Colorado	(-22.8° F, -30.4° C)
Milwaukee, Wisconsin	(-22.7° F, -30.4° C)
Marquette, Michigan	(-21.2° F, -29.6° C)
Leavenworth, Kansas	(-21.1° F, -29.5° C)
Denver, Colorado	(-20.3° F, -29.1° C)
Lewiston, Idaho	(-20.0° F, -28.9° C)
Topeka, Kansas	(-19.5° F, -28.6° C)
Mackinaw City, Michigan	(-19.0° F, -28.3° C)
Dodge City, Kansas	(-18.0° F, -27.8° C)
Burlington, Vermont	(-18.0° F, -27.8° C)
Springfield, Illinois	(-17.0° F, -27.2° C)
Salt Lake City, Utah	(-16.7° F, -27.1° C)
Portland, Maine	(-12.3° F, -24.6° C)
Eastport, Maine	(-12.2° F, -24.6° C)
Saint Louis, Missouri	(-11.5° F, -24.2° C)
Chicago, Illinois	(-10.8° F, -23.8° C)
Terre Haute, Indiana	(-10.1° F, -23.4° C)

Albany, New York	( -9.9° F, -23.3° C)
Carson City, Nevada	( -9.6° F, -23.1° C)
Middlebrook, West Virginia	( -9.0° F, -22.8° C)
Boston, Massachusetts	( -6.2° F, -21.2° C)
Indianapolis, Indiana	( -6.0° F, -21.1° C)
Erie, Pennsylvania	( -6.0° F, -21.1° C)
Roseburg, Oregon	( -6.0° F, -21.1° C)
New Haven, Connecticut	( -4.4° F, -20.2° C)
Nantucket, Massachusetts	( -3.5° F, -19.7° C)
Detroit, Michigan	( -3.0° F, -19.4° C)
Block Island, Rhode Island	( -3.0° F, -19.4° C)
New London, Connecticut	( -3.0° F, -19.4° C)
Portland, Oregon	( -2.0° F, -18.9° C)
Santa Fe, New Mexico	( -2.0° F, -18.9° C)
Olympia, Washington	( -1.8° F, -18.8° C)
Moorestown, New Jersey	( -1.0° F, -18.3° C)
Cairo, Illinois	( -0.3° F, -17.9° C)
Fort Smith, Arkansas	( 1.2° F, -17.1° C)
New York City, New York	( 1.9° F, -16.7° C)
Nashville, Tennessee	( 2.0° F, -16.7° C)
Columbus, Ohio	( 2.2° F, -16.6° C)
Philadelphia, Pennsylvania	( 2.4° F, -16.4° C)
Lexington, Kentucky	( 5.2° F, -14.9° C)
Cincinnati, Ohio	( 6.0° F, -14.4° C)
Little Rock, Arkansas	( 7.0° F, -13.9° C)
Louisville, Kentucky	( 7.9° F, -13.4° C)
Washington, D.C.	( 9.2° F, -12.7° C)
Baltimore, Maryland	( 9.2° F, -12.7° C)
San Antonio, Texas	(11.4° F, -11.4° C)
Knoxville, Tennessee	(12.2° F, -11.0° C)
Lynchburg, Virginia	(14.0° F, -10.0° C)
Shreveport, Louisiana	(15.0° F, -9.4° C)
Norfolk, Virginia	(16.2° F, -8.8° C)
Charlotte, North Carolina	(17.2° F, -8.2° C)
Vicksburg, Mississippi	(17.5° F, -8.1° C)
Montgomery, Alabama	(17.5° F, -8.1° C)
Sacramento, California	(19.0° F, -7.2° C)
Raleigh, North Carolina	(19.0° F, -7.2° C)
Columbia, South Carolina	(21.3° F, -5.9° C)
Augusta, Georgia	(22.0° F, -5.6° C)
Galveston, Texas	(23.0° F, -5.0° C)
Mobile, Alabama	(23.0° F, -5.0° C)
Charleston, South Carolina	(26.0° F, -3.3° C)
Pensacola, Florida	(26.1° F, -3.3° C)
Yuma, Arizona	(27.0° F, -2.8° C)
Savannah, Georgia	(27.2° F, -2.7° C)
San Francisco, California	(28.7° F, -1.8° C)
New Orleans, Louisiana	(28.8° F, -1.8° C)
San Diego, California	(33.0° F, +0.6° C)
Key West, Florida	(58.2° F, +14.6° C)

The depth that rivers, harbors and lakes froze in January and February 1888 in the *United States*:<sup>121</sup>

\* At Bar Harbor, Maine, the *Frenchman's Bay* contained much ice during the latter part of January. Navigation was closed on January 28<sup>th</sup>.

\* At Portland, Maine, the harbor at *Casco Bay* was frozen over with thin ice from January 24<sup>th</sup>.

At Rockland, Maine, the ice, which had closed up the harbor since 1 February departed on 14 February. The ice started leaving about noon, going out with the wind. The immense field of ice occupying the space from Owl's Head to Tillson's wharf, twelve to eighteen inches thick, started in a sheet and swung out in a body, taking all the fleet of vessels in winter quarters here that lay in its wake.

\* At Boston, Massachusetts, the *Boston Harbor* was almost entirely frozen over on January 23<sup>rd</sup> and broke up on February 3<sup>rd</sup>.

\* At Vineyard Haven, Massachusetts, the *Holmes Hole Harbor* was frozen over from January 17<sup>th</sup> to the 23<sup>rd</sup>.

\* At Nantucket, Massachusetts, the *Nantucket Harbor* was frozen over on January 21<sup>st</sup>, closing navigation.

\* At Wood's Hole (in Falmouth), Massachusetts, the *Wood's Hole Harbor* was blockaded with ice and frozen solid to Nantucket Island on January 21<sup>st</sup>. *Buzzard Bay* was also frozen for several hundred yards from shore; all navigation was suspended.

\* At Edgartown, Massachusetts, *Edgartown Harbor* was frozen over beginning on January 24<sup>th</sup>.

\* At New Haven, Connecticut, *New Haven Bay* froze over on January 17<sup>th</sup>.

\* At Burlington, Vermont, *Lake Champlain* froze over on January 22<sup>nd</sup>, seven days earlier than the average date for the last seventy years.

\* At New York City, New York, the *East River* was choked with ice beginning on January 19<sup>th</sup>. There was an unusual amount of drift ice in the upper bay on January 23<sup>rd</sup>.

\* At Port Jervis, New York, the *Delaware River* was gorged [with ice] for a distance of four miles on February 23<sup>rd</sup>. The backwater flooded cellars and basements.

\* At Starkey, New York, *Seneca Lake* froze over on January 22<sup>nd</sup>. It rarely occurs that this lake freezes over before February.

\* At Catawissa, Pennsylvania, the North Branch of the *Susquehanna River* was closed to navigation several times during the winter [due to the ice].

\* At Baltimore, Maryland, ice in the *Chesapeake Bay* and *Baltimore Harbor* rendered navigation difficult.

\* At Kitty Hawk, North Carolina, *Kitty Hawk Bay* was closed to navigation on January 30<sup>th</sup>.

\* At Pittsburg, Pennsylvania, there was floating ice on the *Alleghany* and *Monongahela Rivers* during January. On the 2 January, the ice carried away a span of the 30<sup>th</sup> Street Bridge.

\* At Erie, Pennsylvania, the ice in *Presque Isle Bay* was 20 inches thick on February 16<sup>th</sup>.

\* At Portsmouth, Ohio, there was floating ice in the *Ohio River* during the entire month of January and much of the time it was so heavy as to prevent navigation.

\* At Louisville, Kentucky, there was floating ice in the *Ohio River* and navigation was suspended on January 21<sup>st</sup>.

\* At Cairo, Illinois, there was floating ice in the *Ohio River* from January 17<sup>th</sup> to the 21<sup>st</sup>.

\* At Keokuk, Iowa and points north, the *Mississippi River* was frozen throughout January.

\* At Saint Louis, Missouri, there was a rapid rise on the *Mississippi River* due to an ice dam that formed in January a few miles south of the city at Carondelet.

\* At Boise City, Idaho, the temperature dropped to -26° F on January 15<sup>th</sup>. The frozen streams deprived the cattle of drinking water and the loss of livestock on account of the cold weather is already considerable.

\* At Cairo, Illinois, there was intermittent floating ice on the *Mississippi River*. An ice dam formed at Bird's Point, Missouri on January 15<sup>th</sup> and broke on January 31<sup>st</sup>.

\* At Leavenworth, Kansas and points north, the *Missouri River* was frozen throughout January.

\* At Fort Buford, Dakota, the *Missouri River* remained entirely frozen during January and February.

\* At Little Rock, Arkansas, there was floating ice on the *Arkansas River* beginning on January 17<sup>th</sup>.

\* At Mackinaw City, Michigan, the *Mackinaw Strait* froze over on January 1<sup>st</sup> and by the 2<sup>nd</sup> the ice was 2 inches thick.

\* At Port Huron, Michigan, the *Saint Clair River* was closed for navigation due to the ice on January 2<sup>nd</sup>. An ice bridge formed on January 20<sup>th</sup>.

\* At Grand Haven, Michigan, the *Grand River* was frozen over on February 7<sup>th</sup>. On February 12<sup>th</sup>, *Lake Michigan* was frozen for a distance of 40 miles from the shore.

\* At Milwaukee, Wisconsin, by the end of February the mouth of *Lake Michigan* was almost covered with ice, and the strong westerly gales had packed it in large quantities along the east shore. Fields of ice from ten to twelve feet thick interfered greatly with navigation off Ludington, Michigan. The five steamers, which ply between Milwaukee, Grand Haven and Ludington, were for eight days unable to enter either harbor or to get within eight miles of the east shore.

\* At Sacramento, California, there was floating ice on the *Sacramento River* on January 14<sup>th</sup>. The minimum temperature of 14° F was recorded on January 14<sup>th</sup>. This was the lowest temperature since 21 January 1854 when a

similar cold temperature was observed. Between the 15<sup>th</sup> and the 18<sup>th</sup> of January 1888, ice on streams was sufficiently strong to bear the weight of persons, an unusual occurrence in this region.

\* At San Francisco, California, the temperature dropped to 29° F on the morning of January 15<sup>th</sup>. Ice formed to a thickness of four inches.

\* At Portland, Oregon, the *Columbia River* was frozen over on January 9<sup>th</sup> closing navigation.

\* At Portland, Oregon, the *Willamette River* froze over on January 13<sup>th</sup>. People crossed on the ice on January 15<sup>th</sup>.

At Northfield, Massachusetts in the *United States* in 1888, the temperature dropped from a maximum of 49° F on February 14, to a minimum of -29° F on February 16 to a maximum of 39° F on February 17. There was, therefore, a fall of 78° in forty hours, followed by a rise of 68° in thirty-two hours.<sup>138</sup>

On 11-14 March 1888, the deepest snowfall was 2 feet 6 inches at Northfield, Massachusetts in the *United States*.<sup>138</sup>

The Great Blizzard of March 11 – March 14, 1888 was one of the most severe blizzards in *United States'* recorded history. The storm, referred to as the Great White Hurricane, paralyzed the East Coast from the Chesapeake Bay to Maine, as well as eastern Canada. Snowfalls of 40-50 inches (102-127 centimeters) fell in New York, Massachusetts, New Jersey and Connecticut, and sustained winds of over 45 miles per hour (72 kilometers/hour) produced snowdrifts in excess of 50 feet (15.2 meters). The highest drift (52 feet / 15.8 meters) was recorded in Gravesend, New York. Some snowdrifts were so high that they covered three-story houses. Fifty-eight inches of snow was reported in Saratoga Springs, New York; 48 inches in Albany, New York; 45 inches of snow in New Haven, Connecticut; and 22 inches of snow in New York City. Railroads were shut down, fire stations were immobilized, telegraph service was inoperative and people were confined to their houses for up to a week. Over 400 people died in the blizzard. When the snow finally melted, severe flooding occurred, especially in the Brooklyn, New York area.<sup>51</sup>

On 11-13 March 1888, New York City in the *United States* was battered by a destructive blizzard.<sup>97</sup>

On 11-13 March 1888, a destructive blizzard from the northwest desolated the eastern coast of *United States*. Communication between New York, Philadelphia and Boston was suspended. There were many [ship] wrecks; great loss of life (about 400 people) and property. Food rose to famine prices.<sup>94</sup>

On 11 & 12 March 1888, a great blizzard struck the Atlantic seaboard in the *United States*. New York City felt the effects of this storm in its fiercest form. For more than a day business in that city was entirely suspended, and communication between it and the rest of the country was entirely cut off. New York for about twenty-four hours got its news from Philadelphia by way of London. About 400 lives were lost in New York and the other towns afflicted and in wrecks on the ocean in the vicinity, which the gale caused, while the property loss was estimated at \$3,000,000, but New York City's share of this destruction was only about thirty lives and \$1,000,000 property. [In present currency, that would be equivalent to \$81.5 million in total damages of which New York City's share would be \$27 million based on the Consumer Price Index (CPI) inflation rates.]<sup>197</sup>

On 11-14 March 1888, a severe storm struck the Atlantic coast of the *United States*. The snowfall in some areas exceeded 40 inches and due to the winds, snowdrifts of twenty to forty feet high were measured.<sup>121</sup>

— At Hatteras, North Carolina on the 11<sup>th</sup>, the wind velocity reached sixty miles per hour at 10:30 p.m.; very high tide, nearly submerging the island.

— At Norfolk, Virginia on the 11<sup>th</sup>, a furious gale began at 6:45 p.m. and continued without abatement throughout the 12<sup>th</sup>, the wind reaching a maximum velocity of sixty miles per hour. This storm was one of the most violent that had occurred here since the memorable storm of 1879. Many vessels at anchor in this harbor were blown ashore and wrecked; at Hampton Roads a sloop was capsized and all on board perished.



- At Onancock, Virginia, the high tide during the severe storm of the 11<sup>th</sup> inundated a very large area along Chesapeake Bay, drowning cattle and causing other damage.
- At Baltimore, Maryland on the 11<sup>th</sup>, light rain changed to heavy rain, which changed to snow, accompanied by high northwest wind. In a short time telegraphic communication was cut off with nearly all points. The winds with a maximum velocity of 33 miles per hour caused the lowest tide for many years, the bottom of the harbor being exposed in many places. This severe storm caused an almost entire suspension of business on the 12<sup>th</sup>.
- At Atlantic City, New Jersey, during the gales of 11<sup>th</sup> to 14<sup>th</sup> March, the sloops *Neptune* and *Alert* were blown from their anchorage and sunk. The heavy snow caused delay of trains.
- At Philadelphia, Pennsylvania a storm began on the 11<sup>th</sup>. During the night the storm continued with great severity; the fierce north wind, blinding snow, and rapidly falling temperature causing suspension of street railway traffic. Throughout the next day the wind velocity ranged from 30 to 60 miles per hour. At the Breakwater, out of forty vessels in the harbor on the 11<sup>th</sup>, only thirteen escaped damage or destruction, and thirty or more lives were lost. The damage sustained by the Breakwater and to marine interests was estimated at half a million dollars [\$12 million in today's dollars], but vast as this sum was, it becomes inconsiderable when compared with the losses sustained by the several railroad companies, the least part of which, although great, being the prolonged interruption to travel. This storm was considered the most disastrous that had ever visited this locality.
- At New York City, New York on the 12<sup>th</sup>, rain changed to snow, which continued throughout the day, accompanied by high northwest winds, reaching a velocity of 48 miles per hour. Travel by street railway was entirely suspended by 7 a.m., and at some points the snowdrifts were from fifteen to twenty feet deep.
- At Albany, New York during the evening of the 11<sup>th</sup>/12<sup>th</sup>, heavy snow fell and drifted so as to render travelling difficult. At 7 p.m. snowdrifts were from three to four feet deep, and after 10 p.m. it was dangerous for persons to venture out of doors. The storm continued on the 13<sup>th</sup>, but with less violence, and ended on the morning of March 14<sup>th</sup>. Nearly forty-seven inches of snow fell during the storm.
- At New Haven, Connecticut, heavy snow fell throughout the 12<sup>th</sup> accompanied with high winds. Wind speeds were 36 miles per hour with gusts reaching 60 miles per hour. At Light-House Point the wind-velocity was estimated at seventy miles per hour. Telegraphic communication with New York City was cut off and travel of all kinds interrupted. The storm continued until the morning of the 13<sup>th</sup>, on which date the streets of New Haven were utterly impassable and business was suspended. The storm caused much suffering and the police rescued many exhausted persons from snowdrifts in the heart of the city. The total depth of snow during the storm was forty-four inches.
- At New London, Connecticut on the 12<sup>th</sup>, snow accompanied by furious gale, made travel almost impossible and very dangerous. On the 13<sup>th</sup>, all railroads to the west were blockaded in the morning and in the afternoon those to the east were also blockaded and telegraph lines were prostrated. On the 13<sup>th</sup>, some drifts were from eight to ten feet deep.
- At Eastport, Maine on the 13<sup>th</sup>, the winds reached 72 miles per hour. This was the most severe storm that occurred here since April 1873.

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**1888 A.D.** On 17 February 1888 in *Australia*, a cyclone struck Mackay in Queensland. It damaged many of the buildings in the city and destroyed 2 steamers.<sup>101</sup>

On [17] February 1888, a cyclone struck Mackay in Queensland, *Australia*. Ships and homes were destroyed.<sup>99</sup>

On 18 February 1888, a tornado struck Mount Vernon, Illinois in the *United States*, almost completely destroying the city. Thirty-nine persons were killed and 125 injured, many of them fatally.<sup>197</sup>

On 19 February 1888, a cyclone [tornado] struck in Illinois, in the *United States* causing great destruction of life and property.<sup>90</sup> [This tornado cut a half mile wide path through Mount Vernon, Illinois and resulted in the death of 37 people with 300 injured and 450 homes and public buildings destroyed.]

On 19 February 1888, a tornado destroyed a large part of the town of Mount Vernon, Illinois (population about 8,000) in the *United States*. Eighteen persons were killed, and about three times that number were more or less seriously injured. About one hundred buildings were destroyed, among which was the county courthouse, a large and substantial structure of brick and stone. The starting point of the storm



which devastated Mount Vernon seems to have been near the old town of Kaskaskia, Illinois not far from the Chester Penitentiary. The storm caused damage as it passed through Steeleville, Perry County and between Duquoin and Pinckneyville before striking Mount Vernon.<sup>121</sup>

On 9-11 March 1888, there was a violent gale [in *Great Britain*]. Several vessels were wrecked causing loss of life.<sup>94</sup>

Around 26 March 1888, the Elbe River overflowed [in the *Czech Republic* and/or *Germany*]. About 100 villages were submerged. There was loss of life and destruction of property.<sup>90</sup>

On 27 March 1888, the town of Ninnescah, Kansas in the *United States* was destroyed by a gale.<sup>94</sup>

About 27 March 1888, the Vistula River [in *Poland*] overflowed. About 77 villages were submerged.<sup>90</sup>

On 28 March 1888, there was a great storm and a tidal wave causing much destruction near Wellington, *New Zealand*.<sup>94</sup>

On 7 April 1888, there was a destructive hurricane in Dacca [now Dhaka in central *Bangladesh*]. About 69 persons were killed.<sup>97</sup>

On 7 April 1888, a gale struck Dhaka, *Bangladesh*. Approximately 100 persons were killed.<sup>197</sup>

In 1888 in *India*, there was a storm of great violence on the Bareilly-Pilibhit railway. Eighteen miles of telegraph were demolished and several wagons [train cars] were blown off the line [tracks] and capsized [overturned]. Not long since, the residences in the civil station of Moradabad were almost completely destroyed by a hurricane [tornado].<sup>181</sup>

In 1888, 230 people are said to have lost their lives in a hailstorm in the Moradabad district in the state of Uttar Pradesh, *India*.<sup>181</sup>

In 1888 at Basti district in Uttar Pradesh state of India over 30 inches of rain fell in 24 hours and at Bijnor district 34 inches of rainfall was recorded.<sup>181</sup>

Towards the end of April 1888, heavy rains caused severe flooding in Texas and Oklahoma in the *United States*.<sup>121</sup>

— The northern cities of Texas report exceedingly heavy rains on the 27<sup>th</sup> and 28<sup>th</sup>, which swelled the rivers beyond their banks, inundated the bottoms, and almost swamped towns, causing a great deal of damage to property. The Washata River [Washita River] in the Chickasaw Nation flooded the lowlands, washing away Dougherty Station, Indian Territory [Oklahoma] and a mile of railroad track, including culverts and bridges. Extensive landslide from Arbuckle Mountain covered several hundred feet of track. The Red River was higher than ever known before. In Choctaw Bayou, a few miles from Sherman, Texas, people were compelled to take to the trees on Friday, and were not rescued until yesterday morning. The *Texas Pacific Railroad* has suffered great damage from washouts, and South Bonham has been overflowed to the depth of four feet in many places. Forty families near Atoka have been compelled to abandon their homes, and reports from Muskogee, Indian Territory, indicate much misfortune throughout the territory.

— At Piano, Texas, numerous bridges were washed away.

— At Denison, Texas, the heavy rains of the 27<sup>th</sup> and 28<sup>th</sup> caused a large amount of damage to crops, stock, and railroads. The *Missouri Pacific Railroad*, between this place and Fort Worth, had nearly all bridges washed out or damaged and twenty miles of the Missouri, Kansas, and Texas tracks between Atoka and Durant, Indian Territory, were underwater.

— At Rockwall, Texas, the East Fork of the Trinity River overflowed in this vicinity on the 29<sup>th</sup>.

— At Bonham, Texas on the 30<sup>th</sup> reported the Red River was higher than has been known for years, and all crops in the lowlands were destroyed.

— Navasota, Texas reported that the Brazos, Navasota, San Jacinto, and Saline Rivers flooded the districts to the south and east of Navasota, causing extensive damage to crops.

— At Burnet, Texas on the 30<sup>th</sup>, the recent heavy rains have caused a high stage of water in the Colorado River. Cattle, sheep, and driftwood were seen floating past the city.

Around 8 May 1888, there was a great flood in the Canton River [the extensive river system called Pearl River in southern *China*]. It is said that 3,000 people drowned.<sup>90</sup>

On 17 May 1888, there was a destructive freshet [flood caused by spring thaw] in the Mississippi River in the *United States*. Quincy, Hannibal, Alexandria and other towns on the Illinois coast overflowed.<sup>90</sup>

On 6 June 1888, a storm of unusual severity struck Quebec, Montreal, *Canada* in the afternoon. Damage estimated at \$100,000 [\$2.4 million in today's dollars] was done in the city and in surrounding parishes. In some sections scarcely a barn was left standing. On the same date, a storm struck Ontario, *Canada* causing a large amount of damage. The wind reached a velocity of 80 miles per hour and in the surrounding country blew down many buildings, among which were a number of school houses; several persons injured, some fatally.<sup>121</sup>

On 12 June 1888, severe rains caused the greatest flood ever known in northern Minnesota in the *United States*. Along the branches of streams tributary to the Saint Louis River, millions of acres of land were overflowed and loss of life was feared. At the village of Cloquet, Minnesota, a portion of the town, which is situated on the island, was completely engulfed by a raging torrent. Only the tops of houses were visible. Several dwellings were carried away, but the inhabitants were warned in time, and no loss of life occurred. The immense sawmills were flooded and abandoned, and in the booms 80 million logs were jammed yesterday morning, and the number reached 200 million, last night. All county bridges were carried away. Fond du Lac was underwater, and several buildings were carried down stream. From Fond du Lac to beyond Spring Lake, the tracks of the Saint Paul and Duluth Railway were underwater from two to three feet, and the stream was still rising. Indians and old settlers say this flood has never been equaled.<sup>121</sup>

During 17-20 June 1888, there were inundations in *Mexico* caused by heavy rains. These floods caused great loss of life.<sup>90</sup>

The following are the highest temperatures observed during July 1888 in the *United States*:<sup>121</sup>

Montgomery, Alabama	( 97.6° F, 36.4° C)
Mobile, Alabama	( 96.6° F, 35.9° C)
Phoenix, Arizona	(112.0° F, 44.4° C)
Yuma, Arizona	(113.7° F, 45.4° C)
Little Rock, Arkansas	( 97.3° F, 36.3° C)
Fort Smith, Arkansas	( 99.5° F, 37.5° C)
Fresno, California	(109.2° F, 42.9° C)
San Francisco, California	( 93.4° F, 34.1° C)
San Diego, California	( 77.2° F, 25.1° C)
Denver, Colorado	(103.0° F, 39.4° C)
Pueblo, Colorado	(102.7° F, 39.3° C)
Pike's Peak, Colorado	( 61.5° F, 16.4° C)
New Haven, Connecticut	( 89.8° F, 32.1° C)
New London, Connecticut	( 86.5° F, 30.3° C)
Washington, D.C.	( 93.7° F, 34.3° C)
Pensacola, Florida	( 94.0° F, 34.4° C)
Key West, Florida	( 90.5° F, 32.5° C)

Augusta, Georgia	(103.8° F, 39.9° C)
Savannah, Georgia	( 99.1° F, 37.3° C)
Chicago, Illinois	( 94.3° F, 34.6° C)
Cairo, Illinois	( 95.0° F, 35.0° C)
Indianapolis, Indiana	( 94.8° F, 34.9° C)
Terre Haute, Indiana	( 94.6° F, 34.8° C)
Des Moines, Iowa	( 99.0° F, 37.2° C)
Keokuk, Iowa	( 96.3° F, 35.7° C)
Topeka, Kansas	( 99.8° F, 37.7° C)
Dodge City, Kansas	(102.0° F, 38.9° C)
Louisville, Kentucky	( 95.6° F, 35.3° C)
Lexington, Kentucky	( 95.0° F, 35.0° C)
New Orleans, Louisiana	( 96.5° F, 35.8° C)
Shreveport, Louisiana	( 98.5° F, 36.9° C)
Eastport, Maine	( 77.3° F, 25.2° C)
Portland, Maine	( 87.1° F, 30.6° C)
Baltimore, Maryland	( 94.3° F, 34.6° C)
Boston, Massachusetts	( 88.0° F, 31.1° C)
Nantucket, Massachusetts	( 78.3° F, 25.7° C)
Marquette, Michigan	( 90.5° F, 32.5° C)
Detroit, Michigan	( 91.4° F, 33.0° C)
Saint Vincent, Minnesota	( 89.0° F, 31.7° C)
Saint Paul, Minnesota	( 94.0° F, 34.4° C)
Vicksburg, Mississippi	( 97.0° F, 36.1° C)
Saint Louis, Missouri	( 97.9° F, 36.6° C)
Helena, Montana	( 99.1° F, 37.3° C)
North Platte, Nebraska	(101.2° F, 38.4° C)
Omaha, Nebraska	(101.2° F, 38.4° C)
Winnemucca, Nevada	( 96.0° F, 35.6° C)
Carson City, Nevada	( 94.4° F, 34.7° C)
Santa Fe, New Mexico	( 96.6° F, 35.9° C)
Albany, New York	( 90.0° F, 32.2° C)
New York City, New York	( 89.9° F, 32.2° C)
Charlotte, North Carolina	( 99.6° F, 37.6° C)
Kitty Hawk, North Carolina	(100.2° F, 37.9° C)
Bismarck, North Dakota	( 96.0° F, 35.6° C)
Cincinnati, Ohio	( 95.4° F, 35.2° C)
Columbus, Ohio	( 90.8° F, 32.7° C)
Fort Sill, Oklahoma	( 99.0° F, 37.2° C)
Roseburg, Oregon	(100.0° F, 37.8° C)
Portland, Oregon	( 97.0° F, 36.1° C)
Erie, Pennsylvania	( 87.0° F, 30.6° C)
Philadelphia, Pennsylvania	( 93.8° F, 34.3° C)
Charleston, South Carolina	(100.2° F, 37.9° C)
Columbia, South Carolina	(100.6° F, 38.1° C)
Yankton, South Dakota	(101.8° F, 38.8° C)
Nashville, Tennessee	( 96.8° F, 36.0° C)
Knoxville, Tennessee	( 93.0° F, 33.9° C)
San Antonio, Texas	( 95.2° F, 35.1° C)
Galveston, Texas	( 91.3° F, 32.9° C)
Salt Lake City, Utah	( 97.9° F, 36.6° C)
Lynchburg, Virginia	( 95.0° F, 35.0° C)
Norfolk, Virginia	( 94.2° F, 34.6° C)
Olympia, Washington	( 92.0° F, 33.3° C)
Spokane Falls, Washington	( 96.1° F, 35.6° C)
Milwaukee, Wisconsin	( 90.8° F, 32.7° C)

La Crosse, Wisconsin  
Cheyenne, Wyoming

( 90.9° F, 32.7° C)  
( 97.2° F, 36.2° C)

On 6 July 1888, a very severe and destructive hailstorm struck Laramie City, Wyoming in the *United States*. Some of the hailstones were said to be 6 inches in diameter. Gardens were destroyed and much window glass broken.<sup>121</sup>

On 8-10 July 1888, a destructive flood in the *United States*, resulting from the heavy rains, occurred along the valley of the Monongahela River. The rivers of western Pennsylvania and West Virginia were swollen into torrents. At Grafton, West Virginia, the rise was unprecedented, and the lumber interests suffered severely, the loss to the town and section being estimated at \$250,000 [\$6 million in today's dollars]. The damage at Rowlesburg, West Virginia was also heavy. Wheeling, West Virginia reported that the freshet was the greatest ever known in that section, and that the destruction to property was beyond computation. Pittsburg, Pennsylvania reports the Monongahela River rose at the rate of nine inches per hour throughout the day of the 10<sup>th</sup>, carrying destruction along its shores from the headwaters to the mouth of the river. The damage done by the overflow at Pittsburg during the 10<sup>th</sup> and 11<sup>th</sup> was estimated at \$300,000 [\$7.2 million in today's dollars]. At Parkersburg, West Virginia, the Kanawha River rose thirteen feet on the 10<sup>th</sup>, washing away one bridge. A terrific rainstorm or cloudburst occurred at Wheeling, West Virginia, on the evening of the 19<sup>th</sup>. Many lives were lost; houses were wrecked; bridges carried away, and great damage done to property. At Triadelphia, West Virginia, the damage was particularly severe.<sup>121</sup>

On 21 July 1888, a very severe hail and rain storm passed eight miles southwest of Dysart, Iowa in the *United States*. The storm was very destructive from the northwestern part of Grundy County extending forty miles eastward, and its breadth varied from two to six miles. It is reported that the hailstones were of unusual size, and killed hogs, calves and smaller animals; trees were entirely stripped of their leaves and much damage was done to the outstanding crops; one schoolhouse was totally demolished and many barns wrecked. The damage is estimated from \$500,000 to \$1,000,000. [In present currency, that would be equivalent to \$12 million to \$24 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>121</sup>

During 30-31 July and 1 August 1888, heavy rains caused the rising of rivers in Essex and Kent in *England*. The flood formed lakes navigable by boats. It stopped railways; sweep away the crops from the soil, and created much calamity.<sup>90</sup>

In July and August 1888, there were great floods in *Germany*.<sup>90</sup>

On 6 August 1888 at Marshall, Missouri in the *United States*, a destructive hailstorm visited this county during the evening. It was estimated that the damage done to buildings and crops would reach \$400,000 [\$9.6 million in today's dollars].<sup>121</sup>

On 16 August 1888, there was a great storm in Ontario and Quebec, *Canada*. Many persons were killed by lightning and fright. Damage estimates in Quebec were 1,500,000 dollars.<sup>97</sup>

On 16-19 August 1888, a storm of great strength moved from the *Bahamas* to the west Gulf coast, with violent squalls and incessant rain.<sup>119, 120</sup>

On 20 August 1888, the whole city of New Orleans, Louisiana in the *United States* was inundated after nearly ten inches of rain fell. About one hundred coal barges on the river sunk, causing a loss of about \$250,000 [\$6 million in today's dollars]. The damage to sugarcane, cotton, and rice was estimated at about 25% of the total crop in the southern and eastern portions of the state.<sup>121</sup>

On 21 August 1888, tornadoes struck Delaware and Maryland in the *United States*.<sup>121</sup>

— At Wilmington, Delaware, a tornado caused great damage in this city and vicinity. The path of the storm was two hundred yards in width and about five miles in length. More than twenty persons were injured and one was killed. The damage caused by the tornado was variously estimated at from \$100,000 to \$200,000 [\$2.4 to \$4.8 million in today's dollars].

— A tornado swept through Prince George's, Anne Arundel, Cecil, and Kent counties in Maryland. This tornado appears to have developed in southern Maryland. The first severe damage was done at Jacobsville. It travelled in a zigzag course. The track varied from thirty feet to a quarter of a mile in width. When it moved across Chesapeake Bay, waterspouts were formed. About 3 p.m. it struck the village of Still Pond, destroying a cannery (where forty persons were employed), killing eleven persons. About eighteen or twenty persons were injured at other points in the tornado's track. Great destruction was done; houses, fences, trees, and outbuildings were blown down, and crops badly damaged, entailing a loss of many thousands of dollars.

On 21 August 1888 at Wheeling, West Virginia in the *United States*, a destructive freshet occurred. Many bridges in the surrounding country were washed away. At 6 p.m. the large stone bridge over Wheeling Creek gave way. This bridge was constructed in 1842 and was considered one of the landmarks of the city. At Elm Grove, about five miles from Wheeling, nearly all the buildings were flooded, the damage being estimated at \$25,000 [\$600,000 in today's dollars].<sup>121</sup>

On 18-20 August 1888, southeast gale struck Mobile, Alabama in the *United States*. It produced a very high tide [storm surge] about equal to that of 1860 hurricane.<sup>117</sup>

On 1-5 September 1888, a hurricane struck *Cuba*, *Puerto Rico*, and the *Turks Islands* causing 921 deaths.<sup>141</sup>

On 4 September 1888, there was a destructive cyclone in the *West Indies* and *Cuba*.<sup>97</sup>

In September 1888, one storm [hurricane] moved from north of *Puerto Rico* on the 1<sup>st</sup> westward over *Cuba* and Yucatan to the Mexican coast near Vera Cruz, *Mexico* by the 7<sup>th</sup>. This was a very unusual course. Another storm [hurricane] passed from the *Bahamas* westward over southern Florida in the *United States* where it recurved northward during the 8<sup>th</sup> and 9<sup>th</sup>.<sup>120</sup>

During 1-7 September 1888, a disastrous hurricane traversed the West Indies and the Gulf of Mexico. Captain Edwards, of the *S.S. Jamaican*, experienced a violent hurricane on the 31<sup>st</sup> of August, one hundred and fifty miles northeast of Sombrero Island, [Hat Island in the *Lesser Antilles*] and who calculated that its vortex had passed 120 miles north of the *Virgin Islands* and estimated its diameter at five hundred miles. At noon (Greenwich time) on 1 September, the hurricane center was located north of the western extremity of *Puerto Rico*. On the 2<sup>nd</sup>, a hurricane devastated *Turks Islands*, where the minimum [barometric] pressure fell to 28.95 inches (735.3 millimeters). Twenty-one lives were lost; more than two hundred and fifty houses of the peasantry and over 400,000 bushels of salt were entirely destroyed, and nearly every house left standing was more or less damaged. By noon on the 3<sup>rd</sup>, the center had moved to the northward of Great Inagua Island, [*the Bahamas*] where the barometer fell to about 28.70 inches (729.0 millimeters). At noon on the 4<sup>th</sup>, the center had arrived off the Cuban coast somewhat to the eastward of Sagua, *Cuba*, where the barometer fell to 28.90 inches (734.0 millimeters) and the wind attained a velocity of 120 miles per hour. The storm passed southward of Havana at about 2 a.m. on the 5<sup>th</sup>, and the storm center left the west extremity of the island of *Cuba* during the 5<sup>th</sup>. Attending the passage of the storm center over *Cuba* the losses by destruction of property and crops amounted to millions of dollars, and about eight hundred lives were lost. The principal buildings of the large cities were demolished, and whole towns situated near the seaboard were entirely destroyed by the gigantic waves that swept inland. After leaving *Cuba* the vortex moved to the northern coast of Yucatan [Yucatan Peninsula, *Mexico*], and reached the Mexican coast between Vera Cruz and Coatzacoalcos during the

night of the September 7<sup>th</sup>-8<sup>th</sup>, where it exhibited great strength and occasioned considerable damage to property and shipping.<sup>121</sup>

A severe frost struck Portland, Maine in the *United States* on 7 September 1888. Reports from all parts of the state show that this frost was very destructive. It was estimated that the damage done in Maine would exceed \$1,000,000 [\$24 million in today's dollars]. This frost also affected Connecticut, Massachusetts, Vermont, New Hampshire and New York.<sup>121</sup>

Heavy rainfall and flooding pounded the South in the *United States* in September 1888.<sup>121</sup>

— At Hot Springs, Arkansas on the 7<sup>th</sup>, a destructive cloudburst struck the city. The rain fell in torrents for two hours. Hotels were flooded to a depth of four feet; many buildings were torn down; five lives were lost, and several persons were missing. Damage to property estimated at \$100,000 [\$2.4 million in today's dollars].

— Columbus, South Carolina reported on the 8<sup>th</sup> that the crops along the Congaree River were damaged by the floods to the extent of \$1,000,000 [\$24 million in today's dollars]. The river rose twenty feet above the low water mark.

— At Augusta, Georgia on the 10<sup>th</sup>, a flood was desolating this city. The streets were filled with water to a depth of several feet, causing an entire suspension of business. In the freshet of 1840, the severest previously experienced, the water did not reach its present height by fifteen inches.

— At Danville, Virginia on the 10<sup>th</sup>, dangerous floods were reported along the Dan River.

— At Atlanta, Georgia: the rainstorm of the 15-16<sup>th</sup> caused the heaviest rainfall in twenty-four hours (6.23 inches) that has occurred since the establishment of the Signal Service station in 1878. Great damage was done to the cotton crop and by washing out of railroads.

In October 1888, there were great floods in *France* and *Switzerland*.<sup>90</sup>

On 10 October 1888 at Saint John's, New Brunswick, *Canada*, trains on the New Brunswick Railroad were delayed on the 8<sup>th</sup> by washouts resulting from the recent heavy rains. Reports from Fredericton state that four bridges crossing the Nashwaak River were swept away yesterday, together with 1,000,000 feet of logs. The water has caused great destruction to the hay and buckwheat crops in Queens and Carleton counties; barns were swept away and a number of saw mills flooded.<sup>121</sup>

In October 1888, prairie fires swept over the Dakotas in the *United States*. Jamestown, Bismarck, Fort Totten, Mandan, Fort Sully, and Fort Yates reported fires. At Fort Sully, South Dakota on the 28<sup>th</sup>, the whole western sky to an altitude of 30° was lighted up by prairie fires on the Sioux Indian reservation; prairie fires were also observed to the south and southwest of this station during the last four days of the month. At Fort Yates, North Dakota on the 31<sup>st</sup>, one of the largest prairie fires ever known in this locality swept over the country opposite here, east of the Missouri River, in the evening. The town of Winona was only saved by the persevering efforts of its inhabitants.<sup>121</sup>

On 15-16 November 1888, there was a destructive gale in *Scotland*, northern *England* and *Ireland*. The gale caused many shipwrecks. Forth bridge in eastern *Scotland* was damaged.<sup>97</sup>

A hurricane of tropical origin was first located northeast of the *Windward Islands* on 17 November 1888. From this position it pursued a path westward to the *Bahamas Islands*, where it arrived on the 22<sup>nd</sup>. On the 22<sup>nd</sup> and 23<sup>rd</sup>, the storm center recurved slowly to the northward, and pursuing an abnormal northerly course, advanced to the south New England coast of the *United States* by the night of the 25-26<sup>th</sup>, after which it moved slowly along the New England coast; over eastern Maine; New Brunswick, *Canada* and the southern part of the Gulf of Saint Lawrence to the vicinity of Cape Race, Newfoundland, by November 30<sup>th</sup>. This storm was attended by very destructive gales off the coast of the *United States* from the 21<sup>st</sup> to the 27<sup>th</sup>, inclusive. The storm attained its maximum energy when the center was south of New England and east of New Jersey.<sup>121</sup>



— At Norfolk, Virginia, a storm began on the 25<sup>th</sup> and continued throughout the following day; the maximum velocity of wind, fifty miles per hour. The storm was very destructive; telegraph lines were prostrated, vessels blown from their moorings, and much damage to other property resulted. The tide was very high, flooding the lower portion of the city.

— At Kitty Hawk, North Carolina on the 24<sup>th</sup>, the storm produced winds blowing steadily at about sixty miles per hour. The tide at Currituck Sound was lower than ever before known. At Kitty Hawk wharf, where there was usually enough water for small steamers and sailing vessels, the water receded about seventy-five feet from the wharf. Between Nag's Head and New Inlet, a distance of about 21 miles, the entire banks were flooded by the tide, and all cattle on this low beach perished.

— At Atlantic City, New Jersey on the 26<sup>th</sup>, the barometer was very low, falling to 28.96 inches; high tide caused much damage.

— At New York City, New York on the 26<sup>th</sup>, numerous houses along the coast were carried away by the wind, and hotels were flooded. The Coney Island railway was seriously damaged by washouts. The damage in this vicinity will amount to millions of dollars.

— At New London, Connecticut on the 26<sup>th</sup>, the tide in the afternoon was about four feet above the usual high water mark. In consequence, several of the wharves were partially submerged. This was the highest tide observed in the previous 25 years.

— At New Haven, Connecticut on the 25<sup>th</sup>, the gale winds attained a maximum velocity of fifty-one miles per hour. The storm caused much damage to property; two houses were blown over, and the telephone and telegraph wires sustained severe injury.

— At Block Island, Rhode Island on the 26<sup>th</sup>, the storm attained a maximum velocity of eighty-four miles per hour. The storm was very destructive to telegraph lines, and caused some damage to shipping. The barometer reached a minimum of 28.91 inches at about noon on the 27<sup>th</sup>.

— At Vineyard Haven, Massachusetts on 24-27 November as a result of the storm, all boats in the harbor dragged anchors; smaller craft were torn from their moorings and driven ashore, and numerous wrecks were reported.

— At Eastport, Maine on the 27<sup>th</sup>. The storm produced winds with a maximum velocity of sixty-four miles per hour. The gale was accompanied by snow, sleet, and heavy rain; much damage was caused to fences and buildings.

— At Boston, Massachusetts on 25-27 November, the storm mirrored the "great blizzard" of 11-13 March 1888. The following is the list of vessels wrecked during the storm according to the Boston Chamber of Commerce. The list does not include the names of vessels damaged or which went ashore and afterwards floated.

Steamship: *Allentown*. Barks: *Alexander Campbell*, *Hannah*. Brigs: *Wilhelmina*, *Golconda*, *Alice*. Schooners: *Amazon*, *Abbie S. Emerv*, *Albert H. Cross*, *Clara*, *E. L. Higgins*, *Elizabeth*, *Ethel M. Davis*, *Edward H. Norton* (fisherman), *Emma*, *G. W. Rawley*, *J. and J. Locke*, *John Mettler* (fisherman), *Lena Breed*, *Marshall O. Wells*, *Nellie Florence* (fisherman), *Robert Dority*, *Robert Ripley*, *Sasanoa*, *T. A. Lambert*, *William McLean*, *Mountain Fawn*.

On 25 November 1888, there was a severe storm on the East Coast of the *United States*. More than 50 vessels were wrecked and about 45 lives were lost.<sup>97</sup>

In 1888 in *Australia*, there was a brief national drought. Heavy livestock losses were experienced in New South Wales. The average wheat yield in New South Wales of 4.8 bushels per acre was the lowest since recordkeeping began in 1857. There were very dry conditions in Tasmania. The plum and apples dried out on the trees. In Queensland, the drought continued into 1889. Livestock losses were heavy. Even native animals and trees died. The cane crop failed entirely. In Victoria, the north and Gippsland were hit hard. The average wheat yield in Victoria dropped to 7.2 bushels per acre. In South Australia, the month of April was one of the driest years ever experienced. The average wheat yield dropped to 3.8 bushels per acre. In Western Australia, the central agricultural areas were greatly affected. The average wheat yield dropped to 10 bushels per acre, the lowest in a decade.<sup>101</sup>

*Also refer to the section 1887 A.D. – 1889 A.D. for information on the famine in China and Asia Minor during that timeframe.*

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### **1889 A.D. – 1892 A.D. India, Russia, Japan, Hungary and Montenegro. Famine**

There was a famine in 1889-92 in Madras [Chennai], *India*.<sup>90</sup>

There was a famine in 1889-92 in *Montenegro*.<sup>90</sup> [*Montenegro* is in southeastern Europe on the northeast Adriatic coast.]

There was a famine in *Japan* in 1890.<sup>90</sup>

*Russia* suffered from a major famine in 1891-92.<sup>90, 96</sup> It is said that 35 million people starved during this famine.<sup>96</sup>

The famine in 1891-92 was initially caused by the bad weather in 1890 and 1891. In the spring of 1891, a serious drought caused crops to fail along the Volga and in many other grain-producing provinces. The dry autumn delayed the seeding of the fields, and the winter, which began early, was more severe than usual, with only light snowfall. (Heavy snow usually protects the seedlings from the cold. Melting snow and ice caused the spring floods of the Volga that spread over the plains whose grass is used as fodder.) But during the winter of 1891-92, the small amount of snow caused the ground to freeze. This killed the young plants because the late planting did not give them enough time to take root. The poor weather eliminated the main source of feed for the animals. The animals were crucial to the peasants because they provided the power needed to plow the fields. The cold weather lasted until mid-April, followed by a summer in 1892 that was extremely hot and dry. Five rainless months contributed to the smallest total grain harvest for European Russia in a decade.<sup>157</sup>

The Russian famine of 1891-92 affected an area of around 900,000 square miles in the Volga and central agricultural areas, once the most fertile and productive regions of Russia. This area included the provinces of Nizhni-Novgorod, Riazan, Tula, Kazan, Simbirsk, Saratov, Penza, Samara and Tambov. It affected between fourteen to twenty million people, of which 375,000 to 400,000 died, mostly of disease. The staple of the peasant diet during the famine was "hunger bread" made from weeds, chopped straw, cockle, tree bark, and sometimes sand. This bread was often described as "a lump of hard black earth covered with a coating of mold". Due to malnutrition caused by the famine, people were more susceptible to infection and a cholera epidemic took root.<sup>157</sup>

According to a Vienna, Austria news account of 2 March 1892, there was a famine in the County of Arva, in *Hungary* [now in northern *Slovakia* and southern *Poland*]. Many children have died in the Namszto district. Seventy-five case of death from starvation have been reported in two months. The peoples food consists of hominy mixed with tree bark, or maize mixed with chopped straw.<sup>95</sup>

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**Winter of 1888 / 1889 A.D.** The following are the lowest temperatures observed during January 1889 in the *United States*:<sup>120</sup>

Montgomery, Alabama	( 26° F, -3.3° C)
Mobile, Alabama	( 31° F, -0.6° C)
Killisnoo, Alaska	( 21° F, -6.1° C)
Tucson, Arizona	( 30° F, -1.1° C)
Yuma, Arizona	( 35° F, +1.7° C)
Little Rock, Arkansas	( 20° F, -6.7° C)
Fort Smith, Arkansas	( 13° F, -10.6° C)
San Francisco, California	( 40° F, +4.4° C)
San Diego, California	( 36° F, +2.2° C)
Fresno, California	( 28° F, -2.2° C)
Denver, Colorado	( 4° F, -15.6° C)
Pueblo, Colorado	(-11° F, -23.9° C)
New Haven, Connecticut	( 11° F, -11.7° C)
New London, Connecticut	( 12° F, -11.1° C)
Washington, D.C.	( 23° F, -5.0° C)

Pensacola, Florida	( 33° F, +0.6° C)
Key West, Florida	( 54° F, +12.2° C)
Augusta, Georgia	( 24° F, -4.4° C)
Savannah, Georgia	( 29° F, -1.7° C)
Lewiston, Idaho	( 10° F, -12.2° C)
Chicago, Illinois	( 0° F, -17.8° C)
Cairo, Illinois	( 19° F, -7.2° C)
Indianapolis, Indiana	( 10° F, -12.2° C)
Lafayette, Indiana	( 1° F, -17.2° C)
Dubuque, Iowa	( -4° F, -20.0° C)
Keokuk, Iowa	( 1° F, -17.2° C)
Albion, Iowa	(-25° F, -31.7° C)
Topeka, Kansas	( 3° F, -16.1° C)
Dodge City, Kansas	( 11° F, -11.7° C)
Louisville, Kentucky	( 17° F, -8.3° C)
Lexington, Kentucky	( 16° F, -8.9° C)
New Orleans, Louisiana	( 34° F, +1.1° C)
Shreveport, Louisiana	( 25° F, -3.9° C)
Eastport, Maine	( -2° F, -18.9° C)
Portland, Maine	( 6° F, -14.4° C)
Baltimore, Maryland	( 20° F, -6.7° C)
Boston, Massachusetts	( 9° F, -12.8° C)
Nantucket, Massachusetts	( 16° F, -8.9° C)
Marquette, Michigan	( 3° F, -16.1° C)
Detroit, Michigan	( 7° F, -13.9° C)
Saint Vincent, Minnesota	(-36° F, -37.8° C)
Saint Paul, Minnesota	(-10° F, -23.3° C)
Pine River, Minnesota	(-34° F, -36.7° C)
Vicksburg, Mississippi	( 26° F, -3.3° C)
Saint Louis, Missouri	( 13° F, -10.6° C)
Fort Missoula, Montana	(-21° F, -29.4° C)
Helena, Montana	(-14° F, -25.6° C)
North Platte, Nebraska	( -9° F, -22.8° C)
Omaha, Nebraska	( -2° F, -18.9° C)
Winnemucca, Nevada	(-14° F, -25.6° C)
Carson City, Nevada	( -1° F, -18.3° C)
West Milan, New Hampshire	(-12° F, -24.4° C)
New Brunswick, New Jersey	( 18° F, -7.8° C)
Cape May, New Jersey	( 21° F, -6.1° C)
Santa Fe, New Mexico	( 0° F, -17.8° C)
Albany, New York	( 6° F, -14.4° C)
New York City, New York	( 17° F, -8.3° C)
Charlotte, North Carolina	( 22° F, -5.6° C)
Kitty Hawk, North Carolina	( 29° F, -1.7° C)
Bismarck, North Dakota	(-18° F, -27.8° C)
Grand Forks, North Dakota	(-31° F, -35.0° C)
Cincinnati, Ohio	( 19° F, -7.2° C)
Columbus, Ohio	( 16° F, -8.9° C)
Fort Supply, Oklahoma	( 12° F, -11.1° C)
Roseburg, Oregon	( 22° F, -5.6° C)
Portland, Oregon	( 24° F, -4.4° C)
Erie, Pennsylvania	( 12° F, -11.1° C)
Philadelphia, Pennsylvania	( 18° F, -7.8° C)
Block Island, Rhode Island	( 10° F, -12.2° C)
Charleston, South Carolina	( 29° F, -1.7° C)
Columbia, South Carolina	( 26° F, -3.3° C)

Yankton, South Dakota	(-12° F, -24.4° C)
Nashville, Tennessee	( 20° F, -6.7° C)
Knoxville, Tennessee	( 20° F, -6.7° C)
San Antonio, Texas	( 28° F, -2.2° C)
Galveston, Texas	( 32° F,  0.0° C)
Salt Lake City, Utah	(  5° F, -15.0° C)
Fort DuCheane, Utah	(-22° F, -30.0° C)
Burlington, Vermont	(  0° F, -17.8° C)
Lynchburg, Virginia	( 18° F, -7.8° C)
Norfolk, Virginia	( 24° F, -4.4° C)
Olympia, Washington	( 22° F, -5.6° C)
Helvetia, West Virginia	(  6° F, -14.4° C)
Milwaukee, Wisconsin	(  3° F, -16.1° C)
La Crosse, Wisconsin	( -7° F, -21.7° C)
Cheyenne, Wyoming	(  0° F, -17.8° C)

The following are the lowest temperatures observed during January 1889: <sup>120</sup>

Guanajuato, <i>Mexico</i>	( 39° F,  3.9° C)
La Logia, <i>Mexico</i>	( 37° F,  2.8° C)
Mexico City, <i>Mexico</i>	( 38° F,  3.3° C)
Topo Chico, <i>Mexico</i>	( 52° F, 11.1° C)
Mazatlan, <i>Mexico</i>	( 57° F, 13.9° C)
Leon, <i>Mexico</i>	( 38° F,  3.3° C)
Zacatecas, <i>Mexico</i>	( 23° F, -5.0° C)
Topolobampo, <i>Mexico</i>	( 57° F, 13.9° C)
New Westminster, British Columbia, <i>Canada</i>	( 24° F, -4.4° C)
Grand Turk Island, <i>West Indies</i>	( 75° F, 23.9° C)
Hamilton, <i>Bermuda</i>	( 54° F, 12.2° C)
Port au Prince, <i>Haiti</i>	( 64° F, 17.8° C)

During the winter of 1888-89, the rivers in the *United States* froze later in the season and to a much lesser degree than normal. The depth that rivers and lakes froze in January 1889: <sup>120</sup>

- \* At Albany, New York, the *Hudson River* froze over for the first time this season on 23 January.
- \* At Buffalo, New York, *Lake Erie* was covered with ice on the 28<sup>th</sup> as far as could be seen.
- \* At Alpena, Michigan, *Thunder Bay and Thunder Bay River*, were partly frozen over on the 12<sup>th</sup>.
- \* At Keokuk, Iowa, the *Mississippi River* was full of floating ice on the 17<sup>th</sup>.
- \* At Leavenworth, Kansas, there was floating ice intermittently in the *Missouri River* during January.

The winter of 1888-89 in Bradford County, Pennsylvania in the *United States* was open and mild. On 29 & 30 September, there was a snowfall that covered the ground over most parts of the county. This winter produced little snow and as a result there was almost no sleighing at Towanda all winter. October had been a month of notably bad weather and there were heavy rains in December. On 9 January 1889, a furious windstorm struck Athens, carrying away chimneys and roofs, uprooting trees, blowing in windows, scattering fences and doing much other damage. Most snow fell on February 18<sup>th</sup> but quickly disappeared. Considerable plowing was done in January and the farmers had their crops put in early. <sup>178</sup>

During February 1889, snow fell every day of the month in Vermont and New York in the *United States*. In Pennsylvania and Ohio, snow fell on every day of the month except one. Snow fell in Michigan on every day of the month except the 14<sup>th</sup> and 28<sup>th</sup>. In Montana, Dakota, Minnesota, Wisconsin, Kansas, Missouri, West Virginia, Massachusetts, New Hampshire and Maine, snow fell on 20 to 24 days during the month of February. The monthly snowfall of February exceeded twenty inches over a considerable portion of the Lake region and New England, and in a few cases some remarkably large falls were recorded. Stations in Michigan, northern New York, and northern New England report more than forty

inches, and extreme depths of 69.6 and 71.4 inches were recorded, respectively, at Barnes' Corners and Lowville, New York.<sup>120</sup>

At Augusta, Georgia in the *United States* on 21 February 1889, about 6 inches of snow fell and then quickly melted. On the same day, snow fell at Columbia, South Carolina. It was the heaviest fall of snow within the recollection of the citizens. At Gaffney City, South Carolina, the deepest snow in twenty years fell on the 21<sup>st</sup>; depth twelve to fourteen inches.<sup>120</sup>

Beginning on 21 February 1889 a blinding snowstorm struck Sault de Ste Marie, Michigan in the *United States*. The wind was measured at 132 miles per hour. Trains were blockaded by the drifting snow.<sup>120</sup>

In March 1889, there was a remarkable deficiency of Arctic ice. This was the first March in the last eight years for which large quantities of icebergs and field ice were notably absent over and near the Banks of Newfoundland, *Canada*. This deficiency first appeared in January and continued until April 1889.<sup>120</sup>

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**1889 A. D.** On 9 January 1889, tornado struck in eastern *United States*, especially in Pennsylvania. There was great destruction and loss of life over an area about 200 miles in length. Cities especially damaged were Pittsburg (14 killed) and at Reading (24 killed), through collapse of a silk-mill; suspension bridge, Niagara was wrecked.<sup>97</sup>

On 9 January 1889, a tornado struck Pittsburg, Pennsylvania in the *United States*. Fifty-three lives were lost.<sup>197</sup>

On 9 January 1889, a massive storm plowed through the Middle Atlantic States and the Great Lakes region of the *United States*. The center of the storm passed almost directly northward from southwest Michigan to the northern portions of Lake Huron. Then the storm turned eastward, disappearing to the northwest of the Gulf of Saint Lawrence on the afternoon of the 11<sup>th</sup>.<sup>120</sup>

— At Toledo, Ohio, on the 9<sup>th</sup>, the maximum wind velocity approached 55 miles per hour. The water in Maumee River was lower on that day than ever before known, the riverbed from the Ohio Central dock to Pennsylvania Bridge was entirely dry during the storm.

— At Harrisburg, Pennsylvania on the 9<sup>th</sup>, the winds were so strong that it carried away and destroyed the anemometer. It was estimated that the winds reached 100 miles per hour. The storm struck the Susquehanna River, sweeping the water up in a wave thirty feet high.

— A violent gale struck Pittsburgh, Pennsylvania on the 9<sup>th</sup>. An unfinished structure of seven stories was completely demolished, carrying with it in its fall portions of other buildings. Forty-nine persons were injured and fifteen killed. An unfinished building in another portion of the city was also wrecked and one man killed. About twelve buildings in Allegheny City and Pittsburgh were unroofed or otherwise damaged; estimated loss from the storm, \$165,000. [In present currency, that would be equivalent to \$4 million in damages based on the Consumer Price Index (CPI) inflation rates.]

— A tornado struck Reading, Pennsylvania on the 9<sup>th</sup>. The cyclone swept across the city from west to east, unroofing factories, mills, and houses, uprooting trees, and overturning nearly everything in its course. The large paint shops of the *Philadelphia and Reading* railroad were demolished, and in a moment the combustible materials contained therein were a mass of flames. A few squares from there it struck the Reading Silk Mill, a large, new five-story building in which some 800 girls and boys were working, and crushed the huge building like an egg-shell before a single person could escape. The building was leveled to the foundations and all the people went down in the midst of a great heap of beams, bricks, and twisted machinery. The path of the cyclone was from 60 to 100 feet wide, and it was fortunate that it passed through a portion of the city that was not entirely built up, else the loss would have been well nigh incalculable. As it is, its path was strewn with wreckage. The Mount Penn Stove Works were unroofed and considerable damage done to the building. The cyclone struck the large nut and bolt works of J. H. Sternberg & Son with great force, carrying away the immense roof of the main building. On North Ninth Street it cut a clean swath through a row of new houses, unroofing nine of them. The storm's actions were most peculiar. In many cases the damage done was such as would be accomplished by an ordinary high wind, but in others it seemed to crash from above. This was notably the case at the silk mill. Witnesses of its demolition say that the



building went down all in a heap as if a huge weight had dropped upon and smashed it. A curious circumstance is, that the high stack of the mill, which was at one corner, was still standing, and was not even shattered. It was estimated that the number of people killed in this storm was 40.

— At Buffalo, New York, the storm, which began during the forenoon of the 9<sup>th</sup> continued through the 10<sup>th</sup>. The high wind caused the heavy falling snow to drift badly and the debris of outhouses, skylights, parts of roofs, fences, etc. were strewn over the streets, detaining the streetcars several hours. The actual velocity of the wind was seventy-eight miles per hour at 7:26 a.m. on the 10<sup>th</sup>. The lake which was free from ice rose 7.8 feet above high water mark, flooding the Island during night of 9/10<sup>th</sup> and rendering its entire population, about twenty families, homeless. The *New York Central Railroad* track near Porter Avenue was completely washed out as well as the "Belt Line" route.

— On the 9<sup>th</sup>, a tornado passed over New York City and then descended down and struck South Brooklyn with great violence, unroofing houses, completely demolishing several, and blowing down fences and trees. This tornado caused an explosion of one of the largest gas tanks in Brooklyn. The tornado path was well defined, and houses were unroofed over its entire course. It also damaged the Navy Yard. The total damage was estimated at \$500,000. [In present currency, that would be equivalent to \$12 million in damages based on the Consumer Price Index (CPI) inflation rates.]

On 2-3, 8 February 1889, there were destructive gales over *Great Britain*. The storm produced [ship] wrecks and loss of life.<sup>97</sup>

On 18 February 1889, a series of tornados struck in Alabama, Georgia and South Carolina in the *United States*. A storm swept over the lower end of Shelby County about thirty miles from Birmingham, Alabama. Many houses were blown down or unroofed; a number of persons were killed and many injured. The storm moved through a thickly populated region. A storm swept through Harmony Grove, Georgia. Houses and trees were driven before the wind like chaff; several persons were killed and a large number injured. Persons on the *Elberton Air-Line* railroad state that the tornado crossed that road between Bowersville and Toccoa, Georgia. It was a singular fact that this storm passed in the track of one, which occurred in 1846; a hurricane, as it was then called back then, swept through a large forest and tore up many trees. A storm struck Griffin, Georgia and did considerable damage along a track three hundred yards wide. At a farm two miles west of Griffin five houses were blown down, and a large barn filled with forage was twisted around. A funnel-shaped cloud did its greatest damage in the neighborhood of Nona, Georgia, on the *Milledgeville and Eatonton Railroad*, causing loss of life and considerable injury to property. A tornado passed about a half a mile from Pacolet, South Carolina and all houses, crops, and lumber over a stretch of country about one fourth of a mile wide suffered from its ravages.<sup>120</sup>

On 8-9 March 1889, there were destructive floods in the midland and southwestern *England*. Leicester, Bristol, Taunton and other places suffer much.<sup>90</sup>

On 15-16 March 1889, a violent hurricane struck at the Samoan Isles in the south Pacific Ocean. The great storm destroyed 3 German and 3 American warships, which were driven ashore at Apia on the island of Upolu in *Samoa* and destroyed. About 50 Americans and 96 Germans were drowned.<sup>97</sup> [Apia is a city in the north-central coast of Upolu, Samoa's second largest island.]

In March 1889, a storm along the Atlantic Coast of the *United States* caused very high tides.<sup>120</sup>

— On the 16<sup>th</sup> at Atlantic City, New Jersey: it has been many years since the tide has been as high here as today. The storm, which has prevailed on the coast, caused the high water, and for a few hours Atlantic City was cut off westward by the flooding of the railroad tracks, which cross the meadows. The water on the *Camden and Atlantic Railroad* this morning was so high that the fires in the railroad engines were extinguished. This afternoon the *Five-Mile Beach* branch railroad was underwater and the *Sea Isle City and Ocean City* branch was flooded. No trains were running beyond Sea Isle City. An unprecedented high tide occurred here on the 20<sup>th</sup>; it was very destructive to the boardwalk, bathhouses, pavilions, and even many of the larger houses. Building after building was quickly undermined by the rushing water and tumbled down into the sea. All along the beach was strewn debris.

— On the 16<sup>th</sup> at Cape May, New Jersey: the tide was the highest known for years; much damage was done here.



— On the 16<sup>th</sup> at Long Branch, New Jersey: the severe storm and high tides which have prevailed along the coast for the past twenty-four hours have caused a great amount of damage. The tide in the Shrewsbury River ran higher than in many years.

— At Sea Bright, New Jersey on the 16<sup>th</sup>: at high tide tonight the heavy sea broke over the beach and swept through the hollow almost in the center of the town. The piles of lumber from bulkheads were carried to Ocean Avenue, striking the fishermen's huts in the hollow and demolishing them. The water in some streets was three feet deep and running with great force.

— On the 17<sup>th</sup> at Asbury Park, New Jersey: the high tides of last night and this morning were very destructive along this part of the coast; the great board walk here was severely damaged, and the bluff was washed out in several places. At Elberon, several bulkheads were washed out. At Point Pleasant on March 17<sup>th</sup>, Bay Head bulkheads were washed away. In many places the surf ran over the beaches and did much damage. The railroad tracks from Absecon to Atlantic City were underwater, and no train could cross at high tide. All the lowlands were overflowed. The railroad from Atlantic City to Egg Harbor Inlet was broken up and trains cannot run. The railroad from Ocean City to the mainland was underwater, as was the railroad from Sea Isle to Avelon.

— Norfolk, Virginia: an unusually high tide occurred on the 15<sup>th</sup> and 20<sup>th</sup>, flooding the lower portions of the city; during the 15<sup>th</sup>, all streetcar travel was interrupted during the day by the high water.

— New York City, New York: it was reported that the tide at Coney Island on the morning of the 21<sup>st</sup> was the highest of the season; the whole distance in and about the bulkhead was a wreck, which \$100,000 will not make good [\$2.4 million in today's dollars]. A big tide prevailed on the 21<sup>st</sup> in the lower part of Elizabeth, New Jersey, and several of the lower stories of houses near the meadows were flooded. Communication with the factories along Staten Island Sound was completely cut off at high water. The tracks of the Newark and Elizabeth branch of the Central Railroad were flooded in places to the depth of nearly five inches, as also were the tracks of the Long Branch Railroad. The tide at South Beach, Staten Island, was the highest seen in many years and did considerable damage. The sea broke over the embankments and flooded the swamp for several miles.

— High tides also occurred as follows: Eastport, Maine on the 21<sup>st</sup>; Woods Hole, Massachusetts on the 16<sup>th</sup>; Cape Henry, Virginia on the 14<sup>th</sup>, 15<sup>th</sup>, 19<sup>th</sup>, 20<sup>th</sup>.

At Wilmington, North Carolina in the *United States* on 19 March 1889, the hail and thunderstorm in the evening was very severe in the northern section of the city. At the Wilmington Compress building nearly all the glass in the skylights was broken, and the hail drifted in places to a depth of twelve inches; the hail also caused much damage to plants and shrubbery. Beyond the city limits north and west the storm was still more severe. At Navassa Guano Works, one hundred and fifty panes of glass were broken and the drifts were three feet deep.<sup>120</sup>

At Fort Clark, Texas in the *United States* on 21 March 1889, a terrific hailstorm with lightning and high wind passed over this place; stones the size of pigeon eggs, and some larger, fell. An enormous quantity of fish, estimated at several wagonloads, were found dead on the banks of Las Moras Creek after the storm. The crops in the [U.S. Army] company gardens were destroyed.<sup>120</sup>

In March 1889, large prairie fires were observed in the *United States* at Poplar River, Montana; Yankton, South Dakota; Fort Sully, South Dakota; Bismarck, North Dakota; Fort Yates, North Dakota; Huron, South Dakota; Fort Reno, Oklahoma; and Fort Sill, Oklahoma.<sup>120</sup>

At Wolsey, South Dakota in the *United States*, a severe sand storm occurred on the 2 April 1889. The wind was very high during the day and drifted the sand three feet in places. At Yankton, South Dakota, the winds increased in force until it attained a maximum velocity of 48 miles per hour. The dust and sand in the air, raised by the wind, became so dense as to obscure the sky. At times the sun was entirely hidden from view by sand and dust, and it became so dark as to require artificial light. Sandstorms also struck Woonsocket, South Dakota. At Fort Sully, South Dakota on the 2<sup>nd</sup>, the winds increased in force and blew with great violence, attaining a maximum velocity of sixty miles per hour. These high winds raised heavy clouds of sand and small pebbles, causing the sky to appear as though covered by dense stratus clouds, and in the streets one could scarcely see one hundred yards. Huron, South Dakota experienced the same fierce winds. In the afternoon, atmospheric electricity was very strong,

necessitating the cutting out of all wires at the telegraph offices. The superintendent of the railway telegraph system found it impossible to remove the "ground" of one wire, although the battery was detached, efforts in that direction resulting in the ignition of the wood-work where the wire entered the office. Telegraphic communication was entirely cut off. Prairie fires started in the country, some from no known cause. It was asserted by trustworthy farmers that the barbs of fence wire emitted showers of sparks at intervals, and several report that fires started at the foot of posts supporting the wires. Many report that the flames rose fifty feet in the air. All combustible matter appeared to be highly susceptible to ignition; in many cases buildings protected by from fifty to one hundred rods [850-1700 feet] of ploughed ground were consumed. No perceptible interval of time elapsed from the moment the structures were on fire until their complete envelopment by flames. Huron was several times threatened, and only strict vigilance and hard work kept the fires from entering the corporation limits.<sup>120</sup>

At Rapid City, South Dakota in the *United States*, a prairie fire started at the northeastern limit of the city on 2 April 1889, and swept six miles down the valley before it was extinguished. The high wind caused the fire to travel at a fearful rate. Several ranches in the track of the fire were completely demolished; one person was burned to death and several injured. At Yankton, South Dakota during the high wind on the 2<sup>nd</sup>, smoldering prairie fires were fanned, and extended into the city, consuming several buildings near the boundary. Prairie fires also prevailed north of the city on the 1<sup>st</sup>, and to the north and east on the 2<sup>nd</sup> and 3<sup>rd</sup>. At Fort Sully, South Dakota, it was reported that very destructive prairie fires swept over the eastern portion of the county on the 2<sup>nd</sup> and 3<sup>rd</sup>. The fires were pushed onward before a gale, which at times blew at the rate of sixty miles per hour, and progressed fifteen to thirty miles per hour. Many farmers have been rendered entirely destitute by the fires, having lost all seed, farming implements, houses, and live stock. A careful estimate places the loss of property of all kinds, in this county, at from \$50,000 to \$75,000 [\$1.2 to \$1.8 million in today's dollars].<sup>120</sup>

On 3 April 1889, there was a black snowfall throughout the northern part of New York in the *United States*. The black snowfall took place in the following counties within New York: Lewis, northern Herkimer, southern Franklin, northwestern Essex, and probably Hamilton. From the reports of forty-nine towns it seems that the "black snow storm" extended from Ava over a distance of one hundred and twelve miles in a northeast direction to Wilmington, and from Pitcairn extending southward some thirty miles to Ava. The "black snow" fell soon after the passage of the storm center, which crossed the state. The area of snow of darkest color was nearly central over Lewis County. At Copenhagen "a pan full of snow, when melted, gave a teaspoonful of very fine ashes," and at Saranac Lake about one-half inch of "black snow" fell over the white snow which preceded it. A specimen of the "black snow" was examined microscopically, and it appears that the sediment collected was finely divided earth. A comparison of this sediment with that from ashes shows that the snow was not discolored by ashes, which was further confirmed by the large number of vegetable fibers in the black snow, the absence of forest fires to the windward of the region affected, and the close resemblance of the "black snow" sediment to an artificial sediment made from humus. These facts, together with those which obtained at the time of the passage of the storm center, make it probable that soil was excavated by some whirlwind, and, after being scattered by the storm, it was deposited over the counties mentioned as the snow was formed.<sup>120</sup> [Tornadoes occurred at Baltimore, Maryland and at Bridgeton, New Jersey on the 3<sup>rd</sup>.]

A violent storm struck the Atlantic Coast of the *United States* on 6-7 April 1889. The damage was especially severe at Virginia and North Carolina.<sup>120</sup>

— Norfolk, Virginia sustained significant damage on the 6<sup>th</sup> and 7<sup>th</sup>. On the 6<sup>th</sup>, the winds attained a maximum velocity of fifty-five miles per hour. The storm surpassed in violence any that have occurred in this section within the memory of man. Numerous buildings were unroofed, superstructures torn away, telegraph lines prostrated, etc. During the night of the 6<sup>th</sup>-7<sup>th</sup>, the situation in this city was appalling; the electric light wires broke and left the city in darkness, except when flames shot up from burning docks and storehouses which caught fire from the quicklime stored therein when reached by the rising water. Early on the morning of the 7<sup>th</sup>, the water from the harbor

overspread the city, damaging property to the estimated amount of one million dollars. [In present currency, that would be equivalent to \$24 million in damages based on the Consumer Price Index (CPI) inflation rates.] The Naval dry-dock was broken into by the rising water and the *U.S.S. Pensacola*, undergoing repairs therein, was sunk. Telegraphic communication with all points was severed; no mails arrived, owing to washouts on railroads, and no vessels ventured out on account of the storm. In this harbor vessels were torn from their moorings and cast upon the land total wrecks. The loss of life and damage to shipping in this vicinity, due to the storm, was unprecedentedly large.

— At Norfolk, Virginia during the storm of the 6<sup>th</sup>-7<sup>th</sup>, the northeasterly wind backed up the water into Chesapeake Bay and caused the tide to rise to an extraordinarily high point, flooding the lower streets in this city. The tide rose to a point higher than ever before seen here, being between six and seven feet higher than the ordinary high water mark, and twelve inches higher than the highest tide hitherto known—that during the great gale of August, 1879. The water was blown out of Albemarle Sound lowering the water in the canal until vessels got aground where they should have had two feet of water to spare. This was due to the gale being immediately followed by a strong westerly wind.

— At Cape Henry, Virginia during the morning of the 7<sup>th</sup>, the winds became so violent that the anemometer cups were blown from their position. At that time the wind was blowing at the rate of 115 miles per hour. It was estimated that it reached a velocity of one hundred and twenty miles per hour after the anemometer cups had been carried away.

— At Suffolk, Virginia, the storm of the 6<sup>th</sup> was the fiercest and most destructive ever known in this section. The tide in the Nansemond River was unprecedented, and on the 7<sup>th</sup> the river extended over its banks on each side for a hundred yards or more. Considerable damage was done to wharf property and to goods stored in warehouses along river. The track of the Suffolk and Carolina Railroad along river was washed from the roadbed and considerably damaged.

— Reports from Williamsburg, Ashland, West Point, Keswick, and Stanton show that the storm and flood at these places were unusually severe and destructive to property during these dates.

— A severe storm with heavy rains struck Kitty Hawk, North Carolina on 7 April 1889. The wind increased in force and attained a velocity of eighty miles per hour. The sea washed over the beach and around the buildings of the Signal Office and Life-Saving Station, the water being knee deep between the buildings. Telegraphic communication was cut off, as was also the telephonic communication north. Several fishing craft and other sailing vessels were reported wrecked.

— Reports from Nags Head, North Carolina stated that the storm was very destructive in that section; two large houses were washed away or blown into the sound; all bath houses were washed down and strewn along the beach; over sixty head of cattle were drowned between that point and Oregon Inlet, and the Oregon Inlet cable was washed away.

— At Hatteras, North Carolina the wind attained a maximum velocity of eighty miles per hour. Several vessels were blown ashore, and one, the schooner *Nellie Potter*, was a total loss. A very high tide submerged Hatteras Island on the 7<sup>th</sup>, and water entered many houses. Trees were uprooted, fences demolished, and gardens ruined. It was stated that this tide was the highest that has occurred since Hatteras Inlet was cut out in 1846.

In April 1889, the Torrens River in *Australia* flooded. Highest recorded flooding occurred in the Adeliade region. There was heavy damage to buildings, roads and crops.<sup>99</sup>

An unusual amount of hailstorms struck many areas of the *United States* in May 1889. Some of these storms were extreme.<sup>120</sup>

— On 12 May 1889, a very severe wind and hail storm passed through Concho and Menard Counties in Texas, killing a number of sheep and calves, and putting out the eyes of several horses. When the storm crossed over Brady Creek it killed hundreds of fish, from large sized catfish down. The destructive path of the storm was about three-fourths of a mile wide.

— On 12 May 1889, at Longview and Bennettstown, Kentucky, lumps of hail as large as goose eggs were picked up, and pieces of ice six inches long were seen. Crops suffered seriously. Tobacco plants were cut down, and fruit trees stripped of their leaves and blossoms. The heaviest loss was to wheat. It was estimated that 600 acres were entirely destroyed and as much more seriously damaged. The loss was estimated at \$6,000 to \$10,000 [\$144,000 to \$240,000 in today's dollars].

— On 13 May 1889, a severe hailstorm struck Lair, Kentucky. The hailstorm was but a few minutes duration. The hailstones were unusually large and fell in sufficient quantity to cover the ground, knocking down horses and injuring stock and crops seriously; limbs of trees from 1 to 1½ inches in diameter were broken off by the hail.

— On 16 May 1889, a severe hailstorm struck Cedar Rapids, Iowa. The hailstones were as large as hens' eggs and caused considerable damage to skylights, greenhouses, etc.

— On 16 May 1889, a report from Buckville, Arkansas states that the severest hailstorm known for years visited that section during the day. The hailstones were of unusual size and fell with terrific force, damaging the crops, and in many places crushing through the tops of houses. The fruit crop was damaged 50 per cent.

During May 1889, protracted droughts were observed in Florida, Georgia, Louisiana, Alabama, Georgia, Tennessee, Mississippi, Arizona, Utah and Michigan in the *United States*.<sup>120</sup>

Several forest fires raged in the *United States* during May 1889:<sup>120</sup>

— On 7 May 1889 at Duluth, Minnesota, destructive forest fires continued to rage in all directions, but in many localities they have burned themselves out. They attacked the heavy pinewoods in many places, and the loss of timber will be very large. Several hundred thousand ties, and thousands of cords of wood had been burned. Numerous buildings, hay, meadows, crops, and bridges have been burned in the western part of the county. Farmers and mill men in the country were fighting the fires. The air in the city was filled with smoke.

— On 4-6 May 1889 at La Crosse, Wisconsin, extensive forest fires prevailed in the northern part of the state and owing to the dry weather the fires burned fiercely. Railroad men arrived over the Omaha road on the 4<sup>th</sup> report that the forest from Ashland to Clear Lake, one hundred and fifty miles, was ablaze. Many thousands of ties were destroyed and some towns endangered. On the Fond du Lac Indian reservation \$50,000 worth of logs and skids were burned [\$1.2 million in today's dollars]. The heavy rain, which fell on the 7<sup>th</sup> in the northern section of the state, partially extinguished the fires.

— On 8 May 1889 at Mason City, Iowa, destructive fires were burning in the woods between Plymouth and Rock Falls, since the evening of the 4<sup>th</sup>. So far the farmers have been able to save their homes.

— On 8 May 1889 at Newburgh, New York, forest fires were burning in the Shallangunk [Shawangunk] Mountains and in the Catskills; also in the highlands below this city, and on the Fishkill Mountains. Passengers on the New York and New England road state that the fires were burning on the mountains in that vicinity and on the state line. A large amount of woodland has been seriously damaged. The fires were reported to be on the increase in all directions.

— At various points in the Upper Peninsula of Michigan, severe forest fires had progressed since about the 5 May 1889. Fences, cord wood [firewood], shingles, posts, and standing timber were consumed by the flames. It was estimated that half a million feet of logs have been burned, the crops ruined in many localities, and a large number of buildings destroyed. Reports also show that destructive fires were general at about the same time in the northern portion of the Michigan, and in Ottawa, Muskegon, Midland, Clare, Gladwin, and Osceola counties, in the middle portion; in Lenawee county, in the southeastern, and Allegan county in the southwestern portion of the Michigan. The light rain in the Upper Peninsula on the 8<sup>th</sup>, and in the southern half of the state on the 10<sup>th</sup>, and the general rain throughout the state from the 15<sup>th</sup> to the 22<sup>nd</sup> extinguished the fires.

— On 8 May 1889 at Custer City, Pennsylvania, a fierce forest fire was raging about the Moody tract, five miles south of the city all day. The tract was one of the most valuable oil properties in this county, and a large number of rigs and small tanks of oil were reported destroyed. A big forest fire was in progress in the lumber woods near Kane and was working its way rapidly towards Porter station. There are fires on all sides of here, and another large one is plainly seen to the northwest.

During the afternoon of 10 May 1889 at Wichita, Kansas in the *United States* during a thunderstorm, a shower of fishes, from one to four inches long, fell at the Burton Car Works, four miles north of this city. They covered the ground in thousands. One, brought to police headquarters, was a small catfish about three and three-fourths inches long, such as abound in the streams hereabouts.<sup>120</sup>

On 10 May 1889, a destructive storm struck on the east coast of the *United States*.<sup>97</sup>

On 17 May 1889, there was a great storm in southern *Germany*, especially in *Austria*, *Bohemia* [now western *Czech Republic*]. The storm produced a great loss of life and property. Then on 3-4 June 1889,

another storm struck *Switzerland*.<sup>97</sup>

On 25 May 1889, a great storm struck the coast of Sydney, *Australia* with much loss of life and property.<sup>97</sup>

In May 1889, there were floods in the Conemaugh Valley, Pennsylvania in the *United States*.<sup>90</sup>

Heavy rains during the end of May in Pennsylvania in the *United States* contributed to a major flood event called the Johnstown Flood. The area, which drained into the reservoir above the dam on the South Fork, which gave way and caused the disaster at Johnstown, Pennsylvania, was about fifty-two square miles. On the morning of May 30<sup>th</sup> the Johnstown river-gauge (7:44 a.m.) read 1.0 foot above low water. On the 31<sup>st</sup>, at the same time, it read fourteen feet; three hours later at 10:44 it read twenty feet. There was a subsequent observation of the creek at fourteen minutes after 12 o'clock, which reads as follows: "Water higher than ever known; can't give exact measurement." The dam on the South Fork gave way at 1 p.m., and the city of Johnstown was overwhelmed by the flood at 3 p.m. Mrs. H. M. Ogle, who held the position of [Weather] Signal Service observer there since 1 November 1884, was lost in this great catastrophe.<sup>120</sup>

It was estimated that the loss of life and property in the string of communities in the direct path of the Johnstown flood in Pennsylvania in the *United States* was about as follows:<sup>120</sup>

	<u>Lives Lost</u>	<u>Property Damage</u>
Johnstown and Millville	7,000	\$ 18,000,000
Pennsylvania Railroad	--	\$ 15,000,000
Franklin and East Conemaugh	38	\$ 1,200,000
Cambria	1,100	\$ 750,000
Woodvale	300	\$ 3,500,000
Kernville	600	\$ 300,000
Mineral Point	16	\$ 100,000
Minersville	8	\$ 15,000
Morrellville	1	\$ 10,000
Sheridan and Coopersdale	--	\$ 75,000
Total	9,063	\$ 38,950,000

Although the flood at Johnstown, Pennsylvania was the most destructive in the region both in life and property, probably no more than 1/16<sup>th</sup> of the water in that flood came from the heavy rains, but was rather due to the breaking of the dam and the overflow of the waters in the reservoir.<sup>120</sup>

The scope of the floods of 30 & 31 May and 1 June 1889 reached well beyond the Johnstown, Pennsylvania area. This flood event affected a broad area in Pennsylvania, Maryland and Virginia in the *United States*. The rainfall of 30, 31 May and 1 June 1889, in western and central Pennsylvania in the *United States* was unprecedented for that section of country. The following was the estimated amount of rainfall during this 3-day period: 1.895 cubic miles in the Susquehanna Valley, 1.005 cubic miles in the Potomac Valley, 0.837 cubic miles in the Allegheny and Monongahela Valley, 0.0615 cubic miles in the Johnstown Valley and 0.0065 cubic miles in the Valley above South Fork Dam.<sup>120</sup>

— At Washington, D.C. on 2 June, the waters of the Potomac River rose higher than ever before known. At about noon the water had risen until the tide-gauges were hidden, and was fully three feet above the 1877 flood mark, and that was fully eleven feet above spring-tide high water. The streets and reservations on the lower levels in the center of the city and all the wharves and streets along the riverfront were underwater. The flood caused great damage along the riverfront and on Rock Creek; the harbor improvements were injured and two spans of the Long Bridge were swept away. Serious, if not irreparable, damage was caused along the length of the Chesapeake and Ohio Canal; which was rendered entirely unnavigable throughout its entire length. Railroad communication with the south and west was cut off for two days. Considerable damage was caused to the machinery plants and material in the Navy Yard.



— At Lynchburg, Virginia, on 1 June in consequence of high water produced by the heavy rains during the last three days, northwest of here as well as in the immediate vicinity of this city, nearly all the industrial establishments suspended operation last night. The flood in James River was unprecedented in height and volume since the great flood of 1870. All the bridges at this place have been swept away and the amount of damage done was very large.

— At Harrisburg, Pennsylvania on 1 June, the disastrous rain, which prevailed throughout yesterday and last night ended at 4.40 a.m. today, 3.12 inches falling during the night. River rising rapidly, all bridges declared unsafe, travel suspended, and all the lower districts of the city were underwater, reaching the second stories of the houses in many places. Losses in this city will amount to at least \$1,000,000. All manufactories have stopped operations, and the iron works were underwater. The extreme height of the water in the Susquehanna River was reached at 9 p.m., rising in all 27.01 feet. This was 21.6 inches higher than the great flood of 1865, which was the highest point ever known here.

— At Lewisburg, Pennsylvania on 3 June, the water in the west branch of the Susquehanna River was four feet above high-water mark of the great flood of 1855. Every bridge on the Susquehanna River from Sunbury to Clearfield had been swept away. At Williamsport, from fifty to eighty persons were standing on the bridge at Market Street, which spans the Susquehanna River, when it gave away, plunging the people into the water. At Milton, the water stood five feet high in the streets. At Lewisburg, five spans of the railroad bridge were swept away. The gas works, water works, and mills were flooded. The loss will reach \$75,000. Every town along the west branch of the Susquehanna River was isolated from every other town and communication was difficult, and between some places impossible.

— At Elmira, New York, the water during the night of the 1<sup>st</sup>-2<sup>nd</sup> was from 12 to 18 inches higher than ever before known. The Erie railway bridge was anchored in its place by two trains of loaded freight cars. The water rose to the cars, which, with the bridge, acted as a dam and forced the water back through the city, on the north side of the Chemung River, where the principal business houses were located. The water covered the streets to a depth of two or three feet, and the basements of the stores were quickly flooded, causing thousands of dollars damage.

— At Charleston, West Virginia on 1 June, the Big Kanawha River was dangerously high, and the city was in danger of being submerged. The Chesapeake and Ohio railroad bridge had been swept away.

— At Tyrone, Pennsylvania on 1 June, the Juniata River overflowed its banks and flooded the southern portion of the city, causing great damage.

— The probable value of the property destroyed by these floods throughout the entire flooded district [including the Johnstown flood] has been variously estimated at from \$50,000,000 to \$60,000,000. [In present currency, that would be equivalent to \$1.2 to \$1.4 billion in damages based on the Consumer Price Index (CPI) inflation rates.]

Towards the beginning of June 1889, there was a tremendous 3-day downpour of rain, covering Northern and Western Pennsylvania and Southern New York in the *United States*. This caused most destructive floods, resulting in the breaking of the great Conemaugh dam and the terrible Johnstown disaster on June 1<sup>st</sup>. The rain in Bradford County, Pennsylvania was most extreme on May 31, and on June 1 and 2, a great flood followed in both branches of the Susquehanna River, that of the West Branch being the greatest inundation ever known. In the North Branch the high water nearly equaled that of March 17, 1865. At Athens, Pennsylvania where the Chemung River flowed into the Susquehanna River, the flats and lower part of the town were completely inundated. Buildings were carried away and significant damage was done. The larger creeks became raging torrents, carrying away bridges, buildings, fences and crops. In the valley of the Towanda Creek, the flood was the most destructive since that of July 1850. Great damage was done at Monroeton. The town flooded, streets cut, cellars flooded and gardens washed out, fences and outbuildings carried away. The county bridge at Powell was carried away. The Masontown Bridge made unsafe and the Barclay railroad bridge just below, so undermined that it went down. The State Line & Sullivan Bridge at Monroeton was undermined and went down. Several other bridges in the county were either damaged or carried away. Scores of people sustained loss and the damage to public and private property in Bradford County, Pennsylvania was probably \$200,000 [In present currency, that would be equivalent to \$5.0 million in damages based on the Consumer Price Index (CPI) inflation rates.]. The Susquehanna River attained its greatest height on the morning of June 2<sup>nd</sup> but rapidly receded in the afternoon.<sup>178</sup>

On 2 June 1889, a destructive storm struck Flintshire, Cheshire and Lancashire, *England*. Heavy rain and large hail caused floods. Crops were much injured, buildings struck [by lightning] and [caught] fire.<sup>97</sup>



The weather during June 1889, in the Caribbean Sea, and particularly at the *Windward Islands*, was unusually stormy, with extraordinary rainfall. On the Island of Dominica, on the Shawford Estate, the rainfall was 28.54 inches for eight consecutive days, with frequent squalls of hurricane violence. The total rainfall on the Island of Dominica for the month was 44.36 inches, and many of the other islands were not short of that amount. Much damage was done to plantations, roads, and bridges, owing to the swollen rivers and mountain streams. The trade winds during the month have been very strong, blowing from east to east-northeast, and attended with violent rainsqualls and rough sea.<sup>120</sup>

On 15-16 June 1889, a hurricane struck *Cuba*. Some people died.<sup>141</sup>

An unusual amount of hailstorms struck many areas of the *United States* in June 1889. Some of these storms were extreme.<sup>120</sup>

— On 3 June 1889 at Mesquite, Texas, the hailstones were mostly large, some of them being of enormous size; all of them were of a ragged appearance and of an almost infinite variety of shapes. The larger stones had protuberances one inch long. Reports show that the path of the hailstorm was about eight hundred yards wide, and about one mile long. The hail measured about four inches deep on a level, and about two feet in hollows. At 11 a.m. on the 4<sup>th</sup>, the hail was about eighteen or twenty inches deep in a field four miles northeast of Mesquite.

— On 3 June 1889 at Granbury, Texas, the most damaging wind and hailstorm that had ever been experienced at that place occurred in the evening. The Christian church, a new structure, was twisted about ninety feet out of its natural position. About fifteen hundred window glasses were broken by hailstones; the stones being as large as hens' eggs. The path of the storm was about one mile wide.

— On 5 June 1889 at Way Cross, Georgia, hailstones as large as goose eggs fell in large quantities.

— On 6 June 1889 at Dodge City, Kansas, the fall of hail was of short duration but some of the hailstones were as large as hens' eggs. The general shape was spheroidal, the larger ones having knobby protuberances, and when broken in half the sections presented a core resembling half-melted snow, around which were irregular coatings of ice. Reports show that the hailstorm was more severe in the surrounding country, where poultry was killed, window lights broken, and crops damaged.

— On 19 June 1889 forty miles west of Bingham, Nebraska, the hailstones were about four inches in diameter.

— On 26 June 1889 at Rushford, Minnesota, a severe storm gathered near Wiscoy, and passed through Houston County, then due south, curving slightly to the west through Yukatan and the eastern portion of the town of Norway. A belt two miles wide and thirty miles long was absolutely laid waste. Trees two feet in diameter were twisted off or uprooted by the wind. For two miles the hail pelted all growing crops and vegetation to the ground. It was reported that hailstones as large as a man's fist fell. On the *Southern Minnesota* Railroad about two hundred feet of track was covered with a drift of sand about three feet in depth, and one bridge was partly washed away.

In June 1889, a drought prevailed in several parts of the *United States* including Georgia, Idaho, South Dakota, and Montana.<sup>120</sup>

In June 1889, severe forest fires raged in several regions of the *United States*.<sup>120</sup>

— On 12 June 1889 at Two Harbors, Minnesota, forest fires were raging along the Iron Range Railroad. The city was enveloped in smoke. A strong wind has been blowing all day, and everything was as dry as tinder, which renders the conditions very favorable for the progress of the fires.

— On 12 June 1889 at Ely, Michigan, the most destructive fires of the season were burning in this section; twelve to fifteen houses had been destroyed, and much damage was done to railroad property.

— On 13 June 1889 at Superior, Wisconsin, a destructive fire was sweeping the forests south and west of the city. Already over \$500,000 worth of pine had been destroyed [\$12 million in today's dollars]. The districts tributary to Nemadji and Saint Louis rivers, in Wisconsin and Minnesota, were suffering terribly. The smoke from the burning districts obscures the sun and renders it difficult for vessels to enter the harbor. A strong wind was blowing from the southwest and several villages were threatened. The fires were raging from Saint Croix to the Northern Pacific Junction.

— On 17 June 1889 at Ellensburg, Washington, severe forest fires prevailed on the east side of the Cascade Mountains. The roar of the flames was heard for miles, and during the night the sky was illuminated with a glow. High wind prevails and the fires were expanding.

The summer of 1889 in Bradford County, Pennsylvania in the *United States* was noted for its wetness. July was as remarkable for its frequent rains as the month of June, although the precipitation was considerably less; there were only ten clear days during the whole month.<sup>178</sup>

The following are the highest temperatures observed during July 1889 in the *United States*:<sup>120</sup>

Montgomery, Alabama	( 99° F, 37.2° C)
Mobile, Alabama	( 95° F, 35.0° C)
Tucson, Arizona	(105° F, 40.6° C)
Little Rock, Arkansas	( 95° F, 35.0° C)
Fort Smith, Arkansas	( 98° F, 36.7° C)
San Francisco, California	( 83° F, 28.3° C)
San Diego, California	( 84° F, 28.9° C)
Denver, Colorado	(100° F, 37.8° C)
Pueblo, Colorado	(102° F, 38.9° C)
New Haven, Connecticut	( 88° F, 31.1° C)
New London, Connecticut	( 86° F, 30.0° C)
Washington, D.C.	( 92° F, 33.3° C)
Pensacola, Florida	( 94° F, 34.4° C)
Key West, Florida	( 89° F, 31.7° C)
Augusta, Georgia	(100° F, 37.8° C)
Savannah, Georgia	( 95° F, 35.0° C)
Boise Barracks, Idaho	(102° F, 38.9° C)
Lewiston, Idaho	(101° F, 38.3° C)
Chicago, Illinois	( 90° F, 32.2° C)
Cairo, Illinois	( 91° F, 32.8° C)
Indianapolis, Indiana	( 92° F, 33.3° C)
Lafayette, Indiana	( 95° F, 35.0° C)
Dubuque, Iowa	( 95° F, 35.0° C)
Keokuk, Iowa	( 91° F, 32.8° C)
Topeka, Kansas	( 94° F, 34.4° C)
Dodge City, Kansas	(105° F, 40.6° C)
Louisville, Kentucky	( 92° F, 33.3° C)
Lexington, Kentucky	( 90° F, 32.2° C)
New Orleans, Louisiana	( 95° F, 35.0° C)
Shreveport, Louisiana	( 96° F, 35.6° C)
Eastport, Maine	( 76° F, 24.4° C)
Portland, Maine	( 80° F, 26.7° C)
Baltimore, Maryland	( 93° F, 33.9° C)
Boston, Massachusetts	( 86° F, 30.0° C)
Nantucket, Massachusetts	( 79° F, 26.1° C)
Marquette, Michigan	( 88° F, 31.1° C)
Detroit, Michigan	( 91° F, 32.8° C)
Saint Vincent, Minnesota	( 94° F, 34.4° C)
Saint Paul, Minnesota	( 96° F, 35.6° C)
Vicksburg, Mississippi	( 94° F, 34.4° C)
Saint Louis, Missouri	( 93° F, 33.9° C)
Helena, Montana	( 91° F, 32.8° C)
North Platte, Nebraska	(102° F, 38.9° C)
Omaha, Nebraska	( 94° F, 34.4° C)
Winnemucca, Nevada	(102° F, 38.9° C)
Carson City, Nevada	(100° F, 37.8° C)
West Milan, New Hampshire	( 86° F, 30.0° C)
New Brunswick, New Jersey	( 87° F, 30.6° C)
Cape May, New Jersey	( 90° F, 32.2° C)

Santa Fe, New Mexico	( 90° F, 32.2° C)
Albany, New York	( 89° F, 31.7° C)
New York City, New York	( 88° F, 31.1° C)
Charlotte, North Carolina	( 96° F, 35.6° C)
Kitty Hawk, North Carolina	(100° F, 37.8° C)
Bismarck, North Dakota	( 95° F, 35.0° C)
Cincinnati, Ohio	( 92° F, 33.3° C)
Columbus, Ohio	( 92° F, 33.3° C)
Oklahoma City, Oklahoma	(100° F, 37.8° C)
Fort Sill, Oklahoma	(103° F, 39.4° C)
Roseburg, Oregon	( 97° F, 36.1° C)
Portland, Oregon	( 96° F, 35.6° C)
Erie, Pennsylvania	( 87° F, 30.6° C)
Philadelphia, Pennsylvania	( 94° F, 34.4° C)
Block Island, Rhode Island	( 81° F, 27.2° C)
Charleston, South Carolina	( 97° F, 36.1° C)
Columbia, South Carolina	( 96° F, 35.6° C)
Yankton, South Dakota	( 98° F, 36.7° C)
Nashville, Tennessee	( 93° F, 33.9° C)
Knoxville, Tennessee	( 92° F, 33.3° C)
San Antonio, Texas	( 98° F, 36.7° C)
Galveston, Texas	( 90° F, 32.2° C)
Salt Lake City, Utah	(102° F, 38.9° C)
Burlington, Vermont	( 88° F, 31.1° C)
Lynchburg, Virginia	( 96° F, 35.6° C)
Norfolk, Virginia	( 98° F, 36.7° C)
Olympia, Washington	( 90° F, 32.2° C)
Spokane Falls, Washington	( 96° F, 35.6° C)
Rivesville, West Virginia	( 98° F, 36.7° C)
Milwaukee, Wisconsin	( 90° F, 32.2° C)
La Crosse, Wisconsin	( 92° F, 33.3° C)
Cheyenne, Wyoming	( 95° F, 35.0° C)

The following are the highest temperatures observed during July 1889:<sup>120</sup>

Guanajuato, <i>Mexico</i>	( 83° F, 28.3° C)
Mexico City, <i>Mexico</i>	( 80° F, 26.7° C)
Topo Chico, <i>Mexico</i>	( 92° F, 33.3° C)
Mazatlan, <i>Mexico</i>	( 89° F, 31.7° C)
Leon de Aldamas, <i>Mexico</i>	( 88° F, 31.1° C) (now León, Guanajuato)
Zacatecas, <i>Mexico</i>	( 83° F, 28.3° C)
Montreal, <i>Canada</i>	( 88° F, 31.1° C)
New Westminster, British Columbia, <i>Canada</i>	( 90° F, 32.2° C)
Grand Turk Island, <i>West Indies</i>	( 84° F, 28.9° C)
Hamilton, <i>Bermuda</i>	( 83° F, 28.3° C)

In Fort Worth, Texas in the *United States* on 2 & 3 July 1889, heavy rain prevailed throughout the night, and on the evening of the 3<sup>rd</sup> the water which surrounded this place was the highest since 1866. The entire valley was flooded and covered with six feet of water. To the north the water extended two miles, and no railroads were above water except the Santa Fe. The loss to railroad and other property is at least \$1,500,000 [approximately \$36 million in present dollars using the Consumer Price Index (CPI)]. Crops have sustained serious damage. A small village, containing eighteen houses, four miles northeast Fort Worth, is completely washed away. In nearby Dallas, Texas, the rain of the past three days reached a climax on the afternoon of the 3<sup>rd</sup>, when for one hour the heaviest rain for three years occurred. The water, in tremendous volumes, rushed over the sidewalks and into the stores, causing large damage to stocks.<sup>120</sup>

In Rockport, West Virginia in the *United States* on 18 July 1889, a terrific thunderstorm, accompanied by torrents of rain and vivid lightning, passed over this section during the day. At Rockport 19.00 inches of rain was recorded in two hours and ten minutes, causing the Tygart Creek to rise at this point twenty-two feet in one hour. The village of Rockport was almost entirely swept away, and the estimated loss at this place alone reached \$75,000. The damage along Tygart Creek amounts to \$500,000, while the injury done on Tucker's Creek, Sandy and Slate Rivers was not less. A great many lives were reported lost in the flood. At Parkersburg, West Virginia owing to the heavy rains on the 18<sup>th</sup> and 19<sup>th</sup> the Little Kanawha River rose very rapidly during the 19<sup>th</sup> and 20<sup>th</sup>, carrying down the stream, during these two days, fully 50,000 logs and [railroad] crossties. Thirteen barges loaded with logs and [railroad] crossties sank at the mouth of the river on the 19<sup>th</sup>. Fourteen bridges, four of which were built of iron, were washed away in this county. The damage in this county alone is estimated at \$500,000, and this county has suffered less injury than Wirt, Jackson, or Roane counties. Morristown, a small village in Wirt County, was entirely swept away by the flood, leaving only the wreck of one house where the village once stood, and nineteen people are known to have been drowned.<sup>120</sup> [Overall the damage from these floods was around \$100 million in present dollars using CPI adjustments.]

Chicago, Illinois in the *United States* on 27 July 1889 was struck by a very destructive thunderstorm, accompanied by lightning and unusually heavy rain. From 7.06 p.m. to 10:40 p.m. a total of 4.02 inches of rain fell, which was the heaviest rainfall recorded here since the opening of the Signal Service station in 1870. Large hail fell in the southern and western portions of the city. The damage done by the storm in this city is estimated at over one million dollars [approximately \$24 million in present dollars using the Consumer Price Index (CPI)], and several lives were lost by falling buildings.<sup>120</sup>

A strong thunderstorm struck New Haven, Connecticut in the *United States* on 30 & 31 July 1889. The storm was accompanied by heavy rain, which continued at intervals from 1:35 p.m. on the 30<sup>th</sup> until 3:30 p.m. on the 31<sup>st</sup>. A total of 6.15 inches of rain fell during the 24 hours ending at 3:30 p.m. On the 31<sup>st</sup>, dams and bridges were carried away, and other casualties were caused by the flood in this region. Damage was estimated at \$1,000,000 [approximately \$24 million in present dollars using the Consumer Price Index (CPI)].<sup>120</sup>

In July and August 1889, there were destructive floods in *China* and *Japan*.<sup>90</sup>

During the summer of 1889 there was a drought in the western *United States*. The drought conditions can be observed by lack of rainfall, prevalence of forest fires, prevalence of sandstorms, and abnormally high summer temperatures.<sup>120</sup>

The following are reports of drought conditions in July 1889 in the western *United States*:<sup>120</sup>

\* Winnemucca, Nevada, on 19 July: reliable statements show that, in consequence of the prolonged drought, wheat sown last December yet remains in the ground plump and hard as when harrowed in. The ground was then dry, no rain having fallen for months, and it never has been moist enough since to sprout the grain. There are hundreds of acres sown to wheat and several acres sown to alfalfa, on the meadows, not one grain of which has sprouted, and the seed is apparently as sound as when it was sown. On the 30<sup>th</sup> there are distressing accounts of loss of cattle from the scarcity of water along the Humboldt River. From Humboldt House and this county, west, the water holes in the Humboldt River bed are lined with the decomposed carcasses of dead animals. The water in the sloughs and holes is impregnated with alkali, and when cattle, almost dying with thirst, reach there from the plains, they drink enough of poisonous water to kill them. A similar condition prevails on the Little Humboldt.

\* Fresno, California, on 31 July: the King's River, from where all the canals for irrigation in this section lead, is lower than it has been for seven years, and several of the large canals are closed. The water in this section is scarce.

\* Salt Lake City, Utah, on 31 July: the drought, which has prevailed during the entire month, continues. All vegetation in this section is withered, and the water is scarcely sufficient for household purposes.

\* Helena, Montana, on 31 July: the drought, which was already felt on the 30th of June last, has continued throughout this month, the amount of rainfall during the month being too small to be of any benefit. The crops in this section are completely ruined, some of them cannot even be cut for fodder, and the grass on the ranges has dried and blown away.

The following are reports of sandstorms in July 1889 in the western *United States*:<sup>120</sup>

\* San Carlos, Arizona: on 3 July there was a severe sandstorm that occurred between 7.25 a.m. and 11.30 a.m. The sand and dust were so thick as to obstruct the view, objects six feet distant were not discernible, and the furniture in closed houses were covered by a layer of sand and dust one-eighth inch in depth. Sandstorms were also reported at Fort McDowell, Arizona, on the 11<sup>th</sup>, and at Wilcox, Arizona, on the 6<sup>th</sup>, 12<sup>th</sup>, 28<sup>th</sup>, and 29<sup>th</sup>.

The following are reports of forest fires in July 1889 in the *United States*:<sup>120</sup>

\* Albina, Oregon, on 17 July: dangerous forest fires have been burning for the last week in this county and in the southern part of Washington Territory. The fires have caused losses, which will aggregate \$750,000. Showers of sparks and cinders are flying over this place.

\* Fort Assiniboine, Montana, on 28 July: forest fires are reported in the spurs of the Rocky Mountains west of this place.

\* Chico, California, on 29 July: forest fires are raging on the Humboldt Road, eighteen miles from this place. The fire has burned over a district four miles in length, and destroyed much valuable timber.

\* Fort Benton, Montana, on 29 July: forest fires are raging in the mountains and along the banks of the Missouri for many miles below here. The Northern Pacific track east of Livingston, Montana, was burned out for a short distance. Several mining camps have been deserted, and ranchers are plowing around their land to prevent the fire from spreading.

\* Glenwood Springs, Colorado, on 30 July: the forest fire which has been burning in this vicinity for several days past covers an area of over ten square miles. The air over the entire western slope is filled with smoke from the burning fires in the mountains.

\* Sierra City, California, on 30 July: large forest fires are raging in this region.

\* Gunnison, Colorado, on 30 July: for the last two or three days the mountains in this vicinity have been ablaze with burning timber. The fires are supposed to have started from sparks of locomotives.

\* Susanville, California, on 31 July: forest fires have been burning for the last two months to the north and west of this city, doing considerable damage to stock ranges and timber land.

\* Boise City, Idaho, on 31 July: extensive forest fires are reported in the mountains about forty-five miles north of this city. The fires have taken such proportions that the governor of the territory has requested aid from the Interior Department at Washington City [Washington D.C.] in extinguishing them.

\* Helena, Montana, on 31 July: there were extensive forest fires raging in this region for the past ten days, destroying what little grass was spared by the long and protracted drought.

\* Forest fires were also reported at: Red Bluff, California, northeast and west of this city, on the 12<sup>th</sup>, 13<sup>th</sup>; San Diego, California, on the 29<sup>th</sup>, 30<sup>th</sup>; Linkville, Oregon, on the 26<sup>th</sup>, 28<sup>th</sup>; Roseburg, Oregon, on the 27<sup>th</sup>, 31<sup>st</sup>; and Port Angeles, Washington, on the 19<sup>th</sup>.

The following are the highest temperatures observed during July 1889 in the western *United States*:<sup>120</sup>

Banghart's Stage Station, Arizona	(110° F, 43.3° C)
Casa Grande, Arizona	(116° F, 46.7° C)
Florence, Arizona	(111° F, 43.9° C)
Fort Lowell, Arizona	(111° F, 43.9° C)
Fort McDowell, Arizona	(117° F, 47.2° C)
Fort Mojave, Arizona	(120° F, 48.9° C)
Fort Verde, Arizona	(110° F, 43.3° C)
Gila Bend, Arizona	(112° F, 44.4° C)
Maricopa, Arizona	(115° F, 46.1° C)
Pantano, Arizona	(111° F, 43.9° C)
San Carlos, Arizona	(111° F, 43.9° C)
San Simon, Arizona	(110° F, 43.3° C)
Signal, Arizona	(114° F, 45.6° C)
Yuma, Arizona	(117° F, 47.2° C)

Anderson, California	(110° F, 43.3° C)
Athlone, California	(114° F, 45.6° C)
Bakersfield, California	(112° F, 44.4° C)
Beaumont, California	(113° F, 45.0° C)
Berendo, California	(113° F, 45.0° C)
Bishop Creek, California	(114° F, 45.6° C)
Borden, California	(114° F, 45.6° C)
Cactus, California	(122° F, 50.0° C)
Caliente, California	(112° F, 44.4° C)
Chico, California	(114° F, 45.6° C)
Colton, California	(114° F, 45.6° C)
Corning, California	(111° F, 43.9° C)
Delano, California	(112° F, 44.4° C)
Elmira, California	(110° F, 43.3° C)
Farmington, California	(110° F, 43.3° C)
Fort Gaston, California	(110° F, 43.3° C)
Fresno, California	(115° F, 46.1° C)
Fruto, California	(113° F, 45.0° C)
Goshen, California	(110° F, 43.3° C)
Indio, California	(114° F, 45.6° C)
Jolon, California	(114° F, 45.6° C)
Kingsburg, California	(112° F, 44.4° C)
La Grange, California	(110° F, 43.3° C)
Lemoore, California	(111° F, 43.9° C)
Lewis Creek, California	(110° F, 43.3° C)
Livingston, California	(110° F, 43.3° C)
Los Banos, California	(110° F, 43.3° C)
Mammoth Tank (Amos), California	(120° F, 48.9° C)
Mojave, California	(111° F, 43.9° C)
Needles, California	(119° F, 48.3° C)
Newhall, California	(112° F, 44.4° C)
Newman, California	(110° F, 43.3° C)
Orland, California	(112° F, 44.4° C)
Red Bluff, California	(110° F, 43.3° C)
Redding, California	(115° F, 46.1° C)
Rocklin, California	(113° F, 45.0° C)
Rumsey, California	(110° F, 43.3° C)
Sanger Junction, California	(116° F, 46.7° C)
San Fernando, California	(113° F, 45.0° C)
Seven Palms, California	(120° F, 48.9° C)
Susanville, California	(110° F, 43.3° C)
Tehama, California	(115° F, 46.1° C)
Traver, California	(111° F, 43.9° C)
Tulare, California	(113° F, 45.0° C)
Volcano Springs, California	(126° F, 52.2° C)
Williams, California	(115° F, 46.1° C)
Willow, California	(112° F, 44.4° C)
Winters, California	(110° F, 43.3° C)
Fort Lyon, Colorado	(109° F, 42.8° C)
Powder River, Montana	(106° F, 41.1° C)
El Dorado, Nevada	(119° F, 48.3° C)
Helleck, Nevada	(110° F, 43.3° C)
Hot Springs, Nevada	(115° F, 46.1° C)
Mill City, Nevada	(116° F, 46.7° C)
Palisade, Nevada	(110° F, 43.3° C)
Carlin, Nevada	(108° F, 42.2° C)



Blue Creek, Utah	(109° F, 42.8° C)
Kelton, Utah	(110° F, 43.3° C)
Saint George, Utah	(115° F, 46.1° C)

In August 1889, damaging drought was reported in sections of Montana, Dakota, Missouri, Kansas, Utah, Texas, Iowa, Michigan, Minnesota, Illinois, and Ohio in the *United States*.<sup>120</sup>

In August 1889, forest fires raged in California, Idaho, Washington, Michigan, Montana, Oregon and Wyoming in the *United States*. At Seattle, Washington, for several weeks, this region was clouded by smoke, caused by extensive forest fires in every direction. The entire eastern slope of the Cascade Mountains, from Natchez Pass north to the boundary was in flames. At Helena, Montana, destructive forest fires prevailed during the entire month of August. The fire consumed many million feet of lumber and thousands of acres of timber.

On 3 August 1889 near Mount Holly, New Jersey in the *United States*, the recent heavy rains which culminated in the terrific storms on the 1<sup>st</sup> and 2<sup>nd</sup> inflicted a great deal of damage on the farming community. The greatest injury was done in the valley of the Rancocas River, which had its source in the regions near Brown's Mills, and from that point to its mouth at Delanco River, the loss was heavy. Hundreds of acres of corn have either been washed out entirely or rendered worthless. A lake covering about ten or twelve acres spread south of Monroe Street, in Mount Holley, and in the business portion a ferry was established to convey people to dry places. At 2 a.m. the water reached the engine room of the electric light works, extinguishing the fires, and leaving the city in total darkness. A record of flood at this place, which has been kept for nearly one hundred years, shows that during this flood, the water rose ten inches higher than ever before known. The total loss to Burlington County, will exceed \$150,000 [\$3.6 million in today's dollars].<sup>120</sup>

On 6 August 1889 at Staunton, Virginia in the *United States*, the damage done by continuous rain, from Roanoke to Winchester, was distressing. Three quarters of the wheat crop was caught by the rain in the fields, causing it to sprout and grow in the shocks. Altogether these have been the most disastrous rains in the valley for twenty years, and the loss amounts to millions of dollars. Three-quarters of the hay was also been lost, and most of the oats sprouted as they stood unreaped.<sup>120</sup>

On 7 August 1889, a severe hailstorm struck near Aberdeen, South Dakota in the *United States* cutting a swath several miles through unharvested grain and causing great damage. The hailstones were 8 inches in circumference. On 14 August, at Woolwich, Pennsylvania, hailstones as large as hen's eggs fell, doing great damage to crops.<sup>120</sup>

On 9 August 1889, a very destructive rain storm visited Florence, Colorado in the *United States*, in the evening and continued over two hours, causing the Arkansas River to rise higher than ever before known. The streets in Florence were turned into rivers and people living in the northern portion were forced to leave their houses. The ranchmen living along the river suffered the loss of all their crops, besides horses and cattle, and many buildings have been wrecked. Every bridge spanning the river within ten miles of Florence has been washed away. Two miles below this place over three hundred yards of the *Atchison, Topeka, and Santa Fe Railway* were washed out, and the *Denver and Rio Grande* track was almost obliterated in places. Many dead horses and cattle, and thousands of railroad ties, were floating down the river. The loss to this locality was estimated at \$75,000 [\$1.8 million in today's dollars]. On the same evening at Pueblo, Colorado, a severe storm was the worst ever experienced in this vicinity. The water rose very rapidly in the Arkansas River during the night and on the morning of the 10<sup>th</sup>, a large portion of the city was flooded. Estimated damage in this city \$100,000 [\$2.4 million in today's dollars].<sup>120</sup>

On 21 August and 5-7 October 1889, there were great storms over the *United Kingdom* producing [ship]

wrecks with loss of life.<sup>97</sup>

The storm [hurricane] of 25-27 August 1889 off the coast of the *United States* apparently originated over or north of *Bahamas* and thence moved north of the thirty-fifth parallel where it dissipated. The storm was attended by gales of great violence.<sup>120</sup>

In September 1889, there was a great overflow of the Hoang-Ho or Yellow River [now called the Huang He River] in northern *China*.<sup>90</sup>

A storm advanced from the Windward Islands, West Indies, to the middle Atlantic coast of the *United States* from 3-12 September 1889. The storm produced very high tides and caused considerable damage along the New Jersey and western part of the Long Island coast.<sup>120</sup>

On 9-12 September 1889, a hurricane struck the mid-Atlantic coast of the *United States* causing 40 deaths.<sup>141</sup>

On 11-12 September 1889, there were easterly gales on the Atlantic coast of the *United States*. The storm produced many [ship] wrecks with loss of life off Long Island and New Jersey.<sup>97</sup>

A West Indian hurricane moved westward over the Caribbean Sea from 13-17 September 1889 and then apparently passed over Yucatan and recurved to the north central coast of the Gulf of Mexico by the 22<sup>nd</sup>. On the 18<sup>th</sup>, the storm devastated the coast of Campeche, *Mexico*. "A full report of the great cyclone on Carmen Island, off the coast of Campeche has been received. The cyclone started about 2 o'clock on the afternoon of the 18<sup>th</sup> ultimo, and was heralded by a rapidly falling barometer. It did not, however, gain its full strength until night. The wind then shifted from the west to due south with an impetuosity that caused the vessels in the Carmen harbor to drag their anchors. Masts were snapped and sails torn in shreds. The following morning the shores were strewn with wreckage, there being only one vessel, the *Jova Del Lobregat* that weathered the great gale out of thirty-five vessels of all kinds in the port. When the storm commenced all of the schooners that had sought refuge at a point called Quintilla were also wrecked. The hurricane uprooted great trees, which fell upon houses in Carmen, destroying in all over one hundred and damaging two hundred and fifty others. The big extract factory, the Parochial Church, and the new hospital were seriously damaged. The authorities are now busily engaged in removing the trees from the streets and searching the ruins for dead bodies. So far only one death from the storm is reported, the captain of the brigantine *Enrique*, Mr. R. Alcali, who was killed on the shore. The losses occasioned in the city by the storm are estimated at \$500,000. News of great destruction to other towns near Carmen is now coming Pariscada and Partido have suffered the loss of many houses. In the vicinity of the last named town all crops are a complete loss. In Aquada de Porto Real, all the houses, with the exception of four, were destroyed by trees falling upon them. With the reports so far received the loss will not fall short of \$1,000,000." [In present currency, that would be equivalent to \$24 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>120</sup>

In September 1889, droughts were reported in Iowa, South Dakota, Maine, Alabama, Ohio and Michigan in the *United States*. On the 17<sup>th</sup> at Montgomery, Alabama: the weather for some days has been very dry and hot. Through the country there was considerable complaint on account of the scarcity of water. The mills operated by steam and water power were unable to make full time for lack of water. The drought seems to be particularly severe in the country along the Western Railroad, as the passenger trains on the road were delayed quite frequently because of the shortage in the water supply.<sup>120</sup>

In September 1889, forest fires were reported in South Dakota, Michigan, Colorado, Montana, California and Washington in the *United States*. Prairie fires were reported in North and South Dakota.<sup>120</sup>

— On the 4<sup>th</sup> at East Saginaw, Michigan reported fires raging in the pine forests, and that some of the lumber camps were in danger. About 1,000,000 feet of standing pine have been consumed.

— On the 10<sup>th</sup> at Breckenridge, Colorado, severe forest fires were raging in this county. The entire town of Chihuahua, in the northeastern portion of this county, was consumed by fire.

— On the 11<sup>th</sup> at Helena, Montana, extensive forest fires were reported in the vicinity of Georgetown, Deer Lodge County. Hundreds of men were fighting the fires, but so far they had been unable to check the flames.

— On the 26<sup>th</sup> at Santa Ana, California, fires were burning for the past two days and still continue in the canyons. The burned and burning district now extends one hundred miles from north to south, and was from ten to eighteen miles in width. Over \$1,000,000 worth of pasturage and timber was destroyed [\$24 million in today's currency].

— On the 26<sup>th</sup> at Santa Barbara, California in the upper part of Santa Barbara County, it was estimated that \$200,000 worth of property [\$5 million in today's dollars], including timber and feed, were destroyed during the past week.

On 23 September 1889, 29 vessels were wrecked in Delaware Bay in the *United States*, about 31 lives lost.<sup>97</sup>

During October 1889, damaging drought was general throughout Alabama, Louisiana, Michigan, and Minnesota, in east-central Texas, northern South Carolina, northeastern Indiana and Illinois, northern Iowa, and northwestern Ohio and Wisconsin in the *United States*. In many areas the ground was too dry and hard for planting; wells and cisterns were drying up; the stages of water in rivers were very low and some rivers were completely dry; farmers were driving cattle several miles to obtain water or buying barrels of water for their stock.<sup>120</sup>

On 7 October 1889, destructive gales prevailed over and near the *British Isles*, and the barometer fell to 28.70 inches (729 millimeters) over *Scotland*. On the 7<sup>th</sup>, many shipwrecks were reported and the coasts were strewn with wreckage. From this date until the 10<sup>th</sup>, stormy weather prevailed in that region, and on the 9<sup>th</sup>, the barometer fell below 28.80 inches over the more northern parts of Great Britain.<sup>120</sup>

On 7 October 1889, terrific gales swept over the *British Isles*, causing many shipwrecks. In the northern parts of England and Ireland many houses were demolished and numerous trees uprooted, and the barometer fell below 28.70 inches (729 millimeters) over *Scotland*.<sup>119</sup>

On 7 October 1889, there was a great storm on the island of Sardinia off the west-central coast of *Italy*.<sup>97</sup>

On 14-16 October 1889, gales of great violence, attaining hurricane force at sea occurred along and off the Atlantic coast from the south New England coast to the Carolinas in the *United States*. This storm caused considerable loss and damage to shipping.<sup>120</sup>

On 26-27 October 1889, there was a destructive storm on the coast of Carolina, in the *United States*.<sup>97</sup>

On 11-13 November 1889, a severe storm on the North Atlantic Ocean prevailed over and near the Banks of Newfoundland, *Canada*, and over mid-ocean on the 14<sup>th</sup>, when gales of hurricane force were reported.<sup>120</sup>

In December 1889, heavy and continuous rains caused destructive floods in California and parts of Nevada and Arizona in the *United States*. On the 12<sup>th</sup>, the Sacramento River at Sacramento, California, was the highest ever known, the gauge reading being twenty-six feet eleven and one-half inches. The levee opposite Sacramento broke, flooding a great part of Yolo County. Colusa County sustained greater damage than any of the surrounding sections, on account of the extensive grain fields in that county, which were washed out. At Los Angeles, California, the heavy rains previous to the 15<sup>th</sup> caused considerable damage to the railroads, and the train service of the *Southern Pacific* and *Santa Fe* systems was interrupted by washouts. The *Southern Pacific Railroad* suffered severely on the deserts west of

Yuma, Arizona, where a storm of unusual severity prevailed. Traffic was interrupted on the Santa Fe road by landslides in Cajon Pass, and all communication was cut off from San Diego, on the coast line, by washouts. The bridges on the *California Southern Railroad* between Santa Ana and Los Angeles were washed away on the 23<sup>rd</sup>. At Los Angeles the heavy rains from the 22<sup>nd</sup> to 26<sup>th</sup> caused considerable damage; streets were badly washed and the railroad bridges were generally destroyed. The Los Angeles River changed its channel south of the city, flooding the surrounding country. At Red Bluff, California, the high water, resulting from continuous rains previous to the 14<sup>th</sup>, was very destructive to bridges, etc. Reports state that in Tehama County the damage to public property will amount to \$40,000, while individual losses will aggregate \$250,000 [\$6 million in today's dollars], and that adjoining counties to the south suffered even greater injury from high water. The Rio Virgin River rose so high in the southern part of Lincoln County, Nevada, under the unprecedented rainfall, that it overflowed its banks in many places and changed its course, washing away everything in its path. Lake Tahoe was reported as having risen twelve inches. On the 5<sup>th</sup> the Salt and Verde rivers, in Arizona, rose very rapidly, and at Fort McDowell the Verde River overflowed its banks, flooding the adjacent lowlands. On the 6<sup>th</sup>, at Fort Verde, Arizona, the Verde River was higher than it has been during the last fifteen years, and considerable damage was caused along the river by the inundation of alfalfa fields, washing out of dams, etc.<sup>120</sup>

In 1889 in *Australia*, severe floods took place in Victoria.<sup>101</sup>

*Also refer to the section 1887 A.D. – 1889 A.D. for information on the famine in China and Asia Minor during that timeframe.*

*Also refer to the section 1889 A.D. – 1892 A.D. for information on the famine in India, Russia, Japan, Hungary and Montenegro during that timeframe.*

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**Winter of 1889 / 1890 A.D.** East of the Rocky Mountains in the *United States* and south of the Great Lakes, December 1889 was one of the warmest and driest Decembers in the history of the Signal Service, while in parts of southern California, the reverse of these conditions occurred with great rainfalls and low mean temperatures.<sup>120</sup>

The winter of 1889-90 over the greatest part of the *United States* east of the Mississippi River was one of the warmest on record.<sup>119</sup>

The winter of 1889-90 in Bradford County, Pennsylvania in the *United States* was open and warm. At Christmas, grass was as green as in summer. There was not a cold day until the 22<sup>nd</sup> of January. There was a snowstorm on the 7<sup>th</sup> of February. But there was no sleighing until the first week in March, when it turned cold, freezing the Susquehanna River over and a poor crop of ice was harvested. This was the only week of real winter. Bluebirds appeared on the 27<sup>th</sup> of February. Gardening and farming began early, although during the first two-thirds of May, it rained continually with little sunshine.<sup>178</sup>

On 4-6 November 1889, a heavy snowstorm prevailed in eastern Colorado, western Kansas, northeastern New Mexico, and extreme northern Texas in the *United States*. The snow was attended by low temperature and high wind, and caused loss of life and considerable damage to livestock. The snowfall was variously reported from one to two feet deep in northeastern New Mexico and adjacent parts of Colorado and Texas, and the drifts were sufficiently deep to seriously interfere with railroad traffic. Mr. M.A. Upson, describes this storm:<sup>120</sup>

— The snow storm and blizzard along the line of the Pan Handle of Texas and the eastern line of New Mexico, on the 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> of November, 1889, although giving the heaviest fall of snow ever known this far south in the valley of the Rio Pecos, was comparatively light at this place, and there was but one portion of the day, on the 7<sup>th</sup>, that was excessively cold, the temperature falling to 12° F. The weight of the storm in New Mexico fell on Colfax and Mora counties, in the extreme northeast of the territory, though it was more severe across the line in Texas. Crossing the Rio Pecos, east, the first bench of the plains, some fifty miles, like our valley, is protected by

mountains on the north and west, and by the San Juan Range. As you reach the second bench the ascent is rapid until you reach an extensive flat "mesa" (table) where commences the Staked Plains (Llano Estacado). This "mesa" is literally unprotected from north, east, and northeast winds for hundreds of miles. Blasts from the north and east gather force, and, by the time they reach the thirty-seventh parallel of latitude, they are often charged with frost, sleet, hail, and snow, killing to men and stock. In the storm of November the cowboys lost their lives at a point over two hundred miles from this place. Stock drifted before the storm and hundreds were driven in on to the Pecos. However, this year they were in good condition and the loss was not as heavy as was anticipated. Stock is always fat on the plains, and stock belonging on the river, which had strayed to the plains, fared the worst. As I said before, although severe, the severity and results of this storm have been very much exaggerated in public reports. The men who lost their lives were brave; they were holding beef cattle for shipment only a few miles from settlements when the herds commenced to drift, and it would have been easy to leave them to their fate and seek their own safety; but faithful to their employers, they tried to hold the stock together, and stayed with them until all trails were obliterated; blinding snow, driven with all the velocity of a Texas "norther", obscured air, earth, and sky, and experienced plainmen as they were, they were as helpless as babes. The courage and devotion of cowboys in the interests of their employers is little appreciated in the East. Hundreds of them have died at their posts within my twenty-six years experience in New Mexico.

On 26 November 1889, a storm appeared on the Texas coast of the *United States*, moved northeastward to the lower Great Lake region by the 27<sup>th</sup>, attended in the Mississippi and Missouri valleys by rain or snow. During the 27<sup>th</sup> and 28<sup>th</sup>, the storm increased in strength and swept eastward over the lower lake region, New York, and the Saint Lawrence Valley, attended by snow in the Lake region and the Ohio Valley and Tennessee, heavy rain in New York and New England, destructive gales on the lakes and in the Saint Lawrence Valley and New England, and a heavy snow storm, the first of the season, in the Province of Quebec, *Canada*. A number of vessels were wrecked near Sault de Sainte Marie, Michigan. At Green Bay, Wisconsin, many disasters were reported on the lake because the wind reached speeds of 60 miles per hour combined with snow. The winds caused very high seas on Lake Michigan and as a result a large number of vessels, with valuable cargoes, were ashore near "the straits", and several serious disasters occurred off Chicago, Illinois.<sup>120</sup>

The greatest depth of snowfall reported in the *United States* in December 1889 was 81 ½ inches at Tuscarora, Nevada. In northeastern California and northwestern Wyoming it exceeded sixty inches; in extreme northern Idaho, forty inches; in southwestern Colorado, extreme northern Michigan, and east-central Washington, thirty inches; in northwestern Minnesota, extreme western Montana, southwestern Utah, and northeastern Wisconsin, twenty inches. In the Sierra Nevada Mountains the railroads were blockaded for several days by snow, which drifted to a depth of eighteen to twenty six feet, and in some of the canyons of Ormsby, Washoe, Lander, and Humboldt counties, Nevada, snow was reported packed in depths from twenty to over one hundred feet.<sup>120</sup>

On 12 January 1890, a storm passed over Saint Louis, Missouri in the *United States*. The storm was preceded by thunder and lightning, and accompanied by heavy rain which lasted about three minutes. In the path of the storm three persons were killed, several injured, and about one hundred houses blown down or damaged. Crossing the Mississippi River the storm reached Brooklyn, Illinois where it caused considerable damage. At about the same time, a storm struck Clinton, Kentucky, killing ten persons, injuring upward of fifty others, and doing immense damage to buildings, many of the smaller of which were lifted bodily from their foundations. The path of the storm at Clinton was about three hundred yards wide. Great destruction was also caused at other places in western Kentucky, notably at Wickliffe and Moscow.<sup>119</sup>

On 12 January 1890 a heavy snow storm, with high wind and falling temperature, prevailed over Minnesota, the Dakotas, Nebraska, Kansas, and Iowa in the *United States*, and caused a general blockade of the railroads from Minnesota and the Dakotas southwestward over Kansas. On the 12<sup>th</sup> and 13<sup>th</sup>, the storm along the lower lakes and on Lake Huron was one of the severest in many years, and was attended



by fatalities and great destruction of property. The heaviest snow blockade ever known on the *Central Pacific Railroad* occurred during the latter half of January, when about 120 miles of the railroad crossing the summit of the Sierra Nevada Mountains was blockaded. In the northern counties of Nevada the excessive snowfall caused great loss of livestock. At stations in north Montana, north Nevada, and California the month was the coldest January on record. In the early part of the month floods destroyed millions of dollars worth of property in south Missouri, east Arkansas, and north and east Texas. In the latter part of the month floods, resulting from melting snow, caused great damage in north California. A remarkable feature of the month was the enormous quantity of Arctic ice encountered near Newfoundland and the Grand Banks, where, as a rule, but little ice is encountered in January.<sup>119</sup>

On 13 January 1890, a very severe storm struck Buffalo, New York in the *United States*. The wind attained a maximum velocity of ninety miles per hour. Great damage was caused to property in the city and vicinity, and the water in Lake Erie reached a height 7.6 feet above the mean water mark at 2:30 p.m. on the 13<sup>th</sup>, flooding that portion of the city called "the Island." [Grand Island?]<sup>119</sup>

The following are the lowest temperatures observed during January 1890 in the *United States*:<sup>119</sup>

Montgomery, Alabama	( 29° F, -1.7° C)
Mobile, Alabama	( 33° F, +0.6° C)
Juneau, Alaska	( -4° F, -20.0° C)
Tucson, Arizona	( 24° F, -4.4° C)
Yuma, Arizona	( 30° F, -1.1° C)
Little Rock, Arkansas	( 21° F, -6.1° C)
Fort Smith, Arkansas	( 14° F, -10.0° C)
San Francisco, California	( 36° F, +2.2° C)
San Diego, California	( 35° F, +1.7° C)
Fresno, California	( 24° F, -4.4° C)
Denver, Colorado	( -8° F, -22.2° C)
Pueblo, Colorado	( -2° F, -18.9° C)
Gunnison, Colorado	(-39° F, -39.4° C)
New Haven, Connecticut	( 10° F, -12.2° C)
New London, Connecticut	( 14° F, -10.0° C)
Kirkwood, Delaware	( 18° F, -7.8° C)
Washington, D.C.	( 19° F, -7.2° C)
Pensacola, Florida	( 36° F, +2.2° C)
Key West, Florida	( 65° F, +18.3° C)
Augusta, Georgia	( 29° F, -1.7° C)
Savannah, Georgia	( 32° F, 0.0° C)
Soda Springs, Idaho	(-31° F, -35.0° C)
Lewiston, Idaho	( -9° F, -22.8° C)
Chicago, Illinois	( -5° F, -20.6° C)
Cairo, Illinois	( 17° F, -8.3° C)
Indianapolis, Indiana	( 4° F, -15.6° C)
Lafayette, Indiana	( -3° F, -19.4° C)
Dubuque, Iowa	(-16° F, -26.7° C)
Keokuk, Iowa	( -5° F, -20.6° C)
Topeka, Kansas	(-10° F, -23.3° C)
Dodge City, Kansas	( -3° F, -19.4° C)
Louisville, Kentucky	( 14° F, -10.0° C)
Lexington, Kentucky	( 14° F, -10.0° C)
New Orleans, Louisiana	( 36° F, +2.2° C)
Shreveport, Louisiana	( 26° F, -3.3° C)
Eastport, Maine	(-18° F, -27.8° C)
Portland, Maine	( -3° F, -19.4° C)
Baltimore, Maryland	( 20° F, -6.7° C)



Boston, Massachusetts	( 8° F, -13.3° C)
Nantucket, Massachusetts	( 17° F, -8.3° C)
Marquette, Michigan	( -6° F, -21.1° C)
Detroit, Michigan	( 5° F, -15.0° C)
Saint Vincent, Minnesota	(-38° F, -38.9° C)
Saint Paul, Minnesota	(-22° F, -30.0° C)
Pokegama Falls, Minnesota	(-38° F, -38.9° C)
Vicksburg, Mississippi	( 28° F, -2.2° C)
Saint Louis, Missouri	( 8° F, -13.3° C)
Martindale, Montana	(-42° F, -41.1° C)
Helena, Montana	(-23° F, -30.6° C)
North Platte, Nebraska	(-12° F, -24.4° C)
Omaha, Nebraska	(-14° F, -25.6° C)
Winnemucca, Nevada	(-23° F, -30.6° C)
Carson City, Nevada	(-22° F, -30.0° C)
West Milan, New Hampshire	(-21° F, -29.4° C)
New Brunswick, New Jersey	( 21° F, -6.1° C)
Cape May, New Jersey	( 18° F, -7.8° C)
Santa Fe, New Mexico	( 2° F, -16.7° C)
Albany, New York	( 6° F, -14.4° C)
New York City, New York	( 15° F, -9.4° C)
Charlotte, North Carolina	( 25° F, -3.9° C)
Highlands, North Carolina	( 11° F, -11.7° C)
Bismarck, North Dakota	(-35° F, -37.2° C)
Gallatin, North Dakota	(-40° F, -40.0° C)
Cincinnati, Ohio	( 10° F, -12.2° C)
Columbus, Ohio	( 9° F, -12.8° C)
Fort Sill, Oklahoma	( 12° F, -11.1° C)
Roseburg, Oregon	( 21° F, -6.1° C)
Portland, Oregon	( 12° F, -11.1° C)
Erie, Pennsylvania	( 13° F, -10.6° C)
Philadelphia, Pennsylvania	( 19° F, -7.2° C)
Block Island, Rhode Island	( 14° F, -10.0° C)
Charleston, South Carolina	( 36° F, +2.2° C)
Columbia, South Carolina	( 27° F, -2.8° C)
Yankton, South Dakota	(-22° F, -30.0° C)
Nashville, Tennessee	( 20° F, -6.7° C)
Knoxville, Tennessee	( 24° F, -4.4° C)
San Antonio, Texas	( 25° F, -3.9° C)
Galveston, Texas	( 35° F, +1.7° C)
Salt Lake City, Utah	( -2° F, -18.9° C)
Burlington, Vermont	(-12° F, -24.4° C)
Lynchburg, Virginia	( 23° F, -5.0° C)
Norfolk, Virginia	( 25° F, -3.9° C)
Olympia, Washington	( 7° F, -13.9° C)
Spokane Falls, Washington	(-23° F, -30.6° C)
Pleasant Hill, West Virginia	( 6° F, -14.4° C)
Milwaukee, Wisconsin	(-10° F, -23.3° C)
Neillsville, Wisconsin	(-36° F, -37.8° C)
La Crosse, Wisconsin	(-23° F, -30.6° C)
Cheyenne, Wyoming	( -2° F, -18.9° C)

The following are the lowest temperatures observed during January 1890: <sup>119</sup>

Guanajuato, <i>Mexico</i>	( 38° F, 3.3° C)
La Logia, <i>Mexico</i>	( 41° F, 5.0° C)
Topo Chico, <i>Mexico</i>	( 54° F, 12.2° C)

Leon de Aldamas, <i>Mexico</i>	( 41° F, 5.0° C ) (now León, Guanajuato)
Zacatecas, <i>Mexico</i>	( 31° F, -0.6° C )
Grand Turk Island, <i>West Indies</i>	( 78° F, 25.6° C )
Hamilton, <i>Bermuda</i>	( 50° F, 10.0° C )

Vast fields of Arctic ice and enormous icebergs were encountered over and near the Grand Banks of *Newfoundland* north of the forty-third parallel throughout a greater part of January 1890. By March it became apparent that the enormous and probably unparalleled quantity of Arctic ice encountered to the eastward and southeastward of Newfoundland during the past winter indicates that there was an abnormally heavy flow of ice from Greenland waters and an unusually open season in the Arctic regions during the summer of 1889. The winter was unusually cold in Newfoundland and vicinity, which condition resulted in an enormous accumulation of field ice along the Newfoundland and Labrador coasts, which was broken away by heavy gales, and the formation of unusually heavy ice in the Gulf of Saint Lawrence.<sup>119</sup>

During the winter of 1889-90, the rivers in the *United States* froze later in the season and to a much lesser degree than normal. The depth that rivers and lakes froze in January 1890:<sup>119</sup>

- \* At Alpena, Michigan, *Thunder Bay and Thunder River* froze over on the 16<sup>th</sup>.
- \* At Machias, Maine, the *Machias River* was closed to navigation by ice on the 12<sup>th</sup>.
- \* At Biddeford, Maine, the *Saco River* was closed to navigation by ice during the night of 31 December 1889. The shipping season was reported the longest ever known at that place.
- \* At Sault Sainte Marie, Michigan, the *Saint Mary's River* froze over for the first time this season on the 9<sup>th</sup>.
- \* At Davenport, Iowa, the *Mississippi River* froze over on the 16<sup>th</sup>.
- \* At Kansas City, Missouri: an ice gorge in the *Missouri River* at, and above, Saint Joseph during the early part of the month, lowered the stage of the water at Kansas City to a point about two feet below the record, exposing the main suction pipe of the water works. Floating ice in river, 28<sup>th</sup>, 29<sup>th</sup>, and 30<sup>th</sup>.

In January 1890, vast fields of ice and enormous icebergs were encountered over and near the Grand Banks, north of the forty-third parallel [off Newfoundland, *Canada*].<sup>116</sup>

On 12 January 1890, there were destructive storms in the western *United States*. These storms struck Canada on 14 January 1890.<sup>97</sup>

On 17-27 January 1890, there was a destructive gale with loss of life in the Atlantic and on British coast, especially southern and southwestern *England*. This gale produced high tides and floods.<sup>97</sup>

On 23-24 January 1890, there was a destructive storm on the continent from Paris, *France* to Vienna, *Austria*. [There were 68 British wrecks and 67 lives lost in January 1890.]<sup>97</sup>

February 1890 was the warmest February on record in the Atlantic coast and Gulf States, and in areas in the Ohio Valley and Tennessee in the *United States*. A cold wave the latter part of the month caused great loss of livestock on the ranges in east Oregon and northeast Nevada. The great depth of snow in the cuts along the hue of the *Central Pacific Railroad* crossing the summit of the Sierra Nevada Mountains caused serious interruption to the train service. [Because of the unseasonably warm temperatures,] Lakes Erie and Lake Huron were reported practically open to navigation.<sup>119</sup>

In March 1890, cold waves of unprecedented seasonal severity swept over the southern and southeastern states of the *United States* during the first and middle parts of March, and on the 2<sup>nd</sup>, the heaviest snowstorm in the history of that weather station occurred at Charleston, South Carolina.<sup>119</sup>

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#### 1890 A.D. – 1900 A.D. South Africa. Drought

During 1890-1900, *South Africa* experienced drought conditions.<sup>167</sup>

— On 12 February 1896, the Standard Bank Archives recorded, “A severe and protracted Drought has prevailed [1890-1896], affecting Namaqualand, portions of the T.V.L. (Transvaal), the Free State and nearly the whole of Cape Colony.” “The disastrous effects of drought combined with the serious havoc wrought by locust, have impoverished large areas of the country, and distress in some districts is already acute.”

— At Herschel Area, “Between 1895 and 1899, peasant production in this district was disrupted by droughts, locusts and rinderpest. Here, as elsewhere, numerous Africans were reduced to the most severe poverty – thousands left the district in search of work, while others stayed, living on edible weeds.”

— In 1895 at Cape Colony, “A severe and protracted Drought has prevailed affecting Namaqualand, portions of the T.V.L., the Free State and nearly the whole of Cape Colony, and although partial rains have fallen, they came to late to prevent distress and disaster. Sheep and cattle are generally in poor condition, and in several districts insolvencies among the farming community are already occurring on an unusual scale.”

— In 1897 at Shiloh, “for seven months not enough rain has fallen to lay the dust.”

— In 1899 at Cape Colony, “King Williamstown, Maraisburg, Victoria West and many other parts of the Cape Colony, have also suffered severely from Drought, and in the generally fertile district of Oudtshoorn, the crops are not only in consequence far below average but the inhabitants are in serious straits for want of water.”

— In 1899 at Cape Colony, “The Beaufort West, Oudtshoorn, George, Swellendam and King Williamstown districts have suffered somewhat from Drought, and those of Jansenville, Alice and Fort Beaufort very severely. In the Alice district, the crops are entirely lost, the drought being reported as the worst since 1877, while at Fort Beaufort, the Kat River ceased flowing for the first time in 50 years.”

**1890 A. D.** In early February 1890, there were disastrous floods on the upper River Severn in *Wales*, which caused much suffering.<sup>90</sup>

In February 1890, destructive floods occurred in west Oregon and north California in the *United States* in the early part of the month. Great damage was caused by the overflow of streams in Ohio and west Kentucky. The Verde and Gila Rivers in Arizona, overflowed their banks, and a large storage dam on the Hassayampa River, Arizona, gave way, causing loss of life and destruction of property.<sup>119</sup>

In March 1890 in *Australia*, there were several floods. Brisbane in Queensland experienced severe floods. In New South Wales, the north coastal rivers flooded, along with the Darling River and the rivers in southwest regions of Western Australia.<sup>101</sup>

The Mercury Newspaper of 17 March 1890 reported, “During the time the Brisbane River was in high flood, many of the wharves were submerged, and boats were plying along Stanley Street, the main thoroughfare of South Brisbane, Australia. The suburbs were mostly under water. On Monday a terrific sea was running off Cape Moreton, and fears were entertained for the safety of the Comtoyuroa Lighthouse. At Moreton Bay the floods, which lasted through Monday, Tuesday, Wednesday, and Thursday, were the most disastrous ever known. Almost the whole of South Brisbane has been submerged to a depth of 10 feet, and hundreds of houses were utterly submerged. Boats were plying in the streets day and night to render assistance.”<sup>158</sup>

In March 1890, a great flood prevailed in the lower Mississippi valley of the *United States*, and at most of the important points along the lower Mississippi river the water was the highest ever known. Flood conditions also prevailed along the Ohio River and its tributaries.<sup>119</sup>

About 13 March 1890, there were destructive floods caused by heavy rains in the Mississippi valley and Southern States in the *United States*.<sup>90</sup>

In March 1890, there was a great flood in the lower Mississippi valley in the *United States*.<sup>119</sup>

In March and April 1890, the Mississippi River in the *United States* flooded. The Mississippi valley suffered much by frequent inundations. This flood was very disastrous. Thousands of square miles were

submerged, many towns isolated, and communications cutoff. Louisiana suffered much in April 1890.<sup>97</sup>

On 27 March 1890, There were tornadoes in the Ohio valley in the *United States*, from Cincinnati to Cairo; very great destruction at Louisville, where about 93 persons perished; many places in Illinois, Missouri and Indiana, suffered greatly; total loss of life about 175 people.<sup>97</sup>

On 27 March 1890, a tornado struck Louisville, Kentucky in the *United States*. Louisville's loss of life was placed at 125 at the time, and its property loss at \$2,500,000. [In present currency, that would be equivalent to \$68 million in damages based on the Consumer Price Index (CPI) inflation rates.] The tornado cut a broad path through the city, its width, in the course of greatest destructiveness, being fully 1,000 feet [305 meters].<sup>197</sup>

On 27 March 1890, a group of tornadoes struck Kentucky, southern Indiana, southern Illinois, and southeastern Missouri in the *United States*. The most destructive of this group occurred in Kentucky, where upwards of one hundred lives were lost, and property to the value of about \$4,000,000 was destroyed [approximately \$100 million in present dollars using the Consumer Price Index (CPI)]. In Louisville alone, the loss of life was seventy-six, and many persons were injured, and the losses to property aggregated about \$2,500,000. In Indiana the severest storms occurred in the extreme southern part of the state at Jeffersonville. This tornado then crossed over the Ohio River and struck Louisville. In Illinois seven lives are known to have been lost, many persons were injured, and the damage to property amounted to at least \$200,000. In southeastern Missouri four lives were lost, while the reported damage to property was not heavy. In Tennessee severe windstorms caused the loss of several lives, and the damage to property was very great. Destructive wind and hailstorms prevailed on this date from the Rocky Mountains eastward over the Ohio Valley and Lake region, but no lives were lost west of the Missouri River.<sup>119</sup>

In April 1890, the great flood in the lower Mississippi valley in the *United States* continued. Among the more important crevasses [levee breaks], which occurred were those at Catfish Point, Mississippi, at the Opossum Fork levee, and at the great Morganza levee. At the close of the month not less than 15 parishes, or about one-fourth of the state of Louisiana, had been affected by the flood; about 10,000 acres had been inundated in Mississippi by the Austin crevasse which occurred March 30<sup>th</sup>: and on the Arkansas side of the river about 10,000 acres had been inundated. Water from the Nita crevasse, which occurred March 13<sup>th</sup>, had found its way into Lake Pontchartrain by means of the Manchac Passes.<sup>119</sup>

On 18-20 April 1890, the town of Bourke in *Australia* was temporarily submerged by the rising of the Upper Darling River. This flood was caused by heavy rainfall. There was much property damaged but no loss of life.<sup>97</sup>

From April to October 1890, there were widespread floods in Queensland, New South Wales and South Australia regions of *Australia*. Very high flood levels were recorded along the Darling River and its tributaries and the Murray River. Nine people were drowned and 50 people injured. Approximately ten thousand sheep were lost. Transport and communications were severely disrupted in western New South Wales and South Australia for months.<sup>99</sup>

In May 1890, the flood along the lower Mississippi River in the *United States* subsided gradually. A rise in the Red River caused the overflow of a considerable extent of country in northwest Louisiana and southwest Arkansas. Damaging floods occurred in Ontario, *Canada*; along the Brazos River, Texas; in central New York and northeast Pennsylvania; along the Willamette River, Oregon; along the upper Potomac River; in Fresno and Tulare counties, California; and along the Carson River, Nevada. A noteworthy tornado occurred at Akron, Ohio, on May 10<sup>th</sup>.<sup>119</sup>

On 4 May 1890, there was a cyclone [tornado] in Texas in the *United States*, much destruction, 15 persons killed.<sup>97</sup>

On 28-29 May 1890, a hurricane struck *Cuba*. There were a good number of drownings. Firemen, marines, and civil guard teams were sent from the capital. A good number of these [rescue] crews lost their lives.<sup>141</sup>

In June 1890, the lower Mississippi river fell below the danger line at New Orleans, Louisiana in the *United States*, on the 12<sup>th</sup>, and continued to fall slowly during the month. Floods were reported along the Carson River, Nevada, in Ontario, *Canada*, in central New York, northern Illinois, and southern Wisconsin. Drought injured crops and vegetation in areas in the south Atlantic and Gulf states, and in the lower Missouri valley. Destructive tornadoes occurred at Bradshaw, Nebraska, and at Lee, Livingston, and Pratt counties in Illinois.<sup>119</sup>

In June 1890, Kansas in the *United States* experienced very warm temperatures including: Collyer (120° F), Eureka Ranch (116° F), Freemont (110° F), Gove City (111° F), Grinnell (112° F), Havensville (110° F), Monument (110° F), Oakley (110° F), Quinter (110° F), and Weskan (110° F).<sup>119</sup>

On 3 June 1890, a tornado struck Bradshaw, Nebraska in the *United States*. Twelve persons were killed and many more injured. The damage to property was estimated at \$108,800 [\$2.6 million in today's dollars], not including the loss in livestock.<sup>119</sup>

On 7 June 1890, a tornado with large hail and heavy rain struck Lebanon, South Dakota in the *United States*, causing great destruction to buildings and crops. During the storm, the Little Cheyenne River rose 25 feet in 30 minutes, drowning 9 persons and destroying considerable property.<sup>119</sup>

On 20 June 1890, a tornado struck Lee County, Illinois in the *United States* about 3½ miles south of West Brooklyn. Twelve persons were killed and the loss of property was estimated at \$200,000 [\$4.8 million in today's dollars].<sup>119</sup>

On 20 June 1890, a tornado struck in Lee County, Illinois in the *United States*, 15 deaths.<sup>97</sup>

The following are the highest temperatures observed during July 1890 in the *United States*:<sup>119</sup>

Montgomery, Alabama	( 97° F, 36.1° C)
Mobile, Alabama	( 96° F, 35.6° C)
Tucson, Arizona	( 99° F, 37.2° C)
Yuma, Arizona	(115° F, 46.1° C)
Little Rock, Arkansas	( 97° F, 36.1° C)
Fort Smith, Arkansas	(101° F, 38.3° C)
San Francisco, California	( 80° F, 26.7° C)
San Diego, California	( 80° F, 26.7° C)
Fresno, California	(111° F, 43.9° C)
Denver, Colorado	( 97° F, 36.1° C)
Pueblo, Colorado	(100° F, 37.8° C)
New Haven, Connecticut	( 91° F, 32.8° C)
New London, Connecticut	( 88° F, 31.1° C)
Washington, D.C.	( 98° F, 36.7° C)
Pensacola, Florida	( 97° F, 36.1° C)
Key West, Florida	( 89° F, 31.7° C)
Augusta, Georgia	( 99° F, 37.2° C)
Savannah, Georgia	( 94° F, 34.4° C)
Payette, Idaho	(113° F, 45.0° C)
Lewiston, Idaho	(104° F, 40.0° C)

Chicago, Illinois	( 93° F, 33.9° C)
Cairo, Illinois	( 95° F, 35.0° C)
Indianapolis, Indiana	( 97° F, 36.1° C)
Lafayette, Indiana	( 96° F, 35.6° C)
Dubuque, Iowa	( 98° F, 36.7° C)
Keokuk, Iowa	(104° F, 40.0° C)
Topeka, Kansas	(102° F, 38.9° C)
Dodge City, Kansas	(104° F, 40.0° C)
Louisville, Kentucky	( 96° F, 35.6° C)
Lexington, Kentucky	( 94° F, 34.4° C)
New Orleans, Louisiana	( 96° F, 35.6° C)
Shreveport, Louisiana	( 99° F, 37.2° C)
Eastport, Maine	( 82° F, 27.8° C)
Portland, Maine	( 93° F, 33.9° C)
Baltimore, Maryland	( 98° F, 36.7° C)
Boston, Massachusetts	( 95° F, 35.0° C)
Nantucket, Massachusetts	( 82° F, 27.8° C)
Marquette, Michigan	( 91° F, 32.8° C)
Detroit, Michigan	( 96° F, 35.6° C)
Saint Vincent, Minnesota	( 95° F, 35.0° C)
Saint Paul, Minnesota	( 94° F, 34.4° C)
Vicksburg, Mississippi	( 99° F, 37.2° C)
Saint Louis, Missouri	( 98° F, 36.7° C)
Glendive, Montana	(105° F, 40.6° C)
Helena, Montana	( 96° F, 35.6° C)
North Platte, Nebraska	(103° F, 39.4° C)
Omaha, Nebraska	(105° F, 40.6° C)
Winnemucca, Nevada	( 99° F, 37.2° C)
Carson City, Nevada	( 92° F, 33.3° C)
West Milan, New Hampshire	( 88° F, 31.1° C)
New Brunswick, New Jersey	( 98° F, 36.7° C)
Cape May, New Jersey	( 96° F, 35.6° C)
Santa Fe, New Mexico	( 90° F, 32.2° C)
Albany, New York	( 98° F, 36.7° C)
New York City, New York	( 95° F, 35.0° C)
Charlotte, North Carolina	( 96° F, 35.6° C)
Kitty Hawk, North Carolina	( 96° F, 35.6° C)
Bismarck, North Dakota	( 98° F, 36.7° C)
Steele, North Dakota	(108° F, 42.2° C)
Cincinnati, Ohio	( 95° F, 35.0° C)
Columbus, Ohio	( 96° F, 35.6° C)
Fort Sill, Oklahoma	(106° F, 41.1° C)
Roseburg, Oregon	( 93° F, 33.9° C)
Portland, Oregon	( 95° F, 35.0° C)
Erie, Pennsylvania	( 94° F, 34.4° C)
Philadelphia, Pennsylvania	( 97° F, 36.1° C)
Block Island, Rhode Island	( 85° F, 29.4° C)
Charleston, South Carolina	( 92° F, 33.3° C)
Columbia, South Carolina	( 95° F, 35.0° C)
Yankton, South Dakota	( 98° F, 36.7° C)
Nashville, Tennessee	( 98° F, 36.7° C)
Knoxville, Tennessee	( 95° F, 35.0° C)
San Antonio, Texas	( 99° F, 37.2° C)
Galveston, Texas	( 92° F, 33.3° C)
Salt Lake City, Utah	( 98° F, 36.7° C)
Burlington, Vermont	( 91° F, 32.8° C)



Lynchburg, Virginia	( 97° F, 36.1° C)
Norfolk, Virginia	( 96° F, 35.6° C)
Olympia, Washington	( 89° F, 31.7° C)
Spokane Falls, Washington	(102° F, 38.9° C)
Tyler Creek, West Virginia	( 98° F, 36.7° C)
Milwaukee, Wisconsin	( 94° F, 34.4° C)
La Crosse, Wisconsin	( 97° F, 36.1° C)
Cheyenne, Wyoming	( 92° F, 33.3° C)

The following are the highest temperatures observed during July 1890: <sup>119</sup>

Guanajuato, <i>Mexico</i>	( 81° F, 27.2° C)
La Logia, <i>Mexico</i>	(102° F, 38.9° C)
Mexico City, <i>Mexico</i>	( 78° F, 25.6° C)
Puebla, <i>Mexico</i>	( 82° F, 27.8° C)
Mazatlan, <i>Mexico</i>	( 88° F, 31.1° C)
Leon de Aldamas, <i>Mexico</i>	( 87° F, 30.6° C) (now León, Guanajuato)
Zacatecas, <i>Mexico</i>	( 83° F, 28.3° C)
Montreal, <i>Canada</i>	( 89° F, 31.7° C)
New Westminster, British Columbia, <i>Canada</i>	( 84° F, 28.9° C)
Saint John's, New Foundland, <i>Canada</i>	( 76° F, 24.4° C)
Grand Turk Island, <i>West Indies</i>	( 85° F, 29.4° C)
Hamilton, <i>Bermuda</i>	( 82° F, 27.8° C)
Port au Prince, <i>Haiti</i>	( 97° F, 36.1° C)

A report from Parkersburg, West Virginia in the *United States*, dated 5 July 1890, stated that heavy rain had caused immense damage in that region, and the loss by flood in the Muskingum Valley, Ohio, was estimated at \$500,000 [approximately \$12 million in present dollars using the Consumer Price Index (CPI)].<sup>119</sup>

In July 1890, damaging drought prevailed generally in Kansas, Nebraska, and Iowa, and in areas in the Ohio Valley and Tennessee, the Lake region, and the Atlantic coast states from Massachusetts to Alabama in the *United States*. Navigation was suspended on the upper Ohio River, and on the Cumberland River, at Nashville, Tennessee, on account of low water. The Arkansas River, at Fort Smith, Arkansas, was lower than at any time since April 1887.<sup>119</sup>

On 7 July 1890, a very violent thunderstorm struck Moorhead, Minnesota in the *United States*. The damage at Moorhead was estimated at \$25,000. At Fargo, North Dakota, 7 persons were killed by the storm and 13 injured and the damage was estimated at \$75,000. [\$2.4 million in total damage in today's dollars.]<sup>119</sup>

In July 1890, there was a terrible cyclone [tornado] in Minnesota in the *United States*.<sup>97</sup>

On 8 July 1890, a severe thunderstorm struck Cleveland, Ohio in the *United States* causing an estimated \$100,000 in damages. [\$2.4 million in today's dollars.]<sup>119</sup>

On 9 July 1890, a great cyclone at Muscat [Masqat], *Oman* caused floods. It was reported that about 700 persons perished.<sup>97</sup>

On 13 July 1890, a tornado swept through New Canada Township, Minnesota in the *United States*. The tornado killed 6, injured 23 persons and caused an estimated \$10,000 in damages. [\$240,000 in today's dollars.] Hailstones large enough to kill chickens fell to the north of the tornado path. Foliage was stripped from trees and plants, and near the ruined buildings the trees were stripped of bark. The area of destruction was ½ mile in length and 400 to 800 feet in width. On the same day, a violent storm passed

over Lake Pepin (50 miles southeast of Saint Paul, Minnesota) and overturned the excursion steamer Red Wing with over 200 persons aboard; 100 of these were drowned. The estimated loss to buildings in Lake City, a few miles from the scene of the disaster was \$10,000.<sup>119</sup>

On 20 July 1890, there was a destructive cyclone at Slonim, Russia [now *Belarus*], 19 lives lost.<sup>97</sup>

On 26 July 1890, there was a cyclone in south Lawrence, Merrimac valley, Massachusetts in the *United States*. There were 100 buildings destroyed and 9 deaths.<sup>97</sup>

On 24 July 1890, a tornado struck Lawrence, Massachusetts in the *United States*. The tornado was at times as wide as 300 feet [91 meters]. Seventy dwellings were destroyed or seriously damaged. Eight people were killed outright. But several other people were seriously injured and died later from their injuries. The damage was estimated at \$150,000. [In present currency, that would be equivalent to \$3.8 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>199</sup>

On 26 July 1890, a tornado struck Lawrence, Massachusetts in the *United States*. Eight persons were killed, 63 injured and 35 houses demolished. The city sustained \$60,000 in damages [\$1.4 million in today's dollars].<sup>119</sup>

In August 1890, there were destructive storms in *Austria, France, Switzerland* and in the *United States*.<sup>97</sup>

In August 1890, there were destructive floods in *China*.<sup>90</sup>

In August and September 1890, there were destructive floods in *Austria, Bohemia* [now western *Czech Republic*], *central Europe* and *France*.<sup>90</sup>

In August 1890, considerable damage was caused by flood along the Gila River in Arizona in the *United States*.<sup>119</sup>

On 3 August 1890, a thunderstorm with heavy rain and large hail began at Sioux City, Iowa in the *United States*. Hail continued about 40 minutes; the stones were irregular in shape, some being 1 inch long and  $\frac{3}{4}$  inch thick; the outside of the stones was composed of rough, clear ice and the centre of white, soft ice. Next, the hailstorm passed about  $3\frac{1}{2}$  miles north of Sibley, Iowa. The width of the path of hail was about 6 miles, the path of greatest destruction being  $1\frac{1}{2}$  miles wide, and the path was known to be at least 75 miles in length, and extended over Lyons, Osceola, Dickinson, Emmet, and Winnebago counties in Iowa. The hailstones varied in size from  $\frac{3}{4}$  inch in diameter to the size of hens' eggs. A number of persons were badly injured by hail, and the damage to trees, crops, and property was estimated at \$150,000 [\$3.6 million in today's dollars].<sup>119</sup>

On 12 August 1890, [due to the drought] the Arkansas River was lower at Fort Smith, Arkansas in the *United States*, than at any time since 1856.<sup>119</sup>

On 19 August 1890, a series of tornadoes struck Pennsylvania in the *United States*. The total loss of life in all the towns was 28. Wilkes-Barre was the hardest hit. At Wilkes-Barre 16 persons were killed and the damage was estimated at \$600,000 [\$14.4 million in today's dollars]. Other cities sustained loss. At New Milford, one boy was killed. At Bloomingdale, three were killed. At Register, one individual was fatally injured. At Harveyville, one was killed and the city sustained \$60,000 in damages. At Silkworth, three were killed. At Shickshinny, a girl was killed. At Sinking Spring, one individual was killed. At Reading, one was killed.<sup>119</sup>

A West Indies hurricane moved east of the *Windward Islands* to northwest of *Bermuda* from the 27-31 August 1890. The winds were of hurricane force and caused loss of life and shipping.<sup>119</sup>

On 28-30 August 1890, a hurricane struck the western *Atlantic Ocean*. On one ship there were 10 deaths and on another there was loss of life.<sup>141</sup>

In September 1890, a notable feature was the severe cold wave, which advanced from the northwest over the central valleys west of the Mississippi River in the *United States* on the 13<sup>th</sup>, attended by unprecedentedly low temperature for the season and early frost. Destructive floods prevailed in central and western New York, central and western Pennsylvania, West Virginia, Ohio, and Connecticut from September 10<sup>th</sup> to 15<sup>th</sup>.<sup>119</sup>

On 16-17 September 1890, the Orinoco River and its tributaries in *South America* overflowed causing great destruction.<sup>90</sup> [About 76.3% of the Orinoco River lies in *Venezuela* and the remainder in *Colombia*.]

In October 1890, a tornado struck Richmond and Robeson counties, North Carolina in the *United States*, on the 16<sup>th</sup>. Considerable damage was caused by freshets in the Monongahela and Little Kanawha rivers in West Virginia and a freshet in the Wyoming Valley, Pennsylvania. Cape Fear River flooded its banks near Wilmington, North Carolina. Very dry weather prevailed in parts of Nebraska, Kansas, Missouri, South Dakota, and south Minnesota. Destructive prairie fires occurred along the Cannon Ball, Heart, and Knife rivers in North Dakota during the early part of October.<sup>119</sup>

November 1890 was the driest and warmest November on record in the middle, south Atlantic, and east Gulf states, and generally along the Pacific coast in the *United States*. A tornado occurred near Erie, Pennsylvania on the 17<sup>th</sup>. On the 30<sup>th</sup>, a heavy gale caused damage at Bermuda Island. High water and floods were reported along the Gila and Colorado rivers in western Arizona.<sup>119</sup>

On 7 November 1890, a violent gale struck *Great Britain* and *Ireland*. There was great destruction of life and property, especially at sea. There were 114 lives saved by lifeboats. Viscount Cantelupe drowned and his yacht was wrecked in Belfast Lough in *Northern Ireland*.<sup>97</sup>

On 23 November 1890, a violent northwest gale struck the *English Channel*. There were several wrecks on the southern coast [of *England*].<sup>97</sup>

On 23-25 November 1890, violent gales struck throughout *Europe*.<sup>97</sup>

On 23-25 November 1890, there were destructive inundations caused by violent gales throughout *Europe*, especially in *Germany*, *Austria*, *Mecklenburg*, *Baltic Coast*, *Belgium*, and *Denmark*.<sup>90</sup>

On 29 November 1890, a heavy gale, attended with squalls of almost hurricane force and unusually high seas, caused considerable damage to the shipping interests in Newfoundland, *Canada*.<sup>119</sup>

A notable feature of December 1890 was the unusually low temperature, which prevailed over the extreme northeast part of the *United States* and the abnormally warm weather in the north-central districts. Precipitation was deficient over a greater part of the country, the regions of greatest excess being the north Pacific coast and Cape Breton Island. A tornado passed over Jersey, Georgia on December 8<sup>th</sup>.<sup>119</sup>

On 3 December 1890, a gale was reported in the Gulf of St. Lawrence in *Canada*. Forty vessels said to be wrecked. There was much destruction to shipping and buildings at Newfoundland on 8 December

1890.<sup>97</sup>

On 24 December 1890, violent storms struck the *North Atlantic*. Over 60 vessels were reported lost.<sup>97</sup>

On 28 December 1890 at Deniliquin, *Australia*, 200 houses were damaged by a severe thunderstorm and tornado.<sup>99</sup>

In 1890 during the period between 5 February and 8 August, a drought engulfed Kansu (now Gansu province) in northwest *China* at Lanchow.<sup>153</sup>

*Also refer to the section 1889 A.D. – 1892 A.D. for information on the famine in India, Russia, Japan, Hungary and Montenegro during that timeframe.*

*Also refer to the section 1890 A.D. – 1900 A.D. for information on the drought in South Africa during that timeframe.*

**Winter of 1890 / 1891 A.D.** The frost in *Britain* began on 25 November 1890 and continued with intermissions till 22 January 1891.<sup>90</sup>

On 16 January 1891, a trap with a tandem team drove across the ice on the Serpentine in Hyde Park [London], England.<sup>90</sup>

The winter of 1890-91 in Bradford County, Pennsylvania in the *United States* was a long one of deep snow. The total winter snowfall was 97 inches [2.5 m]. The first snow fell on Election Day, November 4<sup>th</sup>. But there was no sleighing until December. There were heavy snowstorms during the end of December, which covered the ground on the highlands and in the woods to a depth of 3½ feet [1.1 m]. The big drifts on the roads and the deep snow in the woods made it difficult for travel and lumbering operations. There was abundance of good sleighing for many weeks. Bluebirds appeared during the last week in February. March saw wind, snow and rain. Unfavorable weather continued until the first of May. As a result, farm operations were late.<sup>178</sup>

On 24-25 January 1891, New York City in the *United States* was struck by a great snowstorm. Electric lights, telegraph, and telephone communications stopped.<sup>97</sup>

On 7 February 1891, there were violent blizzard in Nebraska and South Dakota in the *United States*, many perished.<sup>97</sup>

On 8-9 March 1891, a blizzard struck Minnesota, Iowa, Illinois and Wisconsin in the *United States*.<sup>97</sup>

On 9-13 March 1891, there was a great snowstorm, or blizzard, throughout *England*, especially in the south and west. Railway traffic, post and telegraph were greatly impeded. In some places totally stopped. There were many wrecks and loss of life in the *English Channel*. There were hurricanes near Dover and Plymouth; [ship] wrecks of fishing boats at Hastings and other places. The *Victoria* (Captain Shirley) had a long dangerous passage from Dover to Calais. Great Western and South-Western railways were disorganized. Fourteen ships were lost; about 60 lives lost.<sup>97</sup>

The minimum temperatures observed in Alaska in the *United States* by month is given below: <sup>137</sup>

For Nuklukayet, Alaska (a few miles below the junction of the Yukon and Tanana rivers) from August 1882 to May 1886

November (-53° F) December (-68° F) January (-76° F) February (-60° F) March (-38° F)

For Tchatowklin, Alaska (also known as Johnny's village, Klat-ol-Klin, Schwatka) from October 1882 to May 1886

November (-50° F) December (-68° F) January (-75° F) February (-74° F) March (-56° F)  
 For Fort Reliance, Canada (on the Yukon River 8.1 miles downstream from Dawson City) from  
 September 1882 to May 1886

November (-50° F) December (-69° F) January (-80° F) February (-72° F) March (-36° F)  
 For Camp Davidson, Alaska (a station at the intersection of the one hundred and forty-first meridian and  
 the Yukon) from September 1889 to June 1891

November (-35° F) December (-49° F) January (-60° F) February (-55° F) March (-45° F)  
 For Camp Colonna, Alaska (a station on the Porcupine River at its intersection with the one hundred and  
 forty-first meridian) from October 1889 to June 1890

November (-36° F) December (-43° F) January (-49° F) February (-47° F) March (-48° F)

**1891 A. D.** In January 1891, there were serious floods in Kent, *England* caused by the spring thaw, after the long frost. Also there were floods in many places on the [*European*] Continent.<sup>90</sup>

On 12-13 February 1891, there was a destructive cyclone over the *Fiji* and *Navigation Isles*, great loss of life and shipping.<sup>97</sup> [Fiji is an island in the South Pacific Ocean. The Navigation Isles are the Navigator Islands now the Samoan Islands.]

On 17 February 1891, there were destructive inundations in West Virginia, Ohio, and the Alleghany [mountain range] in the *United States*. There were floods in Arizona around 2 March and in Tennessee and Mississippi about 8 March.<sup>90</sup>

In February 1891, a flood at Yuma, Arizona in the *United States* caused private property damage estimated at \$300,000. [In present currency, that would be equivalent to \$7 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>135</sup>

On 21-24 February 1891 at Stonewall Mine, California in the *United States*, 23.9 inches of rain fell. On 21-23 February 1891 at Santa Rosa Ranch, California, 15.33 inches of rain fell. On 22-23 February 1891 at Cuyamaca, California, 22.4 inches of rain fell.<sup>116</sup>

In March 1891, nineteen persons were drowned on the North Carolina coast, and 7 persons on the Virginia coast in the *United States* by shipwreck.<sup>135</sup>

On 20 May 1891, a tornado struck in Boone and Audrian [Audrain] counties in Missouri in the *United States*, killing 4 persons, injuring 35 or more and destroying property estimated at \$100,000 [\$2.4 million in today's dollars].<sup>135</sup>

In May 1891, high water in the Rio Grande River caused great destruction of property in New Mexico and western Texas in the *United States*, and the Pecos River was the highest ever known.<sup>135</sup>

During June 1891, the peak temperature observed at the Pacific railroad stations [Ogilby, now a ghost town] in the Colorado Desert, California in the *United States* was 126° F. During July 1891, the temperature at Seven Palms, California reached 123° F.<sup>135</sup>

On 2 June 1891, there was a destructive cyclone [tornado] in South Dakota in the *United States*.<sup>97</sup>

On 10 June 1891, a cyclone destroyed the village of Ponikwa in Galicia [a historic region in Eastern Europe, currently divided between *Poland* and the *Ukraine*] and killed about 30 persons.<sup>97</sup>

About 24 June 1891, a destructive storm struck Iowa, Minnesota, and other states in the *United States*.<sup>97</sup>

On 24-29 June 1891, the Queanbeyan River in *Australia* flooded and was said to be the worst in memory. Floodwater went over the Queanbeyan Bridge and houses were swept away. At the same time the Murrumbidgee River was at record flood stage, just below the level of the 1852 flood at Cavan.<sup>99</sup>

On 26 June 1891, there was a destructive storm and cloudburst in the Rhine provinces. On 1 July the storm was over a large part of *Germany*, chiefly in the Krefeld district and in Brunswick. On 9 July 1891 it was at Salzburg.<sup>97</sup> [The Rhine provinces are in northwestern *Germany* bordering *Luxembourg*, *Belgium* and *the Netherlands*. The Krefeld district is northwest of Düsseldorf in west-central *Germany*. Brunswick is in central *Germany*. Salzburg is in west-central *Germany*.]

The following were the highest temperatures observed during the summer of 1891 in the *United States*:<sup>135</sup>

Montgomery, Alabama	( 99° F, 37.2° C)	on 5 June
Mobile, Alabama	( 96° F, 35.6° C)	on 29 June
Tucson, Arizona	(109° F, 42.8° C)	in June
Yuma, Arizona	(116° F, 46.7° C)	on 29 June
Little Rock, Arkansas	( 96° F, 35.6° C)	on 26 June
Fort Smith, Arkansas	( 97° F, 36.1° C)	on 22 July
San Francisco, California	(100° F, 37.8° C)	on 29 June
San Diego, California	( 89° F, 31.7° C)	on 7 September
Fresno, California	(114° F, 45.6° C)	on 1 July
Denver, Colorado	( 94° F, 34.4° C)	on 13 August
Pueblo, Colorado	( 98° F, 36.7° C)	on 15 August
New Haven, Connecticut	( 93° F, 33.9° C)	on 16 June
New London, Connecticut	( 92° F, 33.3° C)	on 10 August
Dover, Delaware	( 94° F, 34.4° C)	in June
Washington, D.C.	( 95° F, 35.0° C)	on 10 August
Pensacola, Florida	( 95° F, 35.0° C)	on 28 June
Key West, Florida	( 92° F, 33.3° C)	on 4 August
Augusta, Georgia	( 98° F, 36.7° C)	on 4 June
Savannah, Georgia	( 97° F, 36.1° C)	on 27 June
American Falls, Idaho	( 98° F, 36.7° C)	in July
Boise Barracks, Idaho	(109° F, 42.8° C)	in July
Chicago, Illinois	( 96° F, 35.6° C)	on 9 August
Cairo, Illinois	( 93° F, 33.9° C)	on 3 June
Indianapolis, Indiana	( 94° F, 34.4° C)	on 10 August
Lafayette, Indiana	( 97° F, 36.1° C)	in August
Dubuque, Iowa	( 96° F, 35.6° C)	on 8 & 9 August
Keokuk, Iowa	( 95° F, 35.0° C)	on 8 & 9 August
Topeka, Kansas	( 97° F, 36.1° C)	on 18 August
Dodge City, Kansas	( 99° F, 36.7° C)	on 12 July
Louisville, Kentucky	( 95° F, 35.0° C)	on 27 June
Lexington, Kentucky	( 92° F, 33.3° C)	on 9 August
New Orleans, Louisiana	( 94° F, 34.4° C)	on 24 & 30 June
Shreveport, Louisiana	( 97° F, 36.1° C)	on 2 June and 21 August
Eastport, Maine	( 79° F, 26.1° C)	on 13 June
Portland, Maine	( 95° F, 35.0° C)	on 16 June
Baltimore, Maryland	( 94° F, 34.4° C)	on 11 August
Boston, Massachusetts	( 96° F, 35.6° C)	on 16 June
Nantucket, Massachusetts	( 84° F, 28.9° C)	on 10 August
Marquette, Michigan	( 94° F, 34.4° C)	on 14 June
Detroit, Michigan	( 96° F, 35.6° C)	on 9 August
Saint Vincent, Minnesota	( 92° F, 33.3° C)	on 7 May
Saint Paul, Minnesota	( 95° F, 35.0° C)	on 7 & 8 August
Vicksburg, Mississippi	( 98° F, 36.7° C)	on 25 June
Saint Louis, Missouri	( 96° F, 35.6° C)	on 10 August



Fort Assinaboine, Montana	( 92° F, 33.3° C)	on 6 May
Helena, Montana	( 89° F, 31.7° C)	on 25 July and 30 August
North Platte, Nebraska	( 97° F, 36.1° C)	on 8 August
Omaha, Nebraska	( 97° F, 36.1° C)	on 8 August
Winnemucca, Nevada	( 98° F, 36.7° C)	on 24 July
Carson City, Nevada	( 92° F, 33.3° C)	on 30 June
West Milan, New Hampshire	( 90° F, 32.2° C)	in June
New Brunswick, New Jersey	( 98° F, 36.7° C)	on 16 June
Atlantic City, New Jersey	( 91° F, 32.8° C)	on 26 June
Santa Fe, New Mexico	( 87° F, 30.6° C)	on 22 July
Albany, New York	( 95° F, 35.0° C)	on 16 June
New York City, New York	( 94° F, 34.4° C)	on 15 June and 10 August
Charlotte, North Carolina	( 95° F, 35.0° C)	on 26 & 27 June
Wilmington, North Carolina	( 95° F, 35.0° C)	on 27 June
Bismarck, North Dakota	( 94° F, 34.4° C)	on 5 August
Fort Buford, North Dakota	( 97° F, 36.1° C)	on 18 August
Cincinnati, Ohio	( 92° F, 33.3° C)	on 9 August
Columbus, Ohio	( 94° F, 34.4° C)	on 10 August
Oklahoma City, Oklahoma	( 99° F, 37.2° C)	on 20 August
Fort Sill, Oklahoma	(101° F, 38.3° C)	in August
Roseburg, Oregon	(102° F, 38.9° C)	on 23 July
Portland, Oregon	(102° F, 38.9° C)	on 23 July
Erie, Pennsylvania	( 89° F, 31.7° C)	on 9 August
Philadelphia, Pennsylvania	( 97° F, 36.1° C)	on 10 August
Block Island, Rhode Island	( 85° F, 29.4° C)	on 10 August
Charleston, South Carolina	( 95° F, 35.0° C)	on 4 July
Columbia, South Carolina	(100° F, 37.8° C)	on 23 May
Fort Sully, South Dakota	(109° F, 42.8° C)	in August
Nashville, Tennessee	( 97° F, 36.1° C)	on 26 June
Knoxville, Tennessee	( 93° F, 33.9° C)	on 3 June
San Antonio, Texas	(104° F, 40.0° C)	on 7 July
Galveston, Texas	( 92° F, 33.3° C)	on 18 July
Salt Lake City, Utah	( 98° F, 36.7° C)	on 17 July
Burlington, Vermont	( 94° F, 34.4° C)	in June
Lynchburg, Virginia	( 94° F, 34.4° C)	on 10 August
Norfolk, Virginia	( 97° F, 36.1° C)	on 17 June
Olympia, Washington	( 96° F, 35.6° C)	on 23 July
Spokane, Washington	( 97° F, 36.1° C)	on 24 July
Walla Walla, Washington	(108° F, 42.2° C)	on 24 July
Parkersburg, West Virginia	( 94° F, 34.4° C)	on 10 August
Milwaukee, Wisconsin	( 96° F, 35.6° C)	on 9 August
La Crosse, Wisconsin	( 97° F, 36.1° C)	on 8 August
Cheyenne, Wyoming	( 89° F, 31.7° C)	on 13 August

On 6 July 1891, a tornado struck Baton Rouge, Louisiana in the *United States*, killing 10 persons and injuring many others.<sup>135</sup>

On 6 July 1891, there was a destructive storm at Baton Rouge, Louisiana in the *United States*, with loss of life.<sup>97</sup>

About 21 July 1891, there were destructive floods by the rising of the Yang-tse-Kiang River [Yangtze River]; great loss of life at Foochoo [Fuzhou or Foochow on the southeast coast of *China*].<sup>90</sup>

About 26 July 1891, there were great floods in Posen [region in *Poland*]. There was loss of life and destruction of property.<sup>90</sup>

On 5 August 1891, there was a violent hurricane and rain in lower *Austria*, *Moravia*, and upper *Hungary*. The season's vintage [grapes for wine] was destroyed.<sup>94</sup>

On 13-14 August 1891, there were heavy rains and destructive floods in east Lancashire in *England*.<sup>90</sup>

On 18 August 1891, there was a cloudburst at Kollmann [a city that lies on the right bank of the Eisack River], between Botzen and Brixen (Tyrol). The lowlands were flooded. This flood caused about 60 deaths.<sup>94</sup> [Kollmann may be in *Italy* or *Austria*.]

On 18-22 August 1891, a hurricane struck the *Caribbean Islands* of *Martinique*, *Turks Islands* and *Puerto Rico* causing approximately 700 deaths.<sup>141</sup>

During the night of the 18 August 1891 a hurricane devastated the Island of *Martinique*, *Windward [Islands]*, *West Indies*, and reports indicated about seven hundred persons were killed, many injured, and that property to the value of about \$10,000,000 was destroyed. [In present currency, that would be equivalent to \$240 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>135</sup>

On the night of the 18<sup>th</sup>, one of the most disastrous of the type of storms known as West India cyclones devastated the Island of *Martinique*, in the *Windward [Islands]*, *West Indies*. The storm struck the east side of the island of *Martinique* about 6 p.m. and continued for four hours. Incessant lightning, unaccompanied by thunder, continued throughout the storm, and at its conclusion two distinct shocks of earthquake occurred at intervals of about five seconds. In the vicinity of *Caraval Rock [Caravelle Rock]* at 10 a.m., two immense waves passed from the direction of *Saint Lucia*, the sea in the vicinity being quite calm. Another notable feature was the deafness experienced by every person in *Martinique* during the passage of the storm. The loss of life at *Martinique* was reported at 700; many persons were injured; property was destroyed to the value of about \$10 million; and all vessels about the island, some 50 sail of all classes, were wrecked. Pursuing a west-northwest course the storm passed north of *Grand Turk*, *Turks Islands*, *West Indies*, about midnight of the 21<sup>st</sup>. At *Grand Turk*, three persons drowned, and the loss to property was confined to small houses and sailing vessels. From *Grand Turk* the storm center passed to the *Islands of the Bahamas*, a south hurricane being reported over *Crooked Island*, *Bahamas*, the evening of the 22<sup>nd</sup>. A ridge of high barometer occupied the ocean off the south Atlantic coast of the *United States*. This distribution of pressure had the apparent effect of preventing the cyclone from making the usual recurve to the north and northeast, and reports indicated that the hurricane moved westward with diminished energy over extreme south *Florida* during the 24<sup>th</sup>, and passed thence into the *Gulf of Mexico*.

On 24-26 August 1891, there were destructive storms and floods in *Great Britain*, especially on the northwest coast.<sup>94</sup>

In the *United States* during August 1891, the maximum temperature was highest in the *Colorado Desert*, *California*, and in the lower *Gila valley*, *Arizona*, where it rose above 120° F. It was above 110° F in adjoining parts of southeast *California* and west *Arizona* and in the *San Joaquin* and *Sacramento valleys*, *California*. The maximum temperature observed was 129° F at *Volcano Springs*, *California*; 122° F at *Seven Palms*, *California*; 120° F at *Needles*, *California*; 120° F at *Fort Mohave*, *Arizona*; 120° F at *Maricopa*, *Arizona*; and 119° F at *Indio*, *California*.<sup>135</sup>

Several areas of the *United States* suffered from drought conditions in August 1891. In southeast *Massachusetts*, drought seriously affected crops, and many wells went dry. Fruit was injured about *Micco*, *Florida*, and cotton was reported damaged about *Livingston*, *Alabama*. Crops suffered about *Fayette*, *Mississippi*, and *Lead Hill*, *Arkansas*. Drought and cold weather during the latter part of August injured cotton in parts of *Louisiana*. The month was unusually dry and vegetation was damaged by

drought in Brazos County, Texas; Socorro County, New Mexico; Cochise County, Arizona; northwest and east Kansas; and central and northwest Wisconsin. In Polk County, Wisconsin, lakes and ponds were reported lower than ever before observed, and low water in the upper Wisconsin River prevented milling and logging operations. On the 1<sup>st</sup>, rain broke a drought that had been very destructive to livestock and vegetation along the Rio Grande River, Texas, from Presidio to Cameron counties. In the early part of the month crops were badly damaged in southeast Illinois; in Miami and Pulaski counties, Indiana; in Fond du Lac County, Wisconsin; and in western Michigan. In parts of Rhode Island and Connecticut mills were stopped on account of insufficient water.<sup>135</sup>

Several areas of the *United States* suffered from drought conditions in September 1891. Navigation on the middle and lower Mississippi River and tributaries was rendered difficult by low water. In New England, a scarcity of water caused the closing of mills, and in a number of the Southern and Western States, drought injured crops and caused a suspension of farm work. Crops of all kinds were damaged and farming operations were almost entirely suspended in Tennessee and Arkansas. Drought was general in Illinois. In Ohio, fall pasturage and the water supply were seriously affected. Streams were low and wells were failing in parts of Iowa.<sup>135</sup>

Around 9 September 1891, there was a destructive storm off Nova Scotia, *Canada*. There were about 20 vessels wrecked, with loss of life.<sup>94</sup>

On 11-13 September 1891, there was a great storm throughout southern *Spain*.<sup>94</sup>

On 13 September 1891, there were heavy rains and destructive inundations in *Spain*.<sup>90</sup>

On 20-21 September 1891, there were violent storms with loss of life in midland and northern *English counties*, and parts of *Scotland*.<sup>94</sup>

During October 1891, damaging drought prevailed in the southern and southwestern states, and in parts of New England and the middle and western states in the *United States*. Rivers and streams in the south-central valleys and the Southern States were very low. On the Tennessee, Red, and Chattahoochee rivers traffic was practically suspended, and navigation on the Ohio and Mississippi rivers was rendered difficult on account of low water. At Augusta, Maine on the 5<sup>th</sup>, the Kennebec River was lower than at any time during the previous 38 years.<sup>135</sup>

On October 5<sup>th</sup> and 6<sup>th</sup>, a cyclonic area developed west of the *British Isles*, and on the 6<sup>th</sup>, destructive gales prevailed over Ireland and along the west and south coasts of Great Britain. Under the influence of the Iceland area of low pressure, which had apparently assumed a position more to the eastward than usual, and of areas of low pressure, which advanced from the ocean, stormy weather continued over the British Isles until the 23<sup>rd</sup>. On the 13<sup>th</sup> and 14<sup>th</sup> immense damage was caused to coast and inland property in England, Ireland, and the south of Scotland, and gales of destructive violence continued during the 15<sup>th</sup> and 16<sup>th</sup>.<sup>135</sup>

On 13-15 October 1891, there was a violent cyclone over the *British Isles*. This storm caused much destruction of houses, shipping, and trees and a moderate loss of life.<sup>94</sup>

About 22 October 1891, there were disastrous floods in *Spain, France, Italy, and England* (especially in the south and west of *England*).<sup>90</sup>

About 25 October 1891, floods at Limoux in southwestern *France* caused the collapse of buildings and about 20 persons killed.<sup>90</sup>

On 2 November 1891, there was a destructive cyclone in the *Bay of Bengal*, with loss of life.<sup>94</sup>

Beginning on the night of the 10<sup>th</sup> of November and continuing into 11 November 1891, there was a destructive gale in England, especially on the south and west coasts. There were many [ship] wrecks, with loss of life, off Sandgate, Dover, Folkestone, St. Leonards, and Brighton. Telegraphic communication was greatly suspended.<sup>94</sup>

On 11 November 1891, there was great damage from a gale at Boulogne, Paris, Le Havre, Roubaix, and Rouen in *France*; and Bilbao and Madrid in *Spain*.<sup>94</sup>

On 11 November 1891, there was a violent gale at Liverpool, *England* and on the *Irish coasts*, with loss of life.<sup>94</sup>

On 23 November 1891, storms of exceptional severity occurred over the Middle Atlantic states and the lower lake region in the *United States*, resulting in loss of life and destruction of property.<sup>135</sup>

In November 1891, there were great floods in Somersetshire, *England*, which caused the destruction of buildings and crops. Travel was impeded and there was much distress.<sup>90</sup>

On 7-11 December 1891, there were violent gales in the *English Channel* causing [ship] wrecks and loss of life.<sup>94</sup>

On 8-9 December 1891, there were violent gales, which caused [ship] wrecks and loss of life in the *English Channel* and *France*.<sup>94</sup>

On 10-13 December 1891, there were violent gales over northwestern *Europe* and the *British Isles*.<sup>94</sup>

In 1891 in *Australia*, the Murrumbidgee River overflowed its banks.<sup>101</sup>

In 1891, a drought engulfed Kansu (now Gansu province) in northwest *China* at Ching-ning and Ho-shui.<sup>153</sup>

*Also refer to the section 1889 A.D. – 1892 A.D. for information on the famine in India, Russia, Japan, Hungary and Montenegro during that timeframe.*

*Also refer to the section 1890 A.D. – 1900 A.D. for information on the drought in South Africa during that timeframe.*

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**Winter of 1891 / 1892 A.D.** On 19 January 1892 in Sioux City, Iowa, in the *United States*, the low temperature was -28° F (-33.3° C).<sup>111</sup>

A "pogonip" [a storm of rare long prism diamond dust ice crystals] struck Winnemucca, Nevada in the *United States* in January 1892, and lasted from the 22<sup>nd</sup> to the 25<sup>th</sup>, and deposited a coating of ice needles to a depth of two inches upon trees, bushes, fences, buildings, men, and cattle. "Pogonip" is an Indian word, applied to a mist of ice crystals or frozen fog particles that occurs most frequently in the southeastern part of White Pine County, Nevada. In Virginia City an observer, looking down into the layer of mist stated that:<sup>116</sup>

It came suddenly; appeared in its greatest beauty on the morning of January 22; filled up the valleys and rolled up the mountain sides, leaving the tops of the largest hills like islands and rocky headlands; its waves tumbled over each other and rolled over its shores; late in the afternoon its surface was much agitated by some unknown impulse causing its great waves to roll to the westward; they took on a yellow hue, where they tumbled over the eastern mountain rim of the city; Sugar Loaf Mountain became a cone-shaped island, with falls on each side of it. The

canyons were slowly filled and the vapor surged up the sides of Mount Davidson, partly covering the city, and causing intense cold where there had been sunshine and warmth before. It soon receded to its first situation, where it remained until broken up after four days of beautiful existence.

Heavy storms of snow, sleet, and rain swept over the Southwestern and Southern States in the *United States* on 15-17 March 1892. In Oklahoma and Indian territories and Texas the loss of cattle was very great, and early corn and oats were killed and damaged. Snow fell in northern Louisiana. The storm struck Arkansas on the 16<sup>th</sup> and Mississippi on the 17<sup>th</sup>. It prevailed over Tennessee and central and southern Kentucky during the 16<sup>th</sup> and 17<sup>th</sup> as a heavy snowstorm, the depth of snowfall in central and southwest Tennessee, 7 to 25 inches, being the greatest on record for this area. (This snow was beneficial, as it protected wheat, oats, and clover from the severe cold of that period.) At Lexington, Kentucky, the average depth of snowfall was about 7 inches, and in places the snow drifted to a depth of 4 feet. The snowstorm extended over the Ohio Valley on the 16<sup>th</sup> and 17<sup>th</sup> and reached New England on the 18<sup>th</sup>. From the 17<sup>th</sup> to 19<sup>th</sup> low temperature and frost seriously injured crops and early vegetation from the southeastern slope of the Rocky Mountains over the Gulf and south Atlantic states and the northern half of the Florida Peninsula. Over a great part of the Ohio Valley the snowfall was insufficient to afford protection to grain.<sup>136</sup>

During the winter of 1891-92 in Bradford County, Pennsylvania in the *United States*, most of December was very mild. There was good sleighing the first week in January but then there was rain. Sleighing resumed again after January 18<sup>th</sup> when it again turned cold, the temperature fell to -7° F [-22° C] on the 20<sup>th</sup>. It was very cold on 2 & 3 February. In some places, the temperature dropped to -14° F [-26° C]. A big snowfall, two feet [0.6 m] deep, fell from February 29 to March 2 and snowdrifts were numerous on the hill roads until the first of April. March produced significant snowfalls and good sleighing. April was cold and windy. Spring was late and people were unable to plant their gardens until the middle of May.<sup>178</sup>

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### 1892 A.D.

There were disastrous floods in Andalusia, Murcia, and Estremadura in *Spain*, about 12 March 1892.<sup>90</sup> [Andalusia and Murcia are located in southern *Spain*. Estremadura is in west-central *Spain*.]

In 1892, there was a famine in Bombay [now Mumbai in the west coast of *India*] and Rajputana [now the state of Rajasthan in northwest *India*].<sup>94</sup>

Disastrous floods in upper *Italy* about 31 March 1892; railway communications stopped.<sup>90</sup>

On 31 March 1892, there was a destructive tornado in the northwestern *United States*. Over 30 persons were killed.<sup>94</sup>

On 31 March 1892, heavy gales and destructive tornadoes and thunderstorms struck Nebraska, Kansas, Oklahoma and Indian territories, Texas, Missouri, and Iowa in the *United States*. In Kansas, 34 lives were lost, and property to the estimated value of about \$150,000 was destroyed. [In present currency, that would be equivalent to \$3.6 million in damages based on the Consumer Price Index (CPI) inflation rates.] In Texas two lives were lost.<sup>136</sup>

— At Nelson, Nebraska, a tornado, about ¼ mile wide, struck the town. Five persons were injured, and considerable damage was caused to buildings.

— A tornado moved across Adgar [Edgar], Nebraska injuring several persons.

— At Smolan, Kansas, a tornado about 1,300 feet wide moved through the area. The storm destroyed property estimated at \$4,000 [Approximately \$100,000 in today's dollars].

— A tornado visited Oak Hill, Kansas. Following its passage, 2 children were killed and 12 buildings valued at \$6,000 were destroyed.

- At Towanda, Kansas, a tornado cut a path about ¼ mile wide, killing 8 persons, and destroying buildings valued at \$15,000 [\$360,000 in today's dollars].
- At Strong City, Kansas, a tornado killed 4 persons and caused property damage estimated at \$10,000.
- At Kiowa, Kansas, a heavy thunderstorm began 8.30 p.m. and continued until after midnight, damaging property to the extent of about \$15,000.
- A tornado about ¼ mile wide struck Wellington, Kansas. Six persons were killed.
- One person was killed at Liberty, Kansas.
- Near Salina, Kansas, a tornado with a clearly defined funnel-shaped cloud caused property damage estimated at \$100,000 [\$2.4 million in today's dollars].
- At Vine Creek, Kansas, a destructive storm caused the death of one person.
- About midnight a tornado about 700-foot wide struck Wamego, Kansas, destroying everything in a path and killing 5 persons.
- A tornado moved across Florence, Kansas in a path 150-foot wide, killing 2 persons.
- A tornado, approximately 700 feet wide, moved through Rose Hill, Kansas, killing one person; then South Haven killing another person; and then struck Augusta, where it killed 3 more people.
- A tornado passed through Bangs, Texas, cutting a path about one-half mile in width. One person was killed, and the damage to property in the county was about \$10,000.
- A tornado passed through Santa Anna, Texas. The storm first appeared like a column of smoke, then assumed a funnel shape, and struck the outskirts of the town, destroying a number of buildings. One person was killed and 13 were injured. A second tornado passed along a parallel track about the same time, destroying a number of buildings, and injuring several persons.

On 1 April 1892, a storm moved through the central *United States* causing major wind damage. High winds and local storms prevailed from Kansas, Nebraska, and Texas to the western lake region.<sup>136</sup>

- At Valentine, Nebraska, a violent windstorm, with velocity 40 to 58 miles per hour, continued 24 hours, unroofing houses, etc.
- At Lawrence, Kansas, the wind maintained a velocity of 70 to 79 miles per hour for 5 hours with a peak of 90 miles per hour.
- The estimated damage caused by high wind at Leavenworth, Kansas was \$50,000 [\$1.2 million in today's currency].
- A tornado moved over the west part of Harvey County, Kansas, destroying one house and prostrating a large number of trees.
- High wind destroyed small buildings at Wakefield, Shields, Seneca, and Manhattan, Kansas.
- At Kansas City, Missouri, a destructive gale injured 6 persons, one seriously, and property was destroyed to the value of about \$15,000.
- At Warrensburg [Warrensburg], Missouri, a church was blown down and other buildings were damaged.
- At Des Moines, Iowa, the winds reached an extreme velocity of 100 miles per hour, which was the highest ever noted at that station.
- At Chicago, Illinois, the wind reached a velocity of 54 miles per hour. Several buildings were blown down; a 7-story building was blown upon a 2-story tenement, killing at least 6 persons, and injuring many others. The estimated loss to property by the storm was \$40,000 [\$1 million in today's currency].
- At Hinesborough [Hindsboro], Illinois, two tornadoes struck the city; one person was injured and the damage to property was placed at \$2,000.

About 13 April 1892, there were destructive floods on the Mississippi River in the *United States*. There was a great loss of life. The flood resulted in around 250 lives lost. About 1,500 square miles [3,885 square kilometers] of land were covered by floodwaters near St. Louis. The estimated loss was 11 million dollars. [In present currency, that would be equivalent to \$263 million in damages based on the Consumer Price Index (CPI) inflation rates.] The floods abated around 25 May 1892.<sup>97</sup>

In April 1892, floods in the Tennessee River and tributaries caused great damage in Tennessee and northern Alabama in the *United States*. The Yallobusha River [Yalobusha River] was reported the highest ever known at Grenada, Mississippi. High water caused great damage in northern Mississippi. Large areas were submerged in Alabama by the overflow of the Coosa River. In east-central Mississippi great



destruction to life and property resulted from the overflow of the Tombigbee River and tributaries. The flooding drowned about 100 people and carried away much livestock.<sup>136</sup>

On 29 April 1892, there was a disastrous hurricane in *Mauritius* Island.<sup>94</sup>

On 29 April 1892, a hurricane struck *Mauritius*, an island nation in the Indian Ocean, killing 150 persons.<sup>197</sup>

Several regions of the *United States* were suffering from a drought during April 1892. In Florida the month was exceptionally dry. Oranges and small fruits were greatly damaged, and the oat crop was reported a complete failure. A very severe drought prevailed in southern and extreme western Texas. Corn and cottonseed failed to germinate, garden vegetables were a failure, and the outlook for wheat and oats was poor. Owing to absence of grass and water, a great loss of livestock occurred. Continued dry weather and hot winds, with heavy dust storms, severely injured vegetation about Fort Stanton, New Mexico. Grass on the ranges was backward and a great loss of livestock was reported. The month was very dry generally over Oklahoma Territory.<sup>136</sup>

About 6 May 1892, floods caused a rise of the rivers in Illinois in the *United States*; 15 towns flooded.<sup>90</sup>

In May 1892 destructive floods occurred in the middle and lower Mississippi River and tributaries in the *United States*. The most important Mississippi levees held firm. About 60,000 acres of cultivated land in the American Bottom, opposite Saint Louis, Missouri were submerged when the Mississippi River rose to 36 feet. Water from crevasses inundated plantations in various parts of Louisiana. The Missouri River flooded low-lying parts of Kansas City, Missouri. Great devastation by floods was reported along the Illinois River. On the 18<sup>th</sup>, a flood in the Floyd Valley, Iowa, resulted in the loss of about 20 lives and the destruction of property estimated at \$1 million. [In present currency, that would be equivalent to \$24 million in damages based on the Consumer Price Index (CPI) inflation rates.] One thousand families were rendered homeless; 3,000 people were reported destitute; 167 buildings were swept away and 700 were rendered unlivable. The Arkansas River reached the highest stage ever known at Fort Smith, Arkansas (30.9 feet) and overflowed about 10,000 acres of cultivated land. At Little Rock, Arkansas, the stage of water (27.9 feet) was the highest reached since 1844, and the plantations above and below Little Rock were reported underwater. The flooding near Little Rock caused an estimated \$200,000 damage [\$5 million in today's dollars]. Destructive floods occurred along the Red River in Texas and Louisiana. At Shreveport, Louisiana, the river reached the highest stage ever noted at that port, and large areas in Bossier Parish were submerged.<sup>136</sup>

On 26 May 1892, seven months of drought in New South Wales, *Australia* was relieved by rain.<sup>97</sup>

On 27 May 1892, a tornado struck Wellington, Kansas in the *United States*. Twelve persons were killed and property damage was estimated at \$200,000 [\$5 million in today's currency].<sup>136</sup>

On 9-11 June 1892, a hurricane struck *Cuba*. There were 16 deaths in Matanzas and large number in its vicinity. There was 1 death in Havana.<sup>141</sup>

On 14 June 1892, a heavy thunderstorm rolled through Greenfield, Massachusetts in the *United States*. Hailstones 2 to 2½ inches in diameter fell for 3 minutes; 8 persons were killed and property damage was estimated at \$15,000 [\$360,000 in today's dollars].<sup>136</sup>

On 15 June 1892, heavy thunderstorms and tornadoes moved through Minnesota in the *United States* causing destruction and loss of life. Approximately 29 lives were lost and damage exceeded \$133,000.

[In present currency, that would be equivalent to \$3.2 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>136</sup>

- A tornado struck 5 miles south of New Richland, Minnesota. The storm path was about 40 rods [660 feet] in width. Two persons were killed, and 20 buildings were destroyed.
- At Spring Valley, Minnesota, an unusually severe rain and thunderstorm damaged 2 buildings, which were struck by lightning, and caused about \$50,000 of flood damage [\$1.2 million in today's dollars].
- At Linden, Minnesota, lightning killed one person.
- At Easton, Minnesota, a destructive storm cut a path one-eighth to one-fourth mile in width; 14 persons were reported killed, and property damage was estimated at \$15,000.
- Near Minnesota Lake, Minnesota, a tornado cut a ¼ mile path moved through the area. Heavy timbers were carried 2 and 3 miles; debris was thrown in all directions; 4 persons were killed, and the damage to property was estimated at \$16,000.
- Near Winnebago City, Minnesota, a destructive storm with large hail destroyed several buildings.
- At Wells, Minnesota, a tornado cut a 300-500 foot path through buildings and trees; 2 persons were killed, and the damage to property was about \$20,000.
- Near Fairmount, Minnesota, a tornado cut a path about 10 rods in width. Two persons were killed, and the damage to property in Martin County was placed at \$20,000.
- A heavy thunderstorm moved through Albert Lea, Minnesota; 2 persons were killed.
- At Hartland, Minnesota, a thunderstorm, with hail and heavy rain struck; one person was killed, houses and trees were destroyed.
- At Freeborn, Minnesota, a tornado with hail, heavy rain, and sharp lightning, cut a ¼ mile path; one person was killed, and the damage to buildings was estimated at \$10,000.
- Near Blooming Prairie, Minnesota, a tornado cut a 300-foot path; several persons were injured, and heavy articles were carried long distances.
- At Saint Paul, Minnesota, 1.00 inch of rain fell in 10 minutes.
- At Nashville Center, Minn., a thunderstorm, with funnel-shaped cloud, caused damage to the extent of \$2,000 to \$3,000.

On 15-16, June 1892, there were destructive storms in Minnesota in the *United States* and in *Canada*, which caused great loss of life.<sup>94</sup>

On 26 June 1892, a destructive storm struck Bunceton, Missouri in the *United States*. Large hail fell. Damage to crops and property was estimated at over \$200,000 [\$5 million in today's dollars].<sup>136</sup>

July 1892 was noted as a period of persistent and exceptionally high temperatures in the *United States*. From the 18<sup>th</sup> to the 24<sup>th</sup> the daily maximum temperature in Kansas and Nebraska was 100° F or above. In the Atlantic coast and Southern States the period of greatest heat extended from the 24<sup>th</sup> to the 28<sup>th</sup>. At Philadelphia, Pennsylvania, a maximum temperature of 101° F was recorded on the 26<sup>th</sup>, and 99° F was the maximum reading at Baltimore, Maryland, and Washington D.C. On the 27<sup>th</sup> the temperature reached 100° F at Lynchburg, Virginia. These temperatures were the highest ever recorded at the respective stations for the previous third decade for the month of July.<sup>136</sup>

The following were the highest temperatures observed during July 1892 in the *United States*:<sup>136</sup>

Montgomery, Alabama	( 95° F, 35.0° C)
Mobile, Alabama	( 93° F, 33.9° C)
Tucson, Arizona	(106° F, 41.1° C)
Yuma, Arizona	(112° F, 44.4° C)
Little Rock, Arkansas	( 95° F, 35.0° C)
Fort Smith, Arkansas	( 99° F, 37.2° C)
San Francisco, California	( 90° F, 32.2° C)
San Diego, California	( 75° F, 23.9° C)
Fresno, California	(110° F, 43.3° C)
Denver, Colorado	( 97° F, 36.1° C)
Pueblo, Colorado	(100° F, 37.8° C)

New Haven, Connecticut	( 96° F, 35.6° C)
New London, Connecticut	( 92° F, 33.3° C)
Kirkwood, Delaware	(102° F, 38.9° C)
Washington, D.C.	( 99° F, 37.2° C)
Pensacola, Florida	( 92° F, 33.3° C)
Key West, Florida	( 88° F, 31.1° C)
Augusta, Georgia	( 97° F, 36.1° C)
Savannah, Georgia	( 97° F, 36.1° C)
Ruthburg, Idaho	(101° F, 38.3° C)
Boise Barracks, Idaho	(109° F, 42.8° C)
Chicago, Illinois	( 94° F, 34.4° C)
Cairo, Illinois	( 94° F, 34.4° C)
Indianapolis, Indiana	( 97° F, 36.1° C)
Vevay, Indiana	(100° F, 37.8° C)
Dubuque, Iowa	( 95° F, 35.0° C)
Keokuk, Iowa	( 94° F, 34.4° C)
Topeka, Kansas	(100° F, 37.8° C)
Dodge City, Kansas	(102° F, 38.9° C)
McAllaster, Kansas	(110° F, 43.3° C)
Louisville, Kentucky	( 98° F, 36.7° C)
Lexington, Kentucky	( 97° F, 36.1° C)
New Orleans, Louisiana	( 93° F, 33.9° C)
Shreveport, Louisiana	( 97° F, 36.1° C)
Eastport, Maine	( 88° F, 31.1° C)
Portland, Maine	( 90° F, 32.2° C)
Baltimore, Maryland	( 99° F, 37.2° C)
Boston, Massachusetts	( 96° F, 35.6° C)
Nantucket, Massachusetts	( 87° F, 30.6° C)
Marquette, Michigan	( 92° F, 33.3° C)
Detroit, Michigan	( 96° F, 35.6° C)
Saint Vincent, Minnesota	( 88° F, 31.1° C)
Saint Paul, Minnesota	( 90° F, 32.2° C)
Vicksburg, Mississippi	( 95° F, 35.0° C)
Saint Louis, Missouri	( 96° F, 35.6° C)
Fort Keogh, Montana	(107° F, 41.7° C)
Camp Poplar River, Montana	(102° F, 38.9° C)
Theford, Nebraska	(113° F, 45.0° C)
North Platte, Nebraska	(102° F, 38.9° C)
Omaha, Nebraska	(100° F, 37.8° C)
Winnemucca, Nevada	( 96° F, 35.6° C)
Carson City, Nevada	( 90° F, 32.2° C)
West Milan, New Hampshire	( 90° F, 32.2° C)
New Brunswick, New Jersey	( 99° F, 37.2° C)
Camden, New Jersey	(105° F, 40.6° C)
Santa Fe, New Mexico	( 86° F, 30.0° C)
Albany, New York	( 95° F, 35.0° C)
New York City, New York	( 96° F, 35.6° C)
Charlotte, North Carolina	( 97° F, 36.1° C)
Chapel Hill, North Carolina	(103° F, 39.4° C)
Kitty Hawk, North Carolina	( 95° F, 35.0° C)
Bismarck, North Dakota	( 90° F, 32.2° C)
Medora, North Dakota	(108° F, 42.2° C)
Cincinnati, Ohio	( 98° F, 36.7° C)
Columbus, Ohio	( 97° F, 36.1° C)
Oklahoma City, Oklahoma	( 98° F, 36.7° C)
Fort Sill, Oklahoma	(104° F, 40.0° C)

Roseburg, Oregon	( 89° F, 31.7° C)
Portland, Oregon	( 88° F, 31.1° C)
Erie, Pennsylvania	( 90° F, 32.2° C)
Philadelphia, Pennsylvania	(101° F, 38.3° C)
Block Island, Rhode Island	( 88° F, 31.1° C)
Charleston, South Carolina	( 95° F, 35.0° C)
Columbia, South Carolina	(101° F, 38.3° C)
Yankton, South Dakota	(101° F, 38.3° C)
Nashville, Tennessee	( 96° F, 35.6° C)
Knoxville, Tennessee	( 95° F, 35.0° C)
San Antonio, Texas	( 97° F, 36.1° C)
Galveston, Texas	( 88° F, 31.1° C)
Salt Lake City, Utah	( 96° F, 35.6° C)
Burlington, Vermont	( 92° F, 33.3° C)
Lynchburg, Virginia	(100° F, 37.8° C)
Norfolk, Virginia	( 99° F, 37.2° C)
Olympia, Washington	( 86° F, 30.0° C)
Spokane, Washington	( 96° F, 35.6° C)
Charleston, West Virginia	( 98° F, 36.7° C)
Milwaukee, Wisconsin	( 95° F, 35.0° C)
La Crosse, Wisconsin	( 93° F, 33.9° C)
Cheyenne, Wyoming	( 93° F, 33.9° C)

The following were the highest temperatures observed during July 1892: <sup>136</sup>

Fort Francis, Ontario, <i>Canada</i>	( 92° F, 33.3° C)	
La Logia, <i>Mexico</i>	(100° F, 37.8° C)	
Leon de Aldamas, <i>Mexico</i>	( 87° F, 30.6° C)	(now León, Guanajuato)
Mazatlan, <i>Mexico</i>	( 90° F, 32.2° C)	
Mexico City, <i>Mexico</i>	( 79° F, 26.1° C)	
Puebla, <i>Mexico</i>	( 80° F, 26.7° C)	
Topolobampo, <i>Mexico</i>	( 96° F, 35.6° C)	
Vera Cruz, <i>Mexico</i>	( 89° F, 31.7° C)	
Hamilton, <i>Bermuda</i>	( 86° F, 30.0° C)	

On 6-8 July 1892 at Edwards, Mississippi in the *United States*, 16.7 inches of rain fell. <sup>116</sup>

On 26 July 1892, heavy rains at Minneapolis, Minnesota in the *United States*, flooded sewers and interrupted street traffic. In Saint Paul, Minnesota, the damage from heavy rains was estimated at \$250,000 [\$6 million in today's dollars]. <sup>136</sup>

On 4 August 1892, a severe wind and hailstorm passed through Burlington, North Towanda, Ulster, Sheshequin, Rome, Orwell and Pike in Bradford County, Pennsylvania in the *United States*, and did much damage to buildings, fences, tobacco and other crops. <sup>178</sup>

On 22 August 1892, a destructive cloudburst was reported at Roanoke, Virginia in the *United States*. One man was drowned. The streets were flooded to a depth of 3 to 5 feet. And the damage to property was estimated at \$100,000 [\$2.4 million in today's dollars]. <sup>136</sup>

On 30 August 1892, the Great Lakes in the *United States* encountered a severe gale. A schooner was capsized 14 miles north of Manistee, Michigan. The crew consisting of 8 persons was drowned and the vessel was a total loss. A large steamer was lost 60 miles west of Whitefish Point, Michigan. The passengers and crew, numbering 28 persons were, with one exception, drowned. Disasters were also reported at other points on the upper lakes. <sup>136</sup>

On 12 September 1892, there was a cyclone on the *Cape Verde Islands*. Houses, shipping, plantations, and cattle were destroyed.<sup>94</sup>

A "norther" [tropical storm] prevailed along the Mexican coast about Vera Cruz, *Mexico*, from 24-27 September 1892. The maximum wind velocity was reached on the 25<sup>th</sup>, when it continued with undiminished strength for 6 hours. It blew continually in whirls, carrying away roofs of small houses in the vicinity of Vera Cruz, *Mexico*, dashed the American brig *Bazanes* upon the coast, interrupted telegraphic communication, and caused serious damage to the Mexican Railroad. In the southern part of the state of Vera Cruz, even on the frontier, including Oaxaca, the storm was terrible in character and disastrous in its effects, and lightning was an attendant phenomenon. In that section, 5 brick and more than 200 wooden houses were thrown down, a large number of cattle were killed, crops were ruined, trees were uprooted in great numbers, and, what was still worse, many persons were killed and many others were injured. At Pachuca and to the north of Vera Cruz the storm was very severe.<sup>136</sup>

In the Atlantic coast states from New England to Florida and in parts of the Ohio and upper Mississippi valleys and Tennessee, October 1892 was the driest October on record up to that time in the *United States*. In many localities, serious inconvenience and suffering were caused by the failure of cisterns, wells, and streams.<sup>136</sup>

On 13 October 1892, there were great floods in *Italy*. Near Genoa, bridges were destroyed and there were several deaths. Lake Como overflows its banks. On 15 October 1892, railway communication between Rome and Genoa stopped.<sup>97</sup> [Genoa is located along the coast of northwestern *Italy*. Lake Como is inland in northern *Italy*.]

On 13-15 October 1892, there were great floods through heavy rains in northeastern Yorkshire in *England*. There was much damage in York, Leeds, and other places; several persons, and cattle and sheep drowned.<sup>97</sup>

On 13 October 1892, there were destructive floods in Derbyshire, *England* and *Wales*.<sup>97</sup>

Heavy gales prevailed over the Great Lakes in the *United States* during 28-29 October 1892. About 40 vessels were wrecked or damaged, and much damage was caused in the interior. At Milwaukee, Wisconsin, fire driven by high storm winds destroyed property estimated at \$5 million [\$120 million in today's dollars] on the 28<sup>th</sup>. A schooner was wrecked 9 miles south of Manistee, Michigan. At Alpena, Michigan, a number of wrecks were reported. During the 29<sup>th</sup>, a schooner was wrecked near Muskegon, Michigan, and the captain was drowned. The wind lowered the water in the river at Detroit 4 feet and the water in Lake Saint Clair was lowered 2 feet. At Sandusky, Ohio, the gale lowered the water in the bay 5 feet, grounding several vessels. At Cleveland, Ohio, the wind reached a velocity of 60 miles per hour on the 29<sup>th</sup>; 3 steamers, 5 barges, and 2 schooners went ashore in the harbor.<sup>136</sup>

In October 1892, there were disastrous floods in the island of Sardinia, *Italy* and *Venezuela*.<sup>97</sup>

Around 7 November 1892, there was a great storm in the *Black Sea*. Eight ships said to have been wrecked, including the *Lord Byron*.<sup>94</sup>

On 17 November 1892, a well-defined tornado visited Red Bud, Illinois in the *United States*, killing 2 persons, injuring 7, and destroying 82 buildings.<sup>136</sup>

In December 1892, a destructive storm struck the *Black Sea*. The loss of 30 steamers was reported, including the *City of Manchester*.<sup>94</sup>

In 1892 during the period between 24 June and 23 July, floods struck Hopei (now Hebei province) in northern *China* at Nan-yüeh and Kansu (now Gansu province) in northwest *China* at Lin-t'an. Also during the same period (between 24 June and 23 July), a drought engulfed Chekiang (now Zhejiang province) on the east coast of *China* at Chin-hua and Kansu province at Lanchow, Ching-ning, Lin-t'an, T'ung-wei, and Ch'ing-yang.<sup>153</sup>

*Also refer to the section 1889 A.D. – 1892 A.D. for information on the famine in India, Russia, Japan, Hungary and Montenegro during that timeframe.*

*Also refer to the section 1890 A.D. – 1900 A.D. for information on the drought in South Africa during that timeframe.*

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**Winter of 1892 / 1893 A.D.** At Red Wing, Minnesota in the *United States*, the Mississippi River froze over on the 10 December 1892. On the 19<sup>th</sup>, teams [horses, oxen, wagons] were crossing on the ice. At Davenport, Iowa, the Mississippi River was frozen over on the 23<sup>rd</sup> and by the 28<sup>th</sup>, teams were crossing on the ice. At Muscatine, Iowa, the Mississippi River was frozen over on the 22<sup>nd</sup>. At Saint Louis, Missouri, the Mississippi River was frozen and navigation closed on the 28<sup>th</sup>. At Santee Agency, Nebraska, the Missouri River was frozen over on December 11<sup>th</sup> and teams were crossing the ice on the 22<sup>nd</sup>. At Glasgow, Missouri, teams were reported crossing on the ice on the Missouri River on the 25<sup>th</sup>.<sup>136</sup>

During 20-25 December 1892, exceptionally severe storms prevailed over the Pacific coast states of the *United States*. Heavy snow prevailed over Washington from the 21<sup>st</sup> to the 23<sup>rd</sup>, causing damage to property and interrupting railroad traffic. At Tatoosh Island, Washington, a gale prevailed from the 21<sup>st</sup> to the 23<sup>rd</sup>, reaching a maximum velocity of 83 miles per hour. At Olympia, Washington, 2 feet of snow fell from the 20<sup>th</sup> to 22<sup>nd</sup>. At Port Angeles, Washington, the depth of snow exceeded one foot. At Portland, Oregon, about 2 feet of snow fell on the 22<sup>nd</sup> and 23<sup>rd</sup>, this was the heaviest snowfall on record up to that time.<sup>136</sup>

During the winter of 1892-93 in Bradford County, Pennsylvania in the *United States*, December was very mild until the last week when it turned cold. The temperature fell to -8° F [-22° C] on December 27<sup>th</sup>. There were some light snow squalls in December but no sleighing on the hills until the first week in January. Most of January was severe with good sleighing generally. On February 15<sup>th</sup>, it snowed all day without any breaks, but it turned warm on the 16<sup>th</sup> and the snow soon disappeared. The night of February 19<sup>th</sup> was one of terror. The wind blew a constant gale and the weather was intensely cold. There was good sleighing until about the middle of March when heavy rains fell. April was cold and boisterous with snow and hail on the 6<sup>th</sup>, thunderstorm on the 8<sup>th</sup> and a terrific windstorm on the 20<sup>th</sup>. Bluebirds appeared on March 13<sup>th</sup>. Nevertheless spring was very late and there were no planting gardens until the middle of May. On May 7<sup>th</sup> in many places, it froze ice.<sup>178</sup>

On 22-24 December 1892 at Upper Mattole, California in the *United States*, 16.93 inches of rain fell.<sup>116</sup>

The River Thames in London, *England* froze between Maidenhead and Windsor.<sup>29</sup>

There was a frost from 24 December 1892 to 8 January 1893. The frost was severe in *Britain* and the [*European*] Continent from 1-8 January 1893. Many deaths were reported.<sup>94</sup>

The *Baltic Sea* froze during the winter of 1892-93. (In modern times, the *Baltic Sea* also froze during the winters of 1939-40, 1941-42, and 1946-47.) [A partial freezing of the *Baltic Sea* occurred during the winter of 2009-10. This was the coldest winter of the XXI century and the *Baltic Sea* was frozen to the depth of 2/3 feet (20 centimeters) for the length of 10.6 miles (15 kilometers) from the beach line.]<sup>37, 68</sup>



During the winter of 1892-93, the *Baltic Sea* was completely covered with ice.<sup>68</sup>

The following are the lowest temperatures observed during January 1893 in the *United States*:<sup>117</sup>

Montgomery, Alabama	( 17° F, -8.3° C)
Mobile, Alabama	( 22° F, -5.6° C)
Tucson, Arizona	( 23° F, -5.0° C)
Yuma, Arizona	( 33° F, +0.6° C)
Little Rock, Arkansas	( 11° F, -11.7° C)
Fort Smith, Arkansas	( 6° F, -14.4° C)
San Francisco, California	( 36° F, +2.2° C)
San Diego, California	( 38° F, +3.3° C)
Denver, Colorado	( 13° F, -10.6° C)
Pueblo, Colorado	( 10° F, -12.2° C)
New Haven, Connecticut	( -3° F, -19.4° C)
New London, Connecticut	( -4° F, -20.0° C)
Millsboro, Delaware	(-17° F, -27.2° C)
Washington, D.C.	( -6° F, -21.1° C)
Pensacola, Florida	( 23° F, -5.0° C)
Key West, Florida	( 52° F, +11.1° C)
Augusta, Georgia	( 12° F, -11.1° C)
Atlanta, Georgia	( 8° F, -13.3° C)
Savannah, Georgia	( 18° F, -7.8° C)
Henry's Lake, Idaho	(-25° F, -31.7° C)
Kootenai, Idaho	(-21° F, -29.4° C)
Chicago, Illinois	(-16° F, -26.7° C)
Cairo, Illinois	( 0° F, -17.8° C)
Indianapolis, Indiana	(-15° F, -26.1° C)
Lafayette, Indiana	(-25° F, -31.7° C)
Dubuque, Iowa	(-23° F, -30.6° C)
Keokuk, Iowa	(-12° F, -24.4° C)
Decorah, Iowa	(-36° F, -37.8° C)
Topeka, Kansas	( 0° F, -17.8° C)
Dodge City, Kansas	( 2° F, -16.7° C)
Louisville, Kentucky	(-10° F, -23.3° C)
Lexington, Kentucky	(-11° F, -23.9° C)
New Orleans, Louisiana	( 29° F, -1.7° C)
Shreveport, Louisiana	( 26° F, -3.3° C)
Eastport, Maine	( -6° F, -21.1° C)
Portland, Maine	( -5° F, -20.6° C)
Fort Kent, Maine	(-39° F, -39.4° C)
Baltimore, Maryland	( 1° F, -17.2° C)
Boston, Massachusetts	( -4° F, -20.0° C)
Nantucket, Massachusetts	( 4° F, -15.6° C)
Marquette, Michigan	(-15° F, -26.1° C)
Detroit, Michigan	(-10° F, -23.3° C)
Saint Vincent, Minnesota	(-38° F, -38.9° C)
Saint Paul, Minnesota	(-23° F, -30.6° C)
Vicksburg, Mississippi	( 20° F, -6.7° C)
Saint Louis, Missouri	( -2° F, -18.9° C)
Hogan, Montana	(-45° F, -42.8° C)
Havre, Montana	(-43° F, -41.7° C)
Helena, Montana	(-42° F, -41.1° C)
North Platte, Nebraska	( -5° F, -20.6° C)
Omaha, Nebraska	( -9° F, -22.8° C)
Winnemucca, Nevada	( -8° F, -22.2° C)
Carson City, Nevada	( 18° F, -7.8° C)

Berlin, New Hampshire	(-27° F, -32.8° C)
New Brunswick, New Jersey	(-10° F, -23.3° C)
Cape May, New Jersey	( -7° F, -21.7° C)
Santa Fe, New Mexico	( 13° F, -10.6° C)
Albany, New York	( -5° F, -20.6° C)
New York City, New York	( 1° F, -17.2° C)
Charlotte, North Carolina	( 5° F, -15.0° C)
Kitty Hawk, North Carolina	( 9° F, -12.8° C)
Bismarck, North Dakota	(-32° F, -35.6° C)
Fort Stevenson, North Dakota	(-48° F, -44.4° C)
Dickinson, North Dakota	(-47° F, -43.9° C)
Cincinnati, Ohio	(-11° F, -23.9° C)
Columbus, Ohio	(-12° F, -24.4° C)
Oklahoma City, Oklahoma	( -2° F, -18.9° C)
Fort Sill, Oklahoma	( 5° F, -15.0° C)
Roseburg, Oregon	(23° F, -5.0° C)
Portland, Oregon	(12° F, -11.1° C)
Erie, Pennsylvania	( -5° F, -20.6° C)
Philadelphia, Pennsylvania	( 0° F, -17.8° C)
Block Island, Rhode Island	( 2° F, -16.7° C)
Charleston, South Carolina	(20° F, -6.7° C)
Columbia, South Carolina	(11° F, -11.7° C)
Yankton, South Dakota	(-13° F, -25.0° C)
Nashville, Tennessee	( 3° F, -16.1° C)
Knoxville, Tennessee	(-10° F, -23.3° C)
San Antonio, Texas	(26° F, -3.3° C)
Galveston, Texas	(37° F, +2.8° C)
Salt Lake City, Utah	( 4° F, -15.6° C)
Burlington, Vermont	(-10° F, -23.3° C)
Lynchburg, Virginia	( -6° F, -21.1° C)
Norfolk, Virginia	( 6° F, -14.4° C)
Olympia, Washington	( 6° F, -14.4° C)
Spokane, Washington	(-19° F, -28.3° C)
Morgantown, West Virginia	( -4° F, -20.0° C)
Milwaukee, Wisconsin	(-14° F, -25.6° C)
La Crosse, Wisconsin	(-26° F, -32.2° C)
Cheyenne, Wyoming	( 0° F, -17.8° C)

The following are the lowest temperatures observed during January 1893: <sup>117</sup>

Fort Francis, Ontario, <i>Canada</i>	(-38° F, -38.9° C)
St. John, Newfoundland, <i>Canada</i>	( -7° F, -21.7° C)
Leon de Aldamas, <i>Mexico</i>	(35° F, +1.7° C) (now León, Guanajuato)
Puebla, <i>Mexico</i>	(37° F, +2.8° C)
Topolobampo, <i>Mexico</i>	(48° F, +8.9° C)
Hamilton, <i>Bermuda</i>	(49° F, +9.4° C)

In the *United States* at Woods Hall and Nantucket, Massachusetts; Block Island, Rhode Island; New London and New Haven, Connecticut; New York City, Plattsburg Barracks, Rochester, and Buffalo, New York; Atlantic City, New Jersey, Philadelphia, Pittsburg, Erie, Dyberry, Grampian, and Wellsboro, Pennsylvania; Baltimore and Cumberland, Maryland; Washington, D. C.; Norfolk and Lynchburg, Virginia; Raleigh, Charlotte, Hatteras, Kitty Hawk, Wilmington, Southport, and Lenoir, North Carolina; Stateburg, South Carolina; Augusta and Savannah, Georgia; Jacksonville, Florida; Louisville, Kentucky; Parkersburg, West Virginia; Cincinnati, Columbus, Cleveland, and Toledo, Ohio; Indianapolis and Lafayette, Indiana; Springfield and Chicago, Illinois; and Davenport and Dubuque, Iowa, the mean

temperature for January 1893 was the lowest January mean temperature since observations began [by the Weather Bureau].<sup>117</sup>

Ice formed in rivers, lakes and harbors, and caused the closing of navigation at many locations in January 1893 in the *United States*:<sup>117</sup>

- \* At Portland, Maine, ice formed in the lower bay on the 14<sup>th</sup> for the first time since 1884.
- \* Great floes of ice interfered with navigation in *Boston Harbor* in Massachusetts from the 11<sup>th</sup> to the 13<sup>th</sup>.
- \* At Vineyard Haven, Massachusetts, the harbor was frozen on the 12<sup>th</sup>.
- \* At New London, Connecticut, the *Connecticut River* was frozen over on the 11<sup>th</sup>.
- \* Ice in the rivers and harbor at New York City interfered with navigation at intervals during the month.
- \* At Baltimore, Maryland, ice seriously interfered with navigation from the 17<sup>th</sup> to the 22<sup>nd</sup>.
- \* Heavy ice was encountered about the Delaware Breakwater, in the *Delaware River* and in the *Delaware Bay*.
- \* A report from Norfolk, Virginia, dated the 24<sup>th</sup>, stated that navigation in that vicinity had been stopped for two weeks, large steamers, only, being able to cut their way through.
- \* At New Brunswick, New Jersey, ice in the *Raritan River* was 14 inches in thickness on the 20<sup>th</sup>.
- \* At Penns Grove, New Jersey, the *Delaware River* was closed during the month, except the west channel, which was kept open by iceboats.
- \* Heavy ice interfered with navigation at Philadelphia, Pennsylvania, on the 12<sup>th</sup>.
- \* At Washington, D. C., navigation on the *Potomac River* was closed by ice from the 16<sup>th</sup> to the 28<sup>th</sup>. During the cold spell which began December 20, 1892, and continued with little interruption until about January 23, 1893, the mean temperature was 21.2° F, and ice formed on the *Potomac River* to a thickness of 13.5 inches at a point in mid-stream about one half mile above the Aqueduct bridge.
- \* At Clarksville, Virginia, the *Roanoke River* was frozen from the 8<sup>th</sup> to the 26<sup>th</sup>.
- \* At Richmond, Virginia, the *James River* was frozen from the 7<sup>th</sup> to the 26<sup>th</sup>.
- \* At Kitty Hawk, North Carolina, *Albemarle Sound and Bay* were frozen over from the 3<sup>rd</sup> to the 28<sup>th</sup>, suspending navigation.
- \* At Hatteras, North Carolina, navigation was suspended on account of heavy ice.
- \* At Tarboro, North Carolina, the *Tar River* was frozen over on the 19<sup>th</sup>; from the 20<sup>th</sup> to the 23<sup>rd</sup> persons were crossing on the ice.
- \* At Fayetteville, North Carolina, the *Cape Fear River* was frozen over on the 19<sup>th</sup>.
- \* At Cheraw, South Carolina, the *Pee Dee River* was frozen over from the 14<sup>th</sup> to the 26<sup>th</sup>.
- \* At Saint Stephens, South Carolina, floating ice was reported in the *Santee River*, on the 21<sup>st</sup> and 22<sup>nd</sup>.
- \* At Resaca, Georgia, the *Oostanaula River* was frozen over from the 14<sup>th</sup> to the 24<sup>th</sup>.
- \* At Rome, Georgia, the *Oostanaula River* was frozen on the 16<sup>th</sup> for the first time since January 1857. On the 23<sup>rd</sup> the ice was 4 inches thick and people were crossing the river on the ice.
- \* At Whitesburg, Georgia, the *Chattahoochee River* was frozen over from the 19<sup>th</sup> to the 21<sup>st</sup>.
- \* At Cordova, Alabama, floating ice was reported in the *Big Warrior River* on the 16<sup>th</sup>. On the 17<sup>th</sup> the river was partly frozen.
- \* At Wilsonville, Alabama, the *Coosa River* was frozen on the 20<sup>th</sup>.
- \* At Florence, Alabama, there was floating ice in the *Tennessee River* from the 11<sup>th</sup> to the 19<sup>th</sup>.
- \* At Charleston, West Virginia, floating ice was reported in the *Kanawha River* on the 1<sup>st</sup> and the river was closed to navigation on the 7<sup>th</sup>.
- \* At Freeport, Pennsylvania, the *Alleghany River* was closed on the 7<sup>th</sup>.
- \* In New York on the 17<sup>th</sup>, the south end of *Seneca Lake* was frozen over for the first time since 1885.
- \* At Greensboro, Pennsylvania; Morgantown and Fairmont, West Virginia, the *Monongahela River* was frozen during different periods of the month.
- \* At Pittsburg, Pennsylvania, the *Ohio River* was frozen from the 11<sup>th</sup> to the 25<sup>th</sup>.
- \* At Parkersburg, West Virginia, the *Ohio River* was frozen on the 1<sup>st</sup>.
- \* At Wheeling, West Virginia, the *Ohio River* was frozen in January.
- \* At New Cumberland, West Virginia, the *Ohio River* was frozen in January.
- \* At Cincinnati, Ohio, the *Ohio River* was frozen on the 6<sup>th</sup>. On the 8<sup>th</sup>, an ice gorge broke at 2 p.m. and the river was filled with a mass of grinding, crushing ice 4 to 10 feet in thickness, which caused great destruction to river property.
- \* At Shawnee Town, Ohio, the *Ohio River* was frozen from the 13<sup>th</sup> to 26<sup>th</sup>.
- \* At Maysville, Kentucky, teams crossed on the ice on the *Ohio River*.

- \* At Louisville, Kentucky, navigation on the *Ohio River* was nearly suspended on account of heavy ice from the 1<sup>st</sup> to the 6<sup>th</sup>. On the 7<sup>th</sup> the river was full of floating ice. On the 8<sup>th</sup> and 9<sup>th</sup>, the river above the city was gorged with ice. On the 10<sup>th</sup>, the gorge above city broke and caused considerable damage to a coal fleet anchored at Louisville.
- \* At Mount Vernon, Indiana, the *Ohio River* was closed on the 15<sup>th</sup>.
- \* At Louisa, Kentucky, navigation on the *Big Sandy River* was closed on the 1<sup>st</sup>.
- \* At Nashville, Tennessee, a thin ice covered the *Cumberland River* on the 13<sup>th</sup> for the first time since 1877. By the 16<sup>th</sup>, the ice was 2 to 3 inches thick on the river.
- \* At Knoxville, Tennessee, the *Tennessee River* was frozen over on the 16<sup>th</sup>.
- \* At Chattanooga, Tennessee, the *Tennessee River* was frozen from the 17<sup>th</sup> to the 22<sup>nd</sup>.
- \* At Paducah, Kentucky, the *Tennessee River* was frozen over on the 16<sup>th</sup>.
- \* At St. Louis, Missouri, the *Mississippi River* was closed for navigation on the 21<sup>st</sup>.
- \* At Cairo, Illinois, the *Mississippi River* was frozen from shore to shore on the 10<sup>th</sup>, and the *Ohio River* was full of floating ice.
- \* At Memphis, Tennessee, heavy floating ice was reported on the *Mississippi River* from the 12<sup>th</sup> to the 19<sup>th</sup>.
- \* At Helena, Arkansas, ice was reported in the *Mississippi River* on the 15<sup>th</sup>.
- \* On the 22<sup>nd</sup>, the ice in the bay at Erie, Pennsylvania was 17 to 18 inches in thickness.
- \* At Detroit, Michigan, the river was frozen over and people were crossing on the ice on the 10<sup>th</sup>. On the 23<sup>rd</sup> people and teams crossed on the ice from the mainland to many of the islands of the northwest part of *Lake Erie* for the first time in many years.
- \* At Saint Ignace, Michigan, an ice bridge formed to Mackinac Island.
- \* At Grand Haven, Michigan, the harbor was blocked by ice on the 17<sup>th</sup>.
- \* At Miles City, Montana, the *Yellowstone River* was frozen during the beginning of January.
- \* At the Dalles, Oregon, ice was reported in the *Columbia River* from the 1<sup>st</sup> to 3<sup>rd</sup>, and 16<sup>th</sup> to 31<sup>st</sup>.

From January 17<sup>th</sup> to the 19<sup>th</sup> in the *United States*, an exceptionally heavy snowstorm extended eastward over the Gulf and south Atlantic states. The depth of the snowfall in Southern States during 17-19 January: <sup>117</sup>

Raleigh, North Carolina	12.0 inches
Lillington, North Carolina	11.5 inches
Louisburg, North Carolina	12.0 inches
Pittsboro, North Carolina	12.0 inches
Greenville, South Carolina	8.5 inches
Anderson, South Carolina	9.0 inches
Longshore, South Carolina	8.0 inches
Atlanta, Georgia	9.5 inches
Lafayette, Georgia	10.0 inches
Athens, Georgia	10.0 inches
Adairsville, Georgia	11.0 inches
Dahlonega, Georgia	12.0 inches
Gillsville, Georgia	11.0 inches
Toccoa, Georgia	10.0 inches
Canton, Georgia	10.0 inches
Tuscumbia, Alabama	10.0 inches
Gadsden, Alabama	13.5 inches
Decatur, Alabama	10.0 inches
Florence, Alabama	10.5 inches
Fayette, Alabama	10.0 inches
University, Mississippi	11.0 inches
Okolona, Mississippi	10.0 inches
Clarksdale, Mississippi	10.0 inches
Pontotoc, Mississippi	12.0 inches
Corinth, Mississippi	10.0 inches
Little Rock, Arkansas	13.0 inches
Fort Smith, Arkansas	10.5 inches
Kirby, Arkansas	12.0 inches

Stuttgart, Arkansas	12.0 inches
Brinkley, Arkansas	11.0 inches
New Gascony, Arkansas	10.0 inches
Dallas, Arkansas	10.0 inches
Pine Bluff, Arkansas	11.0 inches
Conway, Arkansas	10.2 inches
Madding, Arkansas	11.0 inches

On 14-15 January 1893 at Fort Canby, Washington in the *United States*, powerful squalls struck. The winds on the 14<sup>th</sup>, reached an extreme velocity of 110 miles. The gale continued until about noon of the 15<sup>th</sup>, and reached an extreme velocity of 120 miles per hour at 2.20 a.m. Several houses were blown down, trees were uprooted and broken off, and telegraph lines were prostrated. At Tatoosh Island, Washington, the maximum wind velocity was 72 miles on the 14<sup>th</sup>, and 76 miles per hour on the 15<sup>th</sup>.<sup>117</sup>

In January 1893, a succession of severe cold waves visited the east Gulf and south Atlantic states in the *United States*. In Florida the severest frosts of the month were noted on the 7<sup>th</sup>, 14<sup>th</sup>, and 17<sup>th</sup>.<sup>117</sup>

— On the 7<sup>th</sup>, ripening strawberries, oranges, and some orange trees were frozen at Flatwood [today near Pine Meadows Conservation Area], 2 miles northeast of Eustis, Florida; frost was reported at Jupiter; ice 1/8 inch in thickness and frost were noted at Titusville; and tender vegetation about Tampa was injured by cold. Light frost killed tender vegetation about Jupiter on the 11<sup>th</sup> and 13<sup>th</sup>.

— On the 14<sup>th</sup>, orange trees were frozen at Flatwood, and heavy frost killed many plants about Jupiter; pineapples were not seriously damaged. At Titusville, heavy frost and ice ¼ inch in thickness formed; oranges on trees back from the river were reported frozen solid. At City Point, all tender vegetation and bananas and oranges exposed to the westerly wind were killed. Thin ice was reported at Fort Pierce, 92 miles south of Titusville. At Tampa, the temperature fell to 31° F without causing material damage to fruit.

— On the 17<sup>th</sup>, the temperature fell to 24° F at Jacksonville, the lowest temperature noted at that station since 4 January 1887. At Titusville a large number of young fish were reported killed by cold. About Jupiter, tender vegetation and pineapples in exposed places were injured, and damaging frost was reported to the southern extremity of the "**Everglades**." At Tampa, the minimum temperature, 29° F, was the lowest noted at that place since 1886, and oranges in exposed places were slightly injured. On the 19<sup>th</sup>, heavy frost injured tender vegetation about Galveston, Texas.

February 1893 was unusually cold over the greater part of the *United States*. On the 1<sup>st</sup>, weather stations in the Dakotas, Montana, and eastern Washington reported the lowest temperature on record for February. On that date a severe "norther" was attended by a fall in temperature of 40° F to 60° F in the Western and Southwestern States. The temperature fell 20° F to 30° F in one hour in northern Texas. In Montana, the cold of the first four days of February was unprecedented; at regular stations of the Weather Bureau the temperature ranged -28° F to -45° F; and along the line of the Great Northern Railroad in western Montana, temperature -50° F to -60° F was reported. A second severe cold wave overspread the West and Southwest on the 6<sup>th</sup>, with a fall in temperature of 40° F to 50° F from the middle Mississippi valley to Oklahoma. Frost was reported in the interior of Florida as far south as Jupiter on the 23<sup>rd</sup>, to the middle Gulf coast on the 8<sup>th</sup>, 13<sup>th</sup>, 20<sup>th</sup>, and 23<sup>rd</sup>, and near Corpus Christi and San Antonio, Texas, on February 8<sup>th</sup>.<sup>117</sup>

The following were the lowest temperatures observed during February 1893 in the *United States*:<sup>117</sup>

Camp Poplar River, Montana	( -54° F, -47.8° C)
Willow City, North Dakota	( -54° F, -47.8° C)
Forman, North Dakota	( -53° F, -47.2° C)
Martinsdale, Montana	( -52° F, -46.7° C)
Gallatin, North Dakota	( -52° F, -46.7° C)
Woodbridge, North Dakota	( -50° F, -45.6° C)
Lakota, North Dakota	( -50° F, -45.6° C)
Bottineau, North Dakota	( -49° F, -45.0° C)
Powder River, Montana	( -49° F, -45.0° C)

Power, North Dakota	( -48° F, -44.4° C)
Milton, North Dakota	( -48° F, -44.4° C)
Sykeston, North Dakota	( -47° F, -43.9° C)
Yule, North Dakota	( -47° F, -43.9° C)
Medora, North Dakota	( -47° F, -43.9° C)
Glendive, Montana	( -47° F, -43.9° C)
Ashley, North Dakota	( -46° F, -43.3° C)
Fort Logan, Montana	( -46° F, -43.3° C)
Fort Buford, North Dakota	( -46° F, -43.3° C)
Havre, Montana	( -45° F, -42.8° C)
Miles City, Montana	( -45° F, -42.8° C)
Reynolds, North Dakota	( -45° F, -42.8° C)
Crookston, Minnesota	( -45° F, -42.8° C)
Grafton, North Dakota	( -44° F, -42.2° C)
Grand Forks, North Dakota	( -44° F, -42.2° C)
Grand Rapids, North Dakota	( -44° F, -42.2° C)
Kelso, North Dakota	( -44° F, -42.2° C)
Napoleon, North Dakota	( -44° F, -42.2° C)
Wahpeton, North Dakota	( -44° F, -42.2° C)
Hogan, Montana	( -43° F, -41.7° C)
Ada, Minnesota	( -43° F, -41.7° C)
Pine River, Minnesota	( -43° F, -41.7° C)
Dickinson, North Dakota	( -43° F, -41.7° C)
Churchs Ferry, North Dakota	( -43° F, -41.7° C)
Fort Stevenson, North Dakota	( -43° F, -41.7° C)
Minto, North Dakota	( -43° F, -41.7° C)
Corbin, Montana	( -43° F, -41.7° C)
Great Falls, Montana	( -42° F, -41.1° C)
Choteau, Montana	( -42° F, -41.1° C)
Fort Keogh, Montana	( -42° F, -41.1° C)
Aberdeen, South Dakota	( -42° F, -41.1° C)
Bozeman, Montana	( -42° F, -41.1° C)
Webster, South Dakota	( -42° F, -41.1° C)
Long Prairie, Minnesota	( -42° F, -41.1° C)
Saint Vincent, Minnesota	( -42° F, -41.1° C)
Bismarck, North Dakota	( -41° F, -40.6° C)
Helena, Montana	( -41° F, -40.6° C)
Park Rapids, Minnesota	( -41° F, -40.6° C)
Ellendale, North Dakota	( -41° F, -40.6° C)
Fargo, North Dakota	( -41° F, -40.6° C)
Sandy Lake Dam, Minnesota	( -41° F, -40.6° C)
Ashcroft, South Dakota	( -40° F, -40.0° C)
Jamestown, North Dakota	( -40° F, -40.0° C)
Alexandria, Minnesota	( -40° F, -40.0° C)
Stofiel, Nevada	( -40° F, -40.0° C)
Lake Winnibigoshish, Minnesota	( -40° F, -40.0° C)
Britton, South Dakota	( -40° F, -40.0° C)
Mellette, South Dakota	( -40° F, -40.0° C)

On 22 February 1893, heavy snow fell in New England, New York, and Pennsylvania in the *United States*. In parts of Maine, snow drifted to a depth of 9 to 11 feet, blockading railroads. Along the coast high wind and snow delayed vessels, and a number of wrecks were reported. Heavy drifting snow delayed trains in New York and Pennsylvania. A schooner went ashore near Kitty Hawk, North Carolina.<sup>117</sup>



A severe cold wave overspread the Southwest in the *United States* on the 3 March 1893, and extended to the south Atlantic coast on the 4<sup>th</sup>, with a fall in temperature of 30° F to 40° F in the Gulf and south Atlantic States, freezing weather to Charleston, South Carolina; Montgomery, Alabama; and Meridian, Mississippi and the lowest temperature on record for March at points in Tennessee and Arkansas. The morning of the 5<sup>th</sup>, the temperature fell below the freezing point over the northern part of the Florida Peninsula, and reached 32° F at New Orleans, Louisiana.<sup>117</sup>

Over the period from 1892-1896 in Merzifon in north-central *Turkey*, the coldest temperature observed was -2.2° F (-19.0° C) on 10 February 1893 and the hottest temperature was 99.5° F (+37.5° C) on 6 August 1895.<sup>137</sup>

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**1893 A.D.** From January 30 to February 18, 1893, three cyclones struck southeast Queensland and northern New South Wales in *Australia*. These storms caused flooding from Rockhampton to Grafton and as far inland as Toowoomba. Many people only survived by clinging to the roofs of their homes. The storm tossed three ships into Brisbane's Botanical Gardens. It swept away the Victoria Bridge. The cyclones took 11 lives and caused £1,000,000 damage. For Brisbane, this was the worst flood until 1974.<sup>101</sup>

On 1-15 February 1893, there were floods at Brisbane, Ipswich and Maryborough in Queensland, *Australia*. The 'Mooloolah rainfall event' was the highest recorded extreme rainfall – 67.5 inches (1715 millimeters) in 72 hrs. At Crohamhurst the rainfall was 35.7 inches (907mm) in 24 hrs. The heavy rainfall occurred when three tropical cyclones struck southeast Queensland and northern New South Wales in quick succession. The storm left a total of 35 people dead and approximately 300 injured and 5,000 homeless. Two major bridges collapsed in Brisbane - the Victoria, and the Indooroopilly Railway Bridge. [At Brisbane] over 600 houses were destroyed (150 washed away, many out to sea). Thousands of other homes were flooded and damaged. Approximately 128,500 acres (52,000 hectares) were flooded when the Brisbane River rose 10 feet (3 meters) or more above normal levels. The floods destroyed the suburb of Indooroopilly. Ipswich was also severely flooded. Three ships (the *Paluma*, the *Elamang* and the *Mary Evans*) moored near the Brisbane Botanic Gardens were swept away after being stranded by an earlier flood. Several of the 35 deaths occurred as houses were swept away and others as individuals tried to use boats in the torrent. Seven miners drowned when the Eclipse Colliery near Ipswich flooded. At Maryborough, the Mary River Bridge was washed away with 130 houses on 5 February and numerous others suffered the same fate at Gympie adding further to the number of homeless.<sup>99</sup>

On 5 February 1893 there were destructive floods in Queensland, *Australia*. And then on 9 March 1893, there were destructive floods in New South Wales, *Australia*.<sup>97</sup>

On 10 February 1893, a destructive gale caused loss of life, throughout the *United Kingdom*, the *English Channel*, and the *North Sea*.<sup>94</sup>

On 28 February 1893, there were floods in *Hungary*. On 14 August 1893, there were destructive floods in upper *Hungary*; more than 30 lives reported lost.<sup>97</sup>

On 4 March 1893, there were violent cyclones [tornadoes] in the *United States*, with great destruction of property and loss of life, especially in Mississippi and Georgia. Another cyclone, reported on 24 March 1893, struck in the Mississippi valley.<sup>94</sup>

On 3 March 1893 in the evening, severe local storms including thunder and hail storms and tornadoes occurred in the east Gulf States of the *United States*. The more destructive storms of this group visited Lauderdale and Clarke counties, in extreme east-central Mississippi, the adjoining counties of Sumter and

Choctaw, in Alabama, and Troup, Meriwether, Pike, and northern Upson counties, in extreme west-central Georgia.<sup>117</sup>

— At Toomsba, Mississippi, a funnel-shaped cloud moved eastward in a path 250 to 300 yards in width, attended by heavy thunder, vivid lightning, heavy rain, and small hail. Articles were carried up in the funnel, and property was destroyed to the estimated value of \$30,000 to \$40,000 [\$700,000 - \$950,000 in today's dollars].

— At Pachuta, Mississippi, a storm moved southeast in a path about 200 yards in width, with heavy rain, continuous vivid lightning, and some hail. One person was killed; trees were torn up by the roots or twisted off, and were piled in and to the right of the center of the path, and a number of buildings were torn to pieces. The value of property destroyed at Pachuta was placed at \$12,000 to \$15,000.

— A heavy thunder and hail storm moved northeast in a path  $\frac{1}{4}$  to  $\frac{1}{2}$  mile in width near Cuba, Alabama, killing one person and leveling timber.

— At Odessa, Georgia, 6 persons were killed, and only 3 houses were left standing.

— At Woodbury, Georgia, 2 persons were killed. At that place heavy rain, a straight wind, thunder, lightning, and hail were reported.

— At Greenville, Georgia, the path of destruction was about one quarter mile wide, and the storm was attended by incessant thunder and lightning, large hail, and heavy rain. At that point one person was killed and 74 buildings were wrecked; the aggregate value of property destroyed was placed at \$150,000 [\$3.6 million in today's dollars].

— At Molena, Georgia, a thunderstorm moved east in a path about  $\frac{1}{2}$  mile wide, killing one person and destroying property to the value of about \$7,000.

— At Piedmont, Georgia, a thunder, rain, and hail storm moved east with a whirling motion in a path  $\frac{3}{4}$  mile in width, killing 1 person, injuring 30, and destroying or damaging a large number of houses.

— One person was reported killed near Barnesville, Georgia.

— A violent storm passed through the southern edge of Forsyth, Georgia, destroying about 20 houses. The storm was attended by very brilliant, incessant lightning.

— A violent, whirling storm, with thunder, lightning, and heavy rain moved east at The Rock, Georgia, in a path  $\frac{1}{2}$  to  $\frac{3}{4}$  miles in width. A number of persons were reported killed, and many were injured. Within a distance of 6 miles, 75 to 100 houses, mostly outbuildings were destroyed, and many large trees were broken off 10 to 12 feet above the ground.

On 9-11 March 1893, there were floods caused by the rising of the Hunter River. Newcastle, *Australia* and other places submerged.<sup>97</sup>

A hurricane was reported on 20 March 1893 over *New Caledonia* and the *New Hebrides* islands. There was great damage to property and loss of 18 lives.<sup>94</sup> [New Caledonia is located in the southwest Pacific Ocean. The New Hebrides islands is an island group in the South Pacific that now forms the nation of Vanuatu.]

On 23 March 1893, severe storms occurred in the evening from Arkansas, northern Louisiana, and northern Mississippi, over western Kentucky and southern and central Indiana in the *United States*. Nineteen persons were killed. The total damage was estimated at \$730,000. [In present currency, that would be equivalent to \$17.5 million based on the Consumer Price Index (CPI) inflation rates.]<sup>117</sup>

— A tornado struck Oklahoma City, Oklahoma causing \$15,000 in damages.

— At Crawfordsville, Arkansas, a severe storm, with thunder, lightning, and rain, moved northeast in a path  $\frac{1}{4}$  to  $\frac{1}{2}$  mile in width, destroying and damaging buildings to the extent of about \$10,000.

— A destructive storm moved through a sparsely settled district between Mangham and Archibald, Louisiana, seven persons were reported killed, and a number of buildings were destroyed. The damage was estimated at \$25,000.

— A storm moved through a thinly settled district,  $1\frac{1}{2}$  mile north of Shubuta, Mississippi with heavy rain and vivid lightning, killing 3 persons and fatally injuring one. Prostrated trees showed a right to left whirling motion.

— A thunder and hail storm moved over Kelly, Mississippi, the path of destruction was  $\frac{1}{4}$  mile in width; 3 or 4 people were reported killed, and the loss of property in that section was placed at \$150,000 [\$3.6 million in today's dollars].

— A tornado struck Olive Branch, Mississippi causing \$150,000 in damages [\$3.6 million in today's dollars].

— A storm struck Vossburg, Mississippi causing several deaths.

- In the northern portion of Nashville, Tennessee, 15 to 20 buildings were demolished, one person was killed, and many were injured.
- A severe thunder and rain storm passed northeast over Murray, Kentucky. An infant was injured, and property to the estimated value of \$30,000 was destroyed. A small, dark, smoky-looking column [tornado] attended the passage of the storm at Murray.
- At Henderson, Kentucky, a thunder, rain, and hail storm moved northeast in a path about 200 yards in width damaging property to the estimated value of \$75,000 [\$1.8 million in today's dollars].
- A thunder and rain storm, with hail, passed over Bowling Green, Kentucky, damaging buildings to the extent of about \$20,000.
- A thunder and hail storm moved over Rowland, Kentucky, in a path about 300 feet in width, destroying property to the value of \$10,000.
- At Hopkinsville, Kentucky, the storm caused \$50,000 in damages.
- At Pembroke, Kentucky, the storm caused \$50,000 in damages.
- A destructive storm moved in a northerly direction over Chandler, Indiana, with heavy thunder, lightning, rain, and hail. The storm apparently had two paths, one west and the other east of Chandler. Within 4 miles of that place 2 persons were injured, one fatally, and one church, 4 residences, and 10 barns were destroyed. The damage was estimated at \$70,000.
- A thunderstorm, with heavy rain and small hail, moved northeast over Bedford, Indiana, destroying and damaging buildings to the extent of \$30,000 to \$50,000.
- A thunderstorm passed northeast over McCordsville, Indiana, within a radius of 15 miles property was damaged to the estimated value of \$10,000.
- At Brooklyn, Indiana, the loss to property was estimated at \$5,000.
- A thunder and rain storm moved over Alexandria, Indiana, one person was killed, and a building was damaged to the extent of \$3,000.
- The storm was destructive in the northwest suburbs of Indianapolis, Indiana, where a squall of wind from the southwest wrecked a number of frail buildings, damaged others, and broke or uprooted 30 to 40 trees in a path about 250 yards in width. The storm caused \$6,000 in damages.

On 7 April 1893, hotels and other buildings destroyed by a great wave [from Lake Michigan] in Chicago, Illinois in the *United States*.<sup>97</sup>

On 11 April 1893 there were destructive cyclones [tornadoes] in Iowa, Illinois, Indiana, Nebraska, Kansas, and Missouri in the *United States* causing many deaths. On 25-28 April 1893, there were cyclones [tornadoes] in Illinois, Texas, and Oklahoma.<sup>94</sup>

April 1893 was marked by exceptionally destructive tornadoes and thunderstorms in the Western and Southwestern States of the *United States*. One hundred and fourteen lives were known to have been lost, and property to the estimated value of over \$1,000,000 was destroyed. [In present currency, that would be equivalent to \$24 million in damages based on the Consumer Price Index (CPI) inflation rates.] The first group of storms visited Missouri, Iowa, and the lower Ohio Valley on the 11<sup>th</sup>, and extended over southern Lower Michigan during the 12<sup>th</sup>. On those dates, 38 persons were reported killed, and the property loss was placed at over \$500,000. The tornadoes that visited Oklahoma and northeastern Texas on the 25<sup>th</sup> caused the loss of 34 lives, of which number 30 were credited to Cleveland County, Oklahoma. During the morning of the 28<sup>th</sup>, Cisco, Texas was struck by a tornado, in which 22 lives were lost and property to the value of \$400,000 was destroyed.<sup>117</sup>

On 7 April 1893:

- At Romeoville, Illinois, a destructive storm, with rain and hail, moved northeast in a path about 40 rods (660 feet) wide; 9 persons were reported killed and the destruction to property was placed at \$26,000.
- A thunder, rain, and hail storm moved over Chicago, Illinois in a path about one mile in width; the damage to glass, by hail, was placed at \$100,000.
- During the day several structures near the World's Fair grounds were demolished by wind; loss about \$30,000.
- A thunderstorm, with rain and hail, moved 3 miles south of South Haven, Michigan. A number of persons were injured, and property was destroyed to the value of \$10,000 to \$20,000.

On 11 April 1893:

- A storm at Akron, Iowa, the damage to buildings by wind was placed at \$50,000.
- A tornado 300 yards wide struck about 3 miles east of Fonda, Iowa, with heavy rain and some hail. A child was killed, and a number of small buildings valued at \$6,000 were destroyed.
- A tornado 100 yards wide struck Newton, Iowa. The storm had a whirling motion, and was preceded by rain and hail. Several persons were injured, and the value of property destroyed was placed at \$10,000.
- At Davenport, Iowa, a thunder and rain storm caused \$20,000 in damages.
- A tornado appeared about ¼ mile northeast of Mayview, Missouri, and moved in an irregular northeasterly course about 12 miles, destroying buildings in its path. The storm cloud presented a black funnel-shaped mass, with the point down; the crest of the cloud appeared to be ablaze, and the path of destruction varied in width from 70 feet to 500 yards.
- The loss of life in Lafayette County, Missouri, by a tornado was placed at 6; a number of persons were injured; and 15 buildings, valued at \$10,000 were destroyed.
- A tornado struck 6 miles northwest of Salem, Missouri, with thunder and lightning and heavy rain, killing 10 persons, and destroying buildings valued at \$20,000.
- At Saint Louis, Missouri, lightning was observed in the northwest and southwest at 6:50 p.m., and increased in frequency and intensity until 7:55 p.m., when thunder was heard and heavy rain began to fall, with hail from 9:15 to 9:30 p.m. About midnight the wind increased to a gale from the southeast. At 1 a.m., a heavy, dark cloud was observed approaching from the southwest, and passed directly over the city, with torrents of rain, and wind 54 miles per hour from the southwest. The pressure oscillated 0.20 inch, as shown by the barograph record, apparently first increasing 0.15 and then decreasing 0.20 inch from the highest point. The storm was exceptionally sudden and severe and caused considerable damage in and about the city and on the Mississippi River.
- At Cedar Creek, Nebraska, a thunder, rain, and hail storm moved over the city damaging property to the estimated value of \$5,000.
- A heavy thunder and hail storm, with light rain, struck near Inman, Nebraska seriously injuring one person and blowing down 19 small buildings.
- A destructive storm passed across the southeast part of Holt County, Nebraska, injuring a number of persons and destroying farm buildings.
- A violent thunder, rain, and hail storm visited Muscotah, Kansas injuring several persons, and destroying property valued at \$10,000.
- At Everest, Kansas, a thunderstorm, with rain and hail, moved over the city; one person was killed near Everest, and some damage was caused by hail.
- During a thunderstorm, which visited Altoona, Kansas hailstones the size of walnuts fell.
- A tornado, with thunder, lightning, and hail, moved over Parker, Kansas cutting a path 300 to 400 feet wide, destroying property to the extent of \$100,000.
- A thunder, rain, and hail storm moved over Paris, Texas damaging property to the value of \$10,000.
- A rain and hail storm visited Petty, Texas injuring 3 persons and damaging property.
- A rain, hail, and thunder storm moved eastward over Oak Cliff, Texas destroying property valued at \$10,000.
- On 12 April 1893:
- A rain and hail storm struck 4 miles south of Newellton, Louisiana; killing one person, injuring several, and destroying property valued at \$10,000.
- A violent thunder, rain, and hail storm struck Baldwin, Mississippi; killing one person and destroying property to the extent of \$15,000.
- A thunder and hail storm struck Robinsonville, Mississippi; killing 12 persons and destroying property to the extent of \$25,000.
- A heavy thunderstorm, with rain and small hail struck Terre Haute, Indiana, damaging buildings to the extent of \$5,000.
- At Kokomo, Indiana, a storm cut a path 150 feet wide killing one person and damaging property to the value of \$5,000.
- A destructive storm passed over Dundee, Michigan; killing one person, and destroying 50 buildings valued at \$50,000 to \$75,000.
- At Rea, Michigan, a storm cut a path 10 rods (165 feet) wide, with sharp lightning and heavy thunder, rain and hail. At Rea one person was reported killed, and many buildings were blown over.
- A tornado struck Ypsilanti, Michigan, cutting a path 200 to 500 feet wide, attended by vivid lightning, continuous thunder, and heavy rain; the value of property destroyed in Ypsilanti was placed at \$100,000.
- A thunderstorm passed near Redford, Michigan damaging property to the extent of \$6,000.

— A violent thunder, hail, and rain storm passed northeast over Royal Oak, Michigan, cutting a path 80 rods (1/4 mile) wide, killing 2 persons, and destroying property to the value of \$50,000.

— At Utica, Michigan, 40 buildings were injured or destroyed by a thunder, rain, and hail storm.

On 20 April 1893:

Unusually severe storms prevailed over the Great Lakes region; a number of marine disasters were reported and heavy rain flooded streams and damaged crops. At Detroit, Michigan, the wind reached a velocity of 72 miles per hour. At Milwaukee, Wisconsin, a shed on a crib, which extended into the Lake was washed away and 15 men were drowned.

On 25 April 1893:

— A tornado visited Cleveland County, Oklahoma on the evening of April 25<sup>th</sup>: At Oklahoma City, 14 miles north of the section visited by the tornado, the afternoon was warm and sultry, with barometer low and unsteady, and wind fresh from the southeast. Heavy rain began 6:46 p.m. (75<sup>th</sup> meridian time), and ended 8:20 p.m., the depth of rainfall being 0.68 inch. At 10:30 p.m. the wind veered to south-southwest, and then to northwest. Before the sky became obscured by nimbus clouds from the southeast, cirrus and cirrocumulus clouds were observed moving rapidly towards the southeast. At Norman, Oklahoma, light rain, with small hail, began 5 p.m. (90<sup>th</sup> meridian time), and was followed at 5:35 p.m. by a sudden heavy fall of rain and strong southeast wind. Immediately following the heavy rain the tornado was distinctly visible south of Norman, moving rapidly northeast. The storm was in view about 10 minutes, and broke up when about due east of the town, without having caused material damage. The funnel or center appeared like a spout lowered from the clouds, and was of a peculiar gray color. But little lightning was observed. About the time the first storm disappeared another cloud formed in the west. This cloud increased rapidly in size, and at 6:25 p.m. moved rapidly in a northeast direction, causing great loss of life and destruction of property. The appearance of the clouds attending this storm was remarkable. The outer clouds seemed to be driven furiously in to the center. No spout or funnel, and but little lightning, was observed, and no roaring sound was noted. In about 20 minutes the storm had disappeared in a northeast direction. About 6 p.m. a heavy, dark cloud was observed 5 or 6 miles southwest of Moore, Oklahoma. The cloud appeared to remain almost stationary, and was joined by other clouds, which advanced from the northwest and southeast. These clouds appeared to dart quickly into the top, and become a part, of the larger cloud. About 6:30 p.m. the cloud began to revolve slowly from right to left and moved north of east with a sullen roar. The edges of the cloud seemed luminous, although no lightning was seen nor thunder heard. After crossing the Canadian River several "twisters" descended from the main cloud. These spouts, except one long one, which trailed 50 to 100 yards behind the main cloud and swung to and fro, would disappear and others would replace them. The tornado was preceded by heavy rain, and a few large hailstones fell at Moore, 1½ miles from the path of the storm, and one hailstone struck a child on the head, breaking its skull. The first house struck by the storm contained 13 persons, 11 of which were killed. The house was torn to pieces and the debris scattered over several acres of ground to the southeast. The few fence posts left standing were covered with mud. The supposition is that in crossing the river the storm sucked up quantities of water and sand or mud and deposited them on the edges of its path. An orchard northeast of the house was stripped of every twig and branch and many of the trees were completely stripped of bark. The orchard looked as though a fire had burned over it. About one-half mile south of this house, a house and barn were scattered over several acres toward the northeast, and four persons were killed. About one mile northeast of the last mentioned house, a house was torn to pieces and the debris thrown southeast and northwest, and 6 persons were killed. A house one-half mile north of that point was demolished and the debris thrown south. In wheat field between the points last named, the wheat was blown close to the ground and lay pointing southeast, while debris from a house to the southeast was scattered over the field. In many places pieces of boards and scantling from the house to the southeast were driven deep into the ground. Two houses one half mile south of the wheat field were scattered toward the north and northeast. The path of destruction was about one-half mile in width. Wire fences were rolled up into great balls. In a number of instances spokes were torn from wagon hubs, and in each instance, save one, the hubs were torn from the axle. In that instance the spokes and tire were carried away. Harrows with their teeth in the ground were undisturbed. The observer states, on the authority of a physician who had examined 14 dead bodies that the persons killed were invariably injured on the left side of the face and body, and some had the appearance of having been burned. Thirty persons, in all, were killed by this storm and many were injured. Many of the houses destroyed were small, frail structures, and probably \$25,000 would cover the loss to buildings in Cleveland County.

— A tornado one mile north of Perkins, Oklahoma cut a path 10 miles in length and averaging 80 rods (1/4 miles) wide; 60 buildings were torn to pieces, 2 persons were killed, and two fatally injured; debris was thrown in all directions, limbs and bark were stripped from trees, and an ordinary square spade was carried 150 feet and driven into a solid oak tree one-half the length of the blade.

— At Langston, Oklahoma, a heavy thunder, rain, and hail storm struck the city killing two persons.



— A tornado struck near Bonita, Texas, with sharp lightning, rain, and hail. In a path 75 to 250 yards in width, 11 houses were torn to pieces, and 2 children were killed.

On 28 April 1893:

— A tornado struck Cisco, Texas, cutting a path about three-fourths of a mile in width and 13 miles in length, with forked lightning, heavy rain, and large hail, killing 22 persons, and destroying property to the estimated value of \$400,000.

— A large funnel-shaped cloud formed near Ponca, Oklahoma, where 6 persons and a quantity of livestock were killed.

The year 1893 in Bradford County, Pennsylvania in the *United States* was remembered for the unequalled, terrible and destructive storms.<sup>178</sup>

\* On 20 April 1893, one of the most persistent gales, ever remembered, blew in from the southeast, struck Bradford County with hurricane force. The gale was most severe in Towanda and vicinity where great damage was done. Several buildings were blown over, many unroofed, fences thrown down and other property damaged.

\* On 3 May 1893, a heavy rain caused a rapid rise in the creeks and the Susquehanna River to the highest, since the June flood of 1889. Along the Schrader, Towanda and Sugar Creeks much damage was done.

\* On 23 May 1893, a heavy windstorm passed over a considerable section of Bradford County on May 23, doing much damage in unroofing and demolishing buildings.

\* On 5 July 1893, a terrific wind and hailstorm passed over Southern Bradford, destroying gardens, damaging fruit, grain and buildings.

\* On 7 September 1893, a tornado struck Bradford County in its northwestern corner and continued diagonally across the northwestern townships, leaving in its trail death and devastation. The storm had its start in Western New York and from the South Mountain it moved in a straight line through Lawrenceville, Jackson, Wells, Columbia, Troy, West Burlington, Granville, Franklin, Monroe, Albany, Terry and Wilmot. "People's attention was called to the rapid advance of a huge black cloud that spanned the sky and was lit up by lurid flashes of lightning. The black pall of the cloud stretched from horizon to horizon and when it had shut down it was dark almost as midnight and caused lamps to be lit, while flashes of lightning, the deep boom of thunder, the steady downpour of rain, interspersed with hail and an orange light that seemed diffused in the air, gave peculiar features to this frightful visitation." Every township in the county was more or less affected by this terrible storm of wind, rain and hail. The damage wrought, besides the killing of four persons, amounted to several hundred thousand dollars. So furious was the wind that huge oak and hickory trees were twisted off at the trunk.

\* Other destructive storms in 1893 occurred on 19 February, 18 August, 28 August and October 13.

In May 1893, there was a great rising [flood] of the Mississippi River in the *United States*.<sup>97</sup>

In May 1893, there were inundations in *Romania*. Railways were stopped and villages destroyed.<sup>97</sup>

On 16 May 1893, severe storms continued near Lake Erie in the *United States*; streams overflowed their banks, causing washouts and landslides on railroads. At Erie, Pennsylvania, rain ended in the morning. In that city the estimated damage to property was \$250,000. In Erie County the damage to property, including railroads, was placed at \$500,000 [\$12 million in today's dollars]. In many instances the water reached the second floors of houses in Erie.<sup>117</sup>

On 21 June 1893, a tornado swept over the region near Perry and Williamstown, Kansas in the *United States*, killing ten persons and destroying considerable property whose value was estimated at \$20,000 [\$480,000 in today's dollars].<sup>117</sup>

On 23 June 1893, a hailstorm struck Concordia, Kansas in the *United States*. The larger hailstones measured 13 to 16 inches in circumference.<sup>117</sup>



On 26 June 1893, heavy rains fell on Pueblo, Colorado in the *United States*. The Arkansas River rose rapidly above the north levee and the levee broke in several places, causing flood damage estimated at \$200,000 [\$4.8 million in today's dollars.]<sup>117</sup>

The following are the highest temperatures observed during July 1893 in the *United States*:<sup>117</sup>

Montgomery, Alabama	( 99° F, 37.2° C)
Mobile, Alabama	( 96° F, 35.6° C)
Tucson, Arizona	(107° F, 41.7° C)
Yuma, Arizona	(109° F, 42.8° C)
Little Rock, Arkansas	( 97° F, 36.1° C)
Fort Smith, Arkansas	( 98° F, 36.7° C)
San Francisco, California	( 74° F, 23.3° C)
San Diego, California	( 79° F, 26.1° C)
Fresno, California	(108° F, 42.2° C)
Denver, Colorado	( 96° F, 35.6° C)
Pueblo, Colorado	( 98° F, 36.7° C)
New Haven, Connecticut	( 92° F, 33.3° C)
New London, Connecticut	( 89° F, 31.7° C)
Millsboro, Delaware	( 97° F, 36.1° C)
Washington, D.C.	( 97° F, 36.1° C)
Pensacola, Florida	( 97° F, 36.1° C)
Key West, Florida	( 91° F, 32.8° C)
Augusta, Georgia	( 98° F, 36.7° C)
Savannah, Georgia	(100° F, 37.8° C)
Payette, Idaho	(104° F, 40.0° C)
Boise Barracks, Idaho	(102° F, 38.9° C)
Chicago, Illinois	( 94° F, 34.4° C)
Cairo, Illinois	( 94° F, 34.4° C)
Indianapolis, Indiana	( 97° F, 36.1° C)
Lafayette, Indiana	( 99° F, 37.2° C)
Dubuque, Iowa	( 96° F, 35.6° C)
Keokuk, Iowa	( 93° F, 33.9° C)
Topeka, Kansas	( 97° F, 36.1° C)
Dodge City, Kansas	(103° F, 39.4° C)
Louisville, Kentucky	( 97° F, 36.1° C)
Lexington, Kentucky	( 95° F, 35.0° C)
New Orleans, Louisiana	( 94° F, 34.4° C)
Shreveport, Louisiana	(101° F, 38.3° C)
Eastport, Maine	( 87° F, 30.6° C)
Portland, Maine	( 93° F, 33.9° C)
Baltimore, Maryland	( 96° F, 35.6° C)
Boston, Massachusetts	( 91° F, 32.8° C)
Nantucket, Massachusetts	( 80° F, 26.7° C)
Marquette, Michigan	( 91° F, 32.8° C)
Detroit, Michigan	( 93° F, 33.9° C)
Saint Vincent, Minnesota	( 90° F, 32.2° C)
Saint Paul, Minnesota	( 98° F, 36.7° C)
Vicksburg, Mississippi	( 96° F, 35.6° C)
Saint Louis, Missouri	( 94° F, 34.4° C)
Glendive, Montana	(117° F, 47.2° C)
Helena, Montana	(102° F, 38.9° C)
North Platte, Nebraska	( 96° F, 35.6° C)
Omaha, Nebraska	( 97° F, 36.1° C)
Winnemucca, Nevada	( 97° F, 36.1° C)
Carson City, Nevada	( 94° F, 34.4° C)

West Milan, New Hampshire	( 88° F, 31.1° C)
New Brunswick, New Jersey	( 97° F, 36.1° C)
Cape May, New Jersey	( 96° F, 35.6° C)
Santa Fe, New Mexico	( 89° F, 31.7° C)
Albany, New York	( 92° F, 33.3° C)
New York City, New York	( 93° F, 33.9° C)
Charlotte, North Carolina	(100° F, 37.8° C)
Kitty Hawk, North Carolina	( 95° F, 35.0° C)
Bismarck, North Dakota	( 98° F, 36.7° C)
Williston, North Dakota	(104° F, 40.0° C)
Cincinnati, Ohio	( 95° F, 35.0° C)
Columbus, Ohio	( 95° F, 35.0° C)
Oklahoma City, Oklahoma	( 97° F, 36.1° C)
Fort Sill, Oklahoma	(103° F, 39.4° C)
Roseburg, Oregon	( 96° F, 35.6° C)
Portland, Oregon	( 92° F, 33.3° C)
Erie, Pennsylvania	( 90° F, 32.2° C)
Philadelphia, Pennsylvania	( 94° F, 34.4° C)
Block Island, Rhode Island	( 81° F, 27.2° C)
Charleston, South Carolina	( 99° F, 37.2° C)
Columbia, South Carolina	(102° F, 38.9° C)
Yankton, South Dakota	( 97° F, 36.1° C)
Nashville, Tennessee	( 96° F, 35.6° C)
Knoxville, Tennessee	( 94° F, 34.4° C)
San Antonio, Texas	( 99° F, 37.2° C)
Galveston, Texas	( 92° F, 33.3° C)
Salt Lake City, Utah	( 99° F, 37.2° C)
Burlington, Vermont	( 87° F, 30.6° C)
Lynchburg, Virginia	( 97° F, 36.1° C)
Norfolk, Virginia	( 95° F, 35.0° C)
Olympia, Washington	( 86° F, 30.0° C)
Spokane, Washington	( 99° F, 37.2° C)
New Cumberland, West Virginia	( 98° F, 36.7° C)
Milwaukee, Wisconsin	( 92° F, 33.3° C)
La Crosse, Wisconsin	( 96° F, 35.6° C)
Cheyenne, Wyoming	( 91° F, 32.8° C)

The following are the highest temperatures observed during July 1893: <sup>117</sup>

Saint John, New Brunswick, <i>Canada</i>	( 85° F, 29.4° C)
Ciudad Porfirio Díaz, <i>Mexico</i>	(100° F, 37.8° C) (now Piedras Negras, Coahuila)
Leon de Aldamas, <i>Mexico</i>	( 84° F, 28.9° C) (now León, Guanajuato)
Puebla, <i>Mexico</i>	( 80° F, 26.7° C)
Hamilton, <i>Bermuda</i>	( 84° F, 28.9° C)

Probably the most destructive tornado that ever visited Iowa in the *United States* swept over the northwestern portion of the state in the evening of 6 July 1893. The storm passed about 2 miles north of Quimby then about 3 miles south of Alta and then arrived at Storm Lake, and south of Newell and then reached Pomeroy, Iowa. The storm track varied from 15 to 20 rods (250-330 feet, 75-100 meters) to ½ mile in width. About 50 persons were killed, upward of 100 injured, and property to the estimated value of about \$200,000 was destroyed. [In present currency, that would be equivalent to \$4.8 million using CPI inflation.] The greatest destruction occurred at Pomeroy, where 44 persons were killed and about 100 buildings valued at \$175,000 were destroyed or badly wrecked in a path about 80 rods (¼ mile, 0.4 kilometers) in width. While passing south of Alta the storm was attended by intensely sharp forked lightning, large hail, and heavy rain. In Buena Vista County 6 persons were killed, and the loss to

property was placed at \$20,000. At Storm Lake the path of the tornado was 20 to 40 rods in width, and water in the lake was lifted high into the air.<sup>117</sup>

On 6 July 1893, there were destructive cyclones [tornadoes] in northwest Iowa in the *United States*. About 100 persons were killed and much property destroyed. On 23-24 August 1893, a destructive storm struck on the coast of New Jersey. There were many [ship] wrecks with loss of life. On 28-29 August 1893, a storm struck Georgia, North and South Carolina and Virginia.<sup>94</sup>

In the *United States* in July 1893, damaging drought prevailed in parts of the middle Atlantic and New England states, North Carolina, eastern Florida, Alabama, the Ohio Valley and Tennessee, southeastern Missouri, Arkansas, central Texas, southern Kansas, western Nebraska, southwestern South Dakota, Utah, and Idaho.<sup>117</sup>

On 6 August 1893, severe thunderstorms struck New England in the *United States*. Much damage was done in Boston, Massachusetts and vicinity. In Lynn, Massachusetts, the damage was estimated at nearly \$100,000 [\$2.4 million in today's dollars].<sup>117</sup>

On 15 August 1893, a hurricane passed north of *Bermuda* recurved and touched Newfoundland, *Canada* on the 18<sup>th</sup>.<sup>117</sup>

On 15 August 1893 a hurricane passed near Martinique. On the 16<sup>th</sup>, the hurricane passed near Saint Thomas, *West Indies* and *Puerto Rico*. The hurricane tracked midway between the Bahamas and Bermuda. It recurved and touched Cape Hatteras on the 20<sup>th</sup> and Cape Cod in the *United States* on the 21<sup>st</sup>. The hurricane was centered over the Bay of Funda, *Canada* during the evening of the 21<sup>st</sup> and then passed over Newfoundland, *Canada*.<sup>117</sup>

On 15 August 1893, Madrid, *Spain* reached a high temperature of 112° F (44.4° C).<sup>97</sup>

On 18 August 1893, the temperature in the shade at Camden-Square in London, *England* reached a peak of 93.6° F (34.2° C).<sup>97</sup>

On 20 August 1893, a hurricane was at latitude 22° N, longitude 63° W. It recurved at latitude 35° N, longitude 75° W; passed near Cape Hatteras and Atlantic City and over New York City in the *United States* on the 24<sup>th</sup>, and thence to the mouth of the Saint Lawrence in *Canada*. Much destruction was done on the middle Atlantic coast.<sup>117</sup>

On 24 August 1893, a hurricane was at latitude 23° N, longitude 67° W. It recurved at latitude 35° N, longitude 81° W, in North Carolina in the *United States*, and passed over Newfoundland, *Canada* on the 30<sup>th</sup>. This storm did much destruction in the South Atlantic states. Its center passed over or near Jacksonville, Florida; Savannah, Georgia; Charleston, South Carolina; Augusta, Georgia; Charlotte, North Carolina; Lynchburg, Virginia; Harrisburg, Pennsylvania; Ithaca and Oswego, New York; Northfield, Vermont; and Saint John, New Brunswick, *Canada*. The destruction to property on shore may be estimated as approximately \$3,000,000. [In present currency, that would be equivalent to \$72 million in damages based on the Consumer Price Index (CPI) inflation rates.] The loss of human life, nearly 2,000, was due principally to drowning by high water on the coast.<sup>117</sup>

On 27-28 August 1893, Charleston, South Carolina in the *United States* was struck by one of the most destructive hurricanes.<sup>124</sup>

On 27-28 August 1893, a great Atlantic hurricane struck South Carolina and Georgia in the *United States* causing between 2,000 and 2,500 deaths.<sup>107</sup>

On 28 August 1893, a great storm struck the South Atlantic coast, which committed havoc in Charleston, South Carolina and Savannah, Georgia in the *United States* and with the shipping on the ocean in their vicinity, the aggregate loss of life being about 1,000.<sup>197</sup>

The hurricane of 27 August 1893 destroyed over 2,000 lives and approximately \$1,000,000 of property in the *United States*. [In present currency, that would be equivalent to \$24 million in damages based on the Consumer Price Index (CPI) inflation rates.] The highest record of storm tide above ordinary high water was measured at 8.2 feet in Fort Pulaski, Georgia. Winds gust at Charleston, South Carolina exceeded 120 miles per hour. The center of the hurricane passed about 80 miles west of Charleston.<sup>118</sup>

On 27-28 August 1893, a hurricane struck South Carolina and Georgia in the *United States*. [One account places the number of deaths at 2,000-2,500; another account provides 1,000-2,000 deaths; and a third list greater than 1,000 deaths.]<sup>141</sup>

On 5 September 1893, a storm was centered in the Gulf of Mexico. On the 6<sup>th</sup>, increasing northwest winds could be felt along the coast of Louisiana and Texas in the *United States*. During Thursday, the 7<sup>th</sup>, the center moved northward over the southeastern portion of Louisiana, doing much damage over a small area, but rapidly breaking up as it moved inland. The course of the center was quite irregular. On the afternoon of the 8<sup>th</sup> it was central in southeastern Alabama, and the area of revolving winds with rain continued to remain south of Tennessee until the 11<sup>th</sup>, by which time pressure had become nearly normal and the storm center had disappeared.<sup>117</sup>

On 7 September 1893, strong storms broke out in New York in the *United States*. At Friendship, New York, the hailstones were the size of hickory nuts. In the Chemung Valley in southern New York, heavy hail caused \$250,000 damage to crops [\$6 million in today's dollars]. It was reported that a hailstone 9¼ inches long was found on the 7<sup>th</sup> in Bath, New York; the attending storm was remarkable for the darkness.<sup>117</sup>

On 7 September 1893, a destructive storm with a funnel-shaped cloud with whirling motion struck Lockport, Louisiana in the *United States*. Five persons were killed, 17 injured, and property was destroyed to the estimated value of \$40,000 [\$1 million in today's dollars].<sup>117</sup>

About 15 September 1893, there were destructive inundations in *Spain*. Then on 1-2 October 1893, there were inundations caused by heavy rains in Naples and in northern *Italy*.<sup>97</sup>

Great damage and dense smoke were caused by forest fires throughout the latter half of September 1893 in Wisconsin in the *United States*. Navigation on Lake Michigan was sometimes interfered with.<sup>117</sup>

On 2 October 1893, a hurricane struck the Gulf of Mexico, on the coast of Louisiana in the *United States*. As a result 2,000 lives were lost.<sup>197</sup>

A gulf hurricane advanced suddenly and unexpectedly northeastward over southeastern Louisiana in the *United States* on the afternoon of 1 October 1893. It was said that over 1,500 lives were lost on the Gulf coast by drowning; there was considerable destruction of property, and the orange, rice, and other crops were completely devastated.<sup>117</sup>

— The observer at New Orleans, Louisiana reports: October 1<sup>st</sup>, a severe and destructive storm began about 6:30 p.m., continuing through the night. Much damage was caused throughout the city. About 2,000 lives were lost along the Gulf coast south and east of this section. The storm was severest in the Louisiana Delta and in the Plaquemines Parish, where it was attended with great loss of life and property. A velocity of 48 miles per hour was

recorded in the city at 8:20 p.m., after which the record was lost, owing to the anemometer getting out of order. A velocity of 65 miles per hour was attained at West End, when the instrument became unserviceable.

— The Secretary of the Louisiana State Weather Service reports: No complete record of the wind velocity or rainfall of the storm can be obtained, since all instruments in the path of the hurricane were blown down, and in the case of Port Eads destroyed. It is evident, however, that the wind must have blown at the rate of 100 miles per hour in the vicinity of Pointe-à-la-Hache, Louisiana and along the islands on the coast. While the wind worked great havoc, yet the immense wave of water that swept over the devastated section engulfed and swept away everything in its path. It is probable that the center of this hurricane passed midway between New Orleans and Port Eads on its northeast course, since the path of greatest destruction was in that neighborhood.

— The water at Mobile, Alabama rose 4 inches above the [storm surge] flood line of 1852, and all recognize it as the worst that has hitherto been experienced there. The extreme velocity of the wind several times reached 80 miles per hour. Great damage was done to property. In the marsh truck farm section nearly every house was swept away, and farms were destroyed in Mobile County. Seven lives were reported lost.

— The storm crossed Louisiana in a northeasterly direction; the center struck the coast of Mississippi a little west of the Alabama boundary line.

— The hurricane center moved slowly northeast over Georgia to Cape Hatteras, and dissipated on the October 5<sup>th</sup>.

On 1-2 October 1893, a great Atlantic hurricane struck Louisiana in the *United States* causing approximately 2,000 deaths.<sup>107</sup>

On 1-2 October 1893, a hurricane struck Louisiana in the *United States* causing between 1,800-2,000 deaths.<sup>141</sup>

On 2 October 1893, a destructive storm struck at New Orleans, and along the southeast coast of the *United States*. About 1,200 people lost their lives.<sup>94</sup>

The hurricane of 2 October 1893 caused the loss of over 1,000 lives on the coast of Louisiana in the *United States*.<sup>118</sup>

On 2 October 1893, a destructive storm struck New Orleans, Louisiana in the *United States*. There were 1,200 deaths. Buildings and works destroyed.<sup>97</sup>

On 11-13 October 1893, a hurricane struck South Carolina and Florida in the *United States* causing 28 deaths.<sup>141</sup>

The hurricane was barely felt in the West Indies, as its track lay to the north of those islands. At Nassau in the *Bahamas* on 11 October 1893, the wind attained a storm velocity. On the coasts of Georgia, Florida, and South Carolina in the *United States*, the storm was very severe and the ocean water rose to an unusual height; after reaching the lower lake region on the 14<sup>th</sup>, the storm was again very severe, being in most places considered as the severest that has been experienced on the Great Lakes for many years.<sup>117</sup>

— At Jupiter, Florida the storm struck beginning on October 11<sup>th</sup>. The wind reached a maximum velocity of 72 miles from the west at midnight. Great damage was done to docks, vessels, crops, and houses. Three bodies were washed ashore in this vicinity. For many miles along the Indian River the sea broke over the peninsula, raising the river to a point never before attained. Orange groves on Indian River were injured and great damage was done to farms. From Titusville to Lake Worth, a distance of 150 miles, nearly all docks were washed away.

— At Titusville, Florida, the continued north and northwest winds drove the water back from the western shore of the Indian River farther than ever before. At the end of the steamboat dock, where there is generally 6 to 8 feet of water, the bed was perfectly dry for about ¼ mile. One house was blown down and several small buildings moved from their foundations, and there was great damage to electric wires. The orange crop was badly damaged, and in some localities the ground was covered with the green fruit; two small steamers and a sailing vessel were wrecked and several docks blown away. Great damage was done to shipping.

— At St. Augustine, Florida, the water level on the October 12<sup>th</sup> reached 12 inches above the sea wall. At Saint Augustine, the waters of the Matanzas and the San Sebastian rivers reached were united, a phenomenon that has not occurred

since the great flood of 22 years previous. Many houses flooded, the cypress blocks of the street pavement floated away, and railroad traffic totally suspended. The tide during this storm rose higher than any known since 1824, and as the city was not guarded by a sea wall the present high water must be considered as the highest known. Mr. J. S. Masters, one of the oldest residents, said that the tide was the highest that he has known since 1824, when he rowed a boat into the hallway of the old Mickler house on Charlotte street.

— At Georgetown, South Carolina, records of high water in previous gales have been preserved by means of notches on trees, and by comparison it appears that the high water of 13-14 October 1893 exceeded that of September 1822, and also that of 28 August 1881, by nearly 3 feet. It exceeded that of 27 August 1893, by at least 2 feet 4 inches. A level was taken from the inside of the North Island lighthouse tower, where the water mark is least likely to be obscured by wave action, and the level reached was 11.3 feet on the U.S. Engineer's tide gauge (or 6.8 feet above ordinary high water mark). The popular report was that the water rose on Magnolia Beach, a sandy peninsula about 25 miles northeast of Georgetown, 6 feet above the August gale. As a result of the two gales, August and October, and one or two freshets in the river, the average production of rice in the entire region was expected to hardly exceed one-sixth or one-seventh of the estimated crop. The total loss of life in this vicinity of Georgetown in the October storm is 22 and the loss of property at least \$250,000 [\$6 million in today's dollars]. Almost worse than the physical losses to the fisherman were their demoralization and discouragement, and loss of confidence. They were prepared to believe all sorts of absurd predictions of more storms coming, which were circulated among them without any one knowing who was responsible for them.

— At Wilmington, North Carolina the storm arrived during the evening of October 13<sup>th</sup>. The tide and overflow were the highest ever known here, and were much worse than that of August 1893 hurricane. At Wilmington, some vessels were lost and all the low lands submerged. At Southport the wind velocity reached 80 miles per hour. At Southport, the wharves were damaged and a three-masted schooner went ashore. At Hatteras, North Carolina, the barkentine *Ravenscraft* went ashore.

— The center passed west of Washington D.C., about 9 p.m. on the 13<sup>th</sup>. At Washington D.C., the wall of a church in the course of erection was blown down.

— By the morning of the 14<sup>th</sup>, the storm crossed Pennsylvania and western New York, and was centered north of Lake Ontario. In Pennsylvania, the storm was felt at Chester, Stroudsburg, Westtown, Lewisburg, Kilmer, Mifflington [Mifflintown], Bethlehem, Carlisle, Chambersburg, Reading, Huntington, Norristown, Easton, Columbia, Pine Grove, Harrisburg, West Chester, Pittsburg, and Erie, where trees were blown down, houses unroofed, telegraphic communication interrupted, and railroad traffic delayed. While the center of this storm passed nearly as far west as Pittsburg the damage along the New Jersey coast was much greater than might have been expected. Several branch lines of the West Jersey Railroad were washed out, telegraph wires were blown down, and many small vessels were washed ashore.

— The storm in New York State began about midnight of the 13<sup>th</sup> and did little damage except in the western portion and on the Lakes. On Lake Erie, off Dunkirk, the *Dean Richmond* foundered with 18 persons. Smaller vessels were wrecked all along the coast. The total known loss on the Lakes was 13 vessels, 54 lives, and \$676,000 [\$16 million in today's dollars]. At New London, Connecticut, the wind reached a maximum velocity of 63 miles per hour and Light Ship [60 foot schooner fitted like a portable lighthouse] *Martha Emma* was wrecked.

— During the November 15<sup>th</sup>, the storm disappeared in the direction of Labrador.

A continuous gale, sometimes of hurricane force prevailed over *Great Britain* and the neighboring portion of *Europe* on the 16-19 November 1893. This storm was one of the most severe on record.<sup>117</sup>

On 16-19 November 1893, violent gales struck over the *British Isles* and the *European Continent*. There was much property damage and shipping destroyed. 293 deaths were reported. A *Hampshire* steamship was wrecked on 18 November; the *Princess of Sunderland* was sunk off the coast of Flamboro with all [hands] lost on 18 November. There were many French fishing smacks off Calais, *France* that were lost and as a result more than 300 lives lost on 18 November 1893.<sup>94</sup>

On 12 December 1893, a destructive gale struck London, England and southern and western coasts.<sup>94</sup>

In 1893-94 in Chhindwara, *India*, the weather was good and a bumper crop was reaped.<sup>180</sup>

In 1893 during the period between 14 June and 12 July, a drought engulfed Anhwei (now Anhui



province) in eastern *China* at T'ai-p'ing.<sup>153</sup>

*Also refer to the section 1890 A.D. – 1900 A.D. for information on the drought in South Africa during that timeframe.*

Over the period from 1864-1894, the year 1893 was the coldest on record in *India*, and the rainfall was much greater than in any preceding year. The figures show that during the three years [1892-1894], *India* had experienced a period of heavy rainfall, such as it had not experienced for at least 30 years.<sup>115</sup>

### Annual Rainfall in India

Year	Number of provinces that reported the rainfall as being			Average departure from the normal for the Indian area only	
	Excessive	Normal	Deficient	Excess	Deficiency
1864	4	--	16	--	- 5.52 inches
1865	8	1	11	--	- 0.77 inches
1866	6	--	14	--	- 2.09 inches
1867	8	2	10	+ 2.77 inches	--
1868	5	--	16	--	- 6.63 inches
1869	8	1	13	+ 0.40 inches	--
1870	14	--	10	+ 1.49 inches	--
1871	12	1	11	+ 0.93 inches	--
1872	14	3	7	+ 2.31 inches	--
1873	3	1	20	--	- 4.46 inches
1874	15	3	6	+ 4.64 inches	--
1875	16	--	8	+ 2.38 inches	--
1876	6	--	18	--	- 4.49 inches
1877	10	--	14	--	- 4.28 inches
1878	17	1	6	+ 6.34 inches	--
1879	16	2	6	+ 1.69 inches	--
1880	13	1	10	--	- 1.56 inches
1881	15	--	9	+ 0.10 inches	--
1882	17	1	6	+ 2.64 inches	--
1883	11	1	12	--	- 0.12 inches
1884	12	--	10	+ 1.49 inches	--
1885	15	--	7	+ 1.17 inches	--
1886	14	--	8	+ 2.77 inches	--
1887	11	--	11	+ 2.04 inches	--
1888	10	--	12	--	- 1.13 inches
1889	15	--	8	+ 1.92 inches	--
1890	14	1	8	+ 0.46 inches	--
1891	6	--	17	--	- 0.30 inches
1892	15	--	8	+ 4.55 inches	--
1893	22	--	1	+ 8.94 inches	--
1894	17	--	6	+ 6.48 inches	--

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**Winter of 1893/ 1894 A.D.** On 21 November 1893, the first blizzard of the season occurred in Minnesota and advanced southeastward into Illinois in the *United States*. At Detroit, Michigan the snowflakes were of enormous size, the diameter being a little smaller than a silver dollar [In 1893, the U.S. silver dollar had a diameter of 1.5 inches or 38.1 millimeters].<sup>117</sup>

During the winter of 1893-94 in Bradford County, Pennsylvania in the *United States* - October, November, December and January were unusually warm with scarcely a cold day. Around the beginning of February the weather turned cold and this continued several days. On February 17<sup>th</sup>, temperature in the

county ranged from -12° F to -16° F [-24° C to -27° C]. Mild weather followed. But then there was another cold snap on the 25<sup>th</sup> when the temperature dropped from -13° F to -24° F [-25° C to -31° C] (the latter at Camptown). There was good sleighing during the end of February and the beginning of March. On 8 March, bluebirds and robins appeared and the boys began to shoot marbles. Nearly all March, it was warm and delightful spring-like weather. April came in cold and on the 10<sup>th</sup> produced a notable snowstorm lasting three days. Snow fell to a depth varying between 16 and 24 inches [41 – 61 cm]. Following the storm there was good sleighing for three days but then the snow melted.<sup>178</sup>

The following are the lowest temperatures observed during January 1894 in the *United States*:<sup>116</sup>

Montgomery, Alabama	( 21° F, -6.1° C)
Mobile, Alabama	( 24° F, -4.4° C)
Tucson, Arizona	( 18° F, -7.8° C)
Yuma, Arizona	( 28° F, -2.2° C)
Little Rock, Arkansas	( 1° F, -17.2° C)
Fort Smith, Arkansas	( -7° F, -21.7° C)
San Francisco, California	( 36° F, +2.2° C)
San Diego, California	( 32° F, 0.0° C)
Denver, Colorado	( -7° F, -21.7° C)
Pueblo, Colorado	( -7° F, -21.7° C)
Pikes Peak, Colorado	(-26° F, -32.2° C)
New Haven, Connecticut	( 11° F, -11.7° C)
New London, Connecticut	( 8° F, -13.3° C)
Milford, Delaware	( 19° F, -7.2° C)
Washington, D.C.	( 17° F, -8.3° C)
Pensacola, Florida	( 27° F, -2.8° C)
Key West, Florida	( 61° F, +16.1° C)
Augusta, Georgia	( 26° F, -3.3° C)
Savannah, Georgia	( 32° F, 0.0° C)
Lake, Idaho	(-26° F, -32.2° C)
Chicago, Illinois	( -9° F, -22.8° C)
Cairo, Illinois	( -4° F, -20.0° C)
Indianapolis, Indiana	( -7° F, -21.7° C)
Lafayette, Indiana	(-17° F, -27.2° C)
Dubuque, Iowa	(-22° F, -30.0° C)
Keokuk, Iowa	(-16° F, -26.7° C)
Topeka, Kansas	(-14° F, -25.6° C)
Dodge City, Kansas	(-15° F, -26.1° C)
Louisville, Kentucky	( -5° F, -20.6° C)
Lexington, Kentucky	( -6° F, -21.1° C)
New Orleans, Louisiana	( 28° F, -2.2° C)
Shreveport, Louisiana	( 13° F, -10.6° C)
Eastport, Maine	( -9° F, -22.8° C)
Portland, Maine	( -8° F, -22.2° C)
Baltimore, Maryland	( 18° F, -7.8° C)
Boston, Massachusetts	( 2° F, -16.7° C)
Nantucket, Massachusetts	( 8° F, -13.3° C)
Marquette, Michigan	( -9° F, -22.8° C)
Detroit, Michigan	( -3° F, -19.4° C)
Saint Vincent, Minnesota	(-38° F, -38.9° C)
Saint Paul, Minnesota	(-25° F, -31.7° C)
Leach Lake, Minnesota	(-49° F, -45.0° C)
Vicksburg, Mississippi	( 16° F, -8.9° C)
Saint Louis, Missouri	(-11° F, -23.9° C)
Mingusville, Montana	(-38° F, -38.9° C) (now Wibaux)
Helena, Montana	(-26° F, -32.2° C)

North Platte, Nebraska	( -26° F, -32.2° C)
Omaha, Nebraska	( -22° F, -30.0° C)
Valentine, Nebraska	( -38° F, -38.9° C)
Winnemucca, Nevada	( -8° F, -22.2° C)
Carson City, Nevada	( -7° F, -21.7° C)
West Milan, New Hampshire	( -24° F, -31.1° C)
New Brunswick, New Jersey	( 10° F, -12.2° C)
Cape May, New Jersey	( 19° F, -7.2° C)
Santa Fe, New Mexico	( 3° F, -16.1° C)
Albany, New York	( 5° F, -15.0° C)
New York City, New York	( 17° F, -8.3° C)
Charlotte, North Carolina	( 24° F, -4.4° C)
Kitty Hawk, North Carolina	( 31° F, -0.6° C)
Bismarck, North Dakota	( -33° F, -36.1° C)
Williston, North Dakota	( -36° F, -37.8° C)
Cincinnati, Ohio	( -4° F, -20.0° C)
Columbus, Ohio	( -4° F, -20.0° C)
Oklahoma City, Oklahoma	( -8° F, -22.2° C)
Fort Sill, Oklahoma	( -5° F, -20.6° C)
Roseburg, Oregon	( 21° F, -6.1° C)
Portland, Oregon	( 27° F, -2.8° C)
Erie, Pennsylvania	( 9° F, -12.8° C)
Philadelphia, Pennsylvania	( 17° F, -8.3° C)
Block Island, Rhode Island	( 7° F, -13.9° C)
Charleston, South Carolina	( 30° F, -1.1° C)
Columbia, South Carolina	( 27° F, -2.8° C)
Yankton, South Dakota	( -26° F, -32.2° C)
Nashville, Tennessee	( -2° F, -18.9° C)
Knoxville, Tennessee	( 12° F, -11.1° C)
San Antonio, Texas	( 16° F, -8.9° C)
Galveston, Texas	( 24° F, -4.4° C)
Salt Lake City, Utah	( -1° F, -18.3° C)
Burlington, Vermont	( -5° F, -20.6° C)
Lynchburg, Virginia	( 20° F, -6.7° C)
Norfolk, Virginia	( 29° F, -1.7° C)
Olympia, Washington	( 18° F, -7.8° C)
Spokane, Washington	( -1° F, -18.3° C)
Morgantown, West Virginia	( 10° F, -12.2° C)
Milwaukee, Wisconsin	( -14° F, -25.6° C)
La Crosse, Wisconsin	( -19° F, -28.3° C)
Osceola, Wisconsin	( -41° F, -40.6° C)
Cheyenne, Wyoming	( -17° F, -27.2° C)

The following are the lowest temperatures observed during January 1894: <sup>116</sup>

Port Francis, Ontario, <i>Canada</i>	( -46° F, -43.3° C)
St. John, New Brunswick, <i>Canada</i>	( -10° F, -23.3° C)
Ciudad Porfirio Díaz, <i>Mexico</i>	( 26° F, -3.3° C) (now Piedras Negras, Coahuila)
Mazatlán, <i>Mexico</i>	( 55° F, +12.8° C)
Topolobampo, <i>Mexico</i>	( 50° F, +10.0° C)
Hamilton, <i>Bermuda</i>	( 53° F, +11.7° C)

The depth that rivers and lakes froze in January 1894 in the *United States*: <sup>116</sup>

- \* At Dubuque, Iowa, the Mississippi River was frozen over on the 8<sup>th</sup>.
- \* At La Crosse, Wisconsin, the ice on the Upper Mississippi River was 22 inches thick.
- \* At Davenport, Iowa, the ice on the Upper Mississippi River was 8 inches thick.

- \* At St. Paul, Minnesota, the ice on the Upper Mississippi River was 20.5 inches thick.
- \* At Hermann, Missouri, the Missouri River was frozen over on the 25<sup>th</sup>.
- \* At Omaha, Nebraska, the ice on the Upper Missouri River was 15 inches thick.
- \* At Williston, North Dakota, the ice on the Upper Missouri River was 24 inches thick.
- \* At Yankton, South Dakota, the ice on the Upper Missouri River was 21 inches thick.
- \* At Port Huron, Michigan, the Black River was frozen over on the 25<sup>th</sup>.
- \* At Marquette, Michigan, on Lake Superior, the harbor was frozen over on the 25<sup>th</sup>.
- \* At Duluth, Minnesota, the ice on Lake Superior was 21 inches thick and at Sault Ste. Marie, Michigan, the ice was 18 inches thick.
- \* At Green Bay, Wisconsin, the ice on Lake Michigan was 18 inches thick, at Chicago, Illinois, the ice was 5 inches thick and at Grand Haven, Michigan, it was 2 inches thick.
- \* At Toledo, Ohio, the ice on Lake Erie was 4 inches thick and at Sandusky, Ohio, the ice was 4.5 inches thick.
- \* At Oswego, New York, the ice on Lake Ontario was 4 inches thick.
- \* At Alpena, Michigan, the ice on Lake Huron was 4 inches thick.
- \* In Wisconsin, the Rock River was frozen and ice was 11 inches thick. Ice on Rock Lake was 14 inches thick.
- \* In Minnesota, ice on the Thief River was 28 inches thick at the end of the month. In Minneapolis, the ice was 22 inches thick on the lake. At Marfield, the ice was 30 inches thick on lakes and ponds. At Blooming Prairie, the ice was 2 feet thick on Cedar River. At Willmar, the ice was 28 inches thick on the lakes.
- \* At Albany, New York, the ice on the Hudson River was 8 inches thick.
- \* At North Platte, Nebraska, the ice on the Platte River was 16 inches thick.

On 25 January 1894, the minimum temperature at Ames, Iowa was -37° F (-38.3° C).<sup>111</sup>

In January 1894, more ice was reported [east of Newfoundland, *Canada*] than in any corresponding month during the previous 12 years. The southernmost ice reported was in N. 44° 27', W. 54° 15', on the 18<sup>th</sup>, and the position of the easternmost ice was reported in N. 44° 48', W. 46° 14', on the 21<sup>st</sup>.<sup>116</sup>

On 27 January 1894, heavy snowstorms occurred over New England and New York in the *United States*, delaying traffic. At Provincetown, Massachusetts, trees were broken from the weight of the snow and damage was done to electric wires. At Nantasket Beach, Massachusetts, the coast was strewn with wreckage.<sup>116</sup>

On 29-30 January 1894, a severe gale and snowstorm prevailed over New England and the Middle Atlantic States in the *United States*. At Eastport, Maine, the storm began the evening of the 29<sup>th</sup>, and by 6:55 a.m. of the 30<sup>th</sup>, the wind had reached a maximum velocity of 78 miles per hour and an extreme velocity of 90 miles. There was very little shipping in port, and the tide being unusually low, the damage was not very great. The storm was the most severe since September 1869. At Gloucester, Massachusetts, a heavy southeast gale prevailed during the 29<sup>th</sup>; a vessel was wrecked near Eastern Point. All along the New England coast a number of vessels were damaged. At Atlantic City, New Jersey, the wind attained a maximum velocity of 52 miles per hour and an extreme velocity of 60 miles; damage was done to electric wires. Throughout New York and Pennsylvania the snow was exceptionally heavy, and caused great delay to traffic and damage to electric wires. At Baltimore, Maryland, the wind reached a maximum velocity of 48 miles per hour from the west. The storm was the most severe in years. One person was blown down and considerably injured and another injured by flying debris. Considerable damage was done to property.<sup>116</sup>

Heavy snowstorms struck across the *United States* on 11 & 12 February 1894. On 11 February, a heavy drifting snowstorm set in over Topeka, Kansas, delaying railroad and streetcar traffic. At Dodge City, Kansas, the most severe norther [a sudden cold gale coming from the North], accompanied by the heaviest snow that has visited that section in years, began in the early morning. No trains on the Santa Fe railroad arrived until 6 p.m. on the 12<sup>th</sup>. Cattle were lost and livestock on the plains suffered badly. On the 12<sup>th</sup>, high winds and heavy snowstorms extended from New England to the Mississippi Valley, delaying traffic and causing damage to property. Shipwrecks occurred along the New England and New

Jersey coasts, and in some cases were attended by loss of life. At Buffalo, New York, the storm was the most severe in the history of that station. It began on the February 12<sup>th</sup> at 7:35 a.m., and continued until the morning of the 13<sup>th</sup>. The snow, which was light and feathery, was drifted by the high wind in some sections to a depth of 4 to 5 feet. At Toledo, Ohio, snow began at 7:05 a.m., with a gale reaching a maximum velocity of 60 miles per hour from the northeast, and sometimes reached an extreme of 88 miles per hour; the storm was the heaviest ever experienced; the Weather Bureau observer at that place reports that snowdrifts in some places reached 8 feet high; considerable damage was done by high wind, and traffic was suspended; the gale caused the water in the river to rise rapidly, flooding docks and cellars. The heaviest storm in the history of Chicago, Illinois began in the early morning; snow began at 5:30 a.m., and continued during the day; the wind averaged nearly 70 miles an hour from the northeast for more than ten hours and reached a maximum velocity of 84 miles at 11 a.m.; damage was done to the amount of \$250,000. [In present currency, that would be equivalent to \$6.2 million in damages based on the Consumer Price Index (CPI) inflation rates.] At Detroit, Michigan, snow began at 9:20 a.m., and continued during the day, accompanied by high wind; trains were delayed throughout the State, and business in general suffered. At Port Huron, Michigan, snow began at 9:51 a.m., with high winds, reaching a maximum velocity of 48 miles per hour; the wind did not go below 40 miles an hour during the afternoon, drifting the snow in some places to a depth of 6 feet. At Milwaukee, Wisconsin, snow began during the early morning, accompanied by a gale of 42 miles per hour, drifting the snow badly. The storm was general throughout Iowa, Kansas, and Missouri, and traffic was greatly delayed.<sup>116</sup>

On 12 February 1894, violent blizzard struck the west of *United States*.<sup>94</sup>

A heavy "Pogonip" occurred at Magill, Nevada in the *United States* on 13 February 1894.<sup>116</sup>

On 24-26 February 1894, unusually severe snow and sleet storms prevailed from Massachusetts over the south Atlantic States, and extended over the Ohio Valley and Tennessee to Texas in the *United States* attended by heavy gales from the New England to the North Carolina coasts. The total depth of snowfall from this storm in the Southern States were: Florence, Alabama received 8 inches of snow; Newburg, Alabama received 9 inches; Osceola, Arkansas received 7 inches; Rison, Arkansas received 8 inches; Lafayette, Georgia received 9 inches; Atlanta, Georgia received 6 inches; Plain Dealing, Louisiana received 3.2 inches; Liberty Hill, Louisiana received 3 inches; Aberdeen, Mississippi received 7 inches; Pontotoc, Mississippi received 6 inches; Shelby, North Carolina received 16 inches; Bakersville, North Carolina received 14 inches; Effingham, South Carolina received 8.5 inches; and Yorkville, South Carolina received 8 inches.<sup>116</sup>

On 6 March 1894, the steamer *Teutonic* met with a gigantic ocean wave that swept over the vessel while steaming westward in the *Atlantic Ocean* from Europe to America.<sup>116</sup> [The *Teutonic* was a luxury liner from the White Star Line. Her length was 582 feet, constituting her the largest ship afloat at the time; breadth, 57 feet 6 inches; depth, 39 feet 4 inches, with a gross tonnage of 9,686 tons. The ship was referred to as a 10,000-ton racer. In September 1889 it made the voyage from Queenstown [Cobh, Ireland] to Sandy Hook [New Jersey] in 6 days, 7 hours and 14 minutes despite running through the teeth of a powerful hurricane.]

A great cold wave passed over Wyoming in the *United States* on 22-27 March 1894. It caused a continuous blizzard of seventy hours at Buffalo, Wyoming.<sup>116</sup>

A very severe cold wave passed through the South in the *United States* towards the latter part of March 1894. Freezing temperatures were reported in Arkansas beginning on 25 March for four consecutive nights. At Augusta, Georgia, the temperature fell to 25° F on the 27<sup>th</sup> and on the 28<sup>th</sup> there was another hard frost killing all the tender vegetation and fruits. Savannah, Georgia estimated the damage in the immediate vicinity was \$100,000 [\$2.5 million in today's dollars]. The cold spell of the 25-30<sup>th</sup> in



Mississippi at the critical period proved very disastrous to farming operations. Corn was cut to the ground. Peaches, pears, plums, pecans, grapes and the first crop of strawberries were killed, even to the coast. As an indication of the severity of the cold it is worthy of note that hickory nuts, acorns and young fruit trees was believed killed in the northern portions of the Mississippi. In Tennessee, the cold wave of March 26 and 27 killed fruit, vegetables, young clover, oats, tobacco plants in some localities, and seriously damaged wheat and Irish potatoes. In West Virginia, the hard freeze on the morning of the 26<sup>th</sup>, a hoar frost on the 27<sup>th</sup> and a killing frost on the 28<sup>th</sup> proved very destructive to all forms of vegetation, in many instances being almost fatal as far as a future crop was concerned. South Carolina was hit hard by the cold wave. The Director of the South Carolina State Weather Service has summarized the reports of damage done by the cold weather of March 26, 27, and 28, received by him from 106 stations fairly distributed over the 35 counties of that State as follows:<sup>116</sup>

Apricots and peaches — totally destroyed 84 reports; partially destroyed 6 reports  
 Figs and pears — totally destroyed 80 reports; partially destroyed 7 reports  
 Pomegranates and plums — totally destroyed 77 reports; partially destroyed 6 reports  
 Apples — totally destroyed 61 reports; partially destroyed 27 reports  
 Raspberries, strawberries, and blackberries — totally destroyed 66 reports; partially destroyed 11 reports  
 Rye and wheat — totally destroyed 2 reports; partially destroyed 38 reports.  
 Oats — totally destroyed 1 report; partially destroyed 46 reports  
 Corn — totally destroyed 21 reports; partially destroyed 25 reports  
 Melons, potatoes, cabbage, and garden truck — totally destroyed 84 reports; partially 8 reports  
 Grapes — totally destroyed 89 reports

Compared with April 1893, there was a marked increase in the quantity of ice reported in the North Atlantic Ocean [east of Newfoundland, *Canada*] in 1894. Ice was reported every day during the month except on April 13<sup>th</sup> to 15<sup>th</sup>.<sup>116</sup>

— On the 7<sup>th</sup>, the British bark *Ruth Palmer* collided with an iceberg off the Grand Banks and sunk. The crew were picked up by the French brigantine *Marie Gabrielle*, and landed at St. Pierre, Newfoundland on April 30<sup>th</sup>.

— On the 12<sup>th</sup>, the French steamship *Olbia* landed at St. Pierre, Canada much damaged by striking an iceberg on the voyage from Marseilles, France.

— On the 17<sup>th</sup>, the British steamship *Earncliffe* arrived at Halifax so much damaged by ice met outside of Halifax harbor that she had to go into dry dock. Extensive reefs of heavy field ice were reported on the eastern coast of Newfoundland.

— On the 18<sup>th</sup>, the British steamship *Valletta*, bound for St. John, New Brunswick, *Canada*, foundered in the ice 50 miles east of Halifax. Her crew was saved by the Norwegian bark *Liberte*.

— Reports state that easterly gales packed heavy ice on the shore and in the harbors of Cape Breton Island, blocking navigation even on the southern coast. It was reported that ice was very heavy in the Gulf of St. Lawrence on the 18<sup>th</sup>. British steamship *Newfoundland*, which for several days had been jammed in the ice off Cow Bay, Cape Breton Island, got clear April 19<sup>th</sup>, and proceeded to Halifax, Nova Scotia, *Canada*. British steamship *Premier* was unable to reach her destined port at Montreal, *Canada* on account of ice, and returned to Halifax.

— On the 22<sup>nd</sup> reports state that Halifax harbor was completely blocked by heavy Gulf ice. Six steamers and 50 sail vessels were detained in port on account of ice. No such blockade has occurred in the past forty-two years.

— On the 24<sup>th</sup> British steamship *Sarmatian*, from Liverpool to Montreal, stopped at Halifax, being unable to get up the Gulf of St. Lawrence on account of ice. Leaving Halifax on the 25<sup>th</sup>, she encountered heavy field ice 60 miles northwest of Bird Rocks. She met pack ice 12 feet thick, covered with seals.

— On the 26<sup>th</sup>, the British schooner *Algeria* had her bows crushed in by the ice and sunk while attempting to make Renew's Harbor, south of St. Johns, Newfoundland.

— On the 30<sup>th</sup>, the British steamship *Pomeranian*, in N. 48° 10', W. 62° 30', sighted two fields of pack ice and a schooner fast in the middle of one of them.

On 10-12 April 1894, unusually severe snowstorms, accompanied by gales, prevailed over New England and the Middle Atlantic States in the *United States*, causing loss of life and damage to shipping. Along the Massachusetts coast several vessels were blown ashore. At Highland Beach, New Jersey, 2 vessels were lost and 15 persons drowned. The sea was very heavy all along the New York and New Jersey coasts, and much damage was done to property. The depth of snow that fell during the storm was:

Darlington, Maryland - 24 inches; Fallston, Maryland - 24 inches; Chester, New Jersey - 21 inches; Addison, New York - 26 inches; Angelica, New York - 28 inches; Bedford, New York - 24 inches; Factoryville, New York - 26.5 inches; Le Roy, New York - 30 inches; Perry City, New York - 27.2 inches; South Canisteo, New York - 28.8 inches; Varysburg, New York - 26.0 inches; Wedgwood, New York - 26 inches; Aqueduct, Pennsylvania - 21 inches; Coatesville, Pennsylvania - 29.2 inches; Hamburg, Pennsylvania - 26 inches; Kilmer, Pennsylvania - 28 inches; Le Roy, Pennsylvania - 27.5 inches; Lewisburg, Pennsylvania - 25 inches; Lock Haven, Pennsylvania - 25.9 inches; Salem Corners, Pennsylvania - 31.5 inches; Selinsgrove, Pennsylvania - 28.5 inches; Wellsboro, Pennsylvania - 21.5 inches; York, Pennsylvania - 26 inches.<sup>116</sup>

On 10-11 April 1894, there was a severe gale on the coast of New Jersey in the *United States*, and heavy fall of snow.<sup>94</sup>

On 18 May 1894, a severe storm struck Lake Michigan in the *United States*. At Chicago, Illinois, this was the most severe storm in the history of the weather station. Snow fell with the rain during the storm. The wind was extremely gusty, blowing at the rate of 30 miles per hour one minute and 65 the next. Many vessels were caught on Lake Michigan and prevented from entering the harbor by the heavy seas; disasters were numerous and 10 lives were lost; the schooners *Evening Star*, *S. G. Mixer*, *Myrtle*, *Lincoln Dall*, *Jack Thompson*, *J. Loomis*, *McLaren*, *Mercury*, and *Rainbow* were total wrecks. The damage caused by this storm exceeded \$100,000 [\$2.5 million in today's dollars], without counting the damage to the right of way of the Illinois Central Railway, which amounted to many thousands more. A report from Alpena, Michigan, states that a heavy north gale and snowstorm prevailed over Middle Island; a raft in tow of the tug *John Owens* went ashore north of Middle Island. The schooner *American Union* that had earlier washed ashore on the 7<sup>th</sup> at Thompsons Harbor, 25 miles north of Alpena, went to pieces; loss of \$10,000. A severe northeast snowstorm swept over Boon, Michigan, continuing throughout the day; snow fell to a depth of 4.0 inches; much timber was broken from the weight of snow. At Port Huron, Michigan, a gale began in the afternoon and continued throughout the 19<sup>th</sup>. A schooner became water-logged a few miles north and went ashore; in the attempts to reach the vessel 4 persons were drowned; the crew were finally saved by the Life-Saving Service, but the vessel and cargo were a total loss. The storm was exceptionally heavy at Green Bay, Wisconsin; the water in the river, blown by the high wind, attained the highest point on record.<sup>116</sup>

An unusually heavy snowfall prevailed throughout the eastern and southern portions of Kentucky in the *United States* on the 19<sup>th</sup> and 20<sup>th</sup> of May. At Carlisle, Somerset, Lexington, Mount Sterling, and Corbin, Kentucky where the snow was from 3 to 8 inches deep, the snow fell while the temperature of the air was between 35° F and 40° F, which was unusually high. No snow had fallen in these regions in the month of May since 1854.<sup>116</sup>

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**1894 A.D.** On [4-9] January 1894, a cyclone struck off the coast Cossack (near Roebourne) in *Western Australia*. [Within the space of 4 days two cyclones passed through this region.] Forty to fifty people died, mainly at sea. Flooding caused by the cyclone added an additional 21 deaths in the Geraldton region.<sup>99</sup>

In February 1894, there was flood in *Western Australia*. It was one of the greatest floods known in this part of *Australia*. The flood affected the regions around Bunbury, Derby, Fitzroy Crossing, and Halls Creek. The flood affected many rivers including the Ord, Margaret, Lennard, Barker and Fitzroy rivers. At least 25,000 sheep were lost and 5 people drowned.<sup>99</sup>

The month of February 1894 produced a remarkable number of electrical phenomena throughout the *Hawaiian Islands*. There were eight distinct thunderstorms during the month at Honolulu and nearly all unusually heavy for this region. One of these storms produced a significant amount of chain lightning.<sup>116</sup>

[Chain lightning or bead lightning is a form of lightning of longer duration than more typical lightning strikes. Chain lightning appears as a string of luminous segments instead of a continuous channel. It occurs infrequently.]

On 4 February 1894, a typhoon was observed in *Madagascar* and the Indian Ocean off the southeast coast of Africa.<sup>116</sup>

On 11-12 February 1894, a southwest gale struck over the British Isles. There was much damage on land, 6 persons killed, and many [ship] wrecks.<sup>94</sup>

On 12-13 February 1894, there was a great storm over *Europe* and the *United States*.<sup>94</sup>

On 21-23 February 1894, a typhoon was observed off the coast of *Japan*.<sup>116</sup>

On 28 April 1894, there was an overflow of the River Noire, near Quebec, *Canada* caused by a landslide. This flood caused about 20 deaths. Many livestock and much property were destroyed.<sup>97</sup>

On 11 May 1894, a severe hailstorm struck Vicksburg, Mississippi in the *United States*. One of the remarkably large hailstones had a solid nucleus, consisting of a piece of alabaster from one-half to three-quarters of an inch. During the same storm at Bovina, 8 miles east of Vicksburg, a gopher turtle, 6 by 8 inches, was entirely encased in ice, and fell with the hail.<sup>116</sup>

On 14 May 1894, a thunder and hail storm of short duration struck Fresno, California in the *United States* causing damage to fruit and grain. In the mountains, on the east side of Fresno County, the storm was reported very severe, and over 4,000 sheep were frozen to death.<sup>116</sup>

On 15-17 May 1894, there were destructive floods in Wisconsin in the United States and other places. Bridges were destroyed and railway traffic stopped. The waters began receding on 22 May 1894.<sup>97</sup>

The year 1894 in Bradford County, Pennsylvania in the *United States* was notably for the warm June; destructive electrical storms in July; and severe drought in August. Four days of almost incessant rain from 18-21 May 1894 put the Susquehanna River on a rampage causing considerable flood damage. June was one of the warmest in years and July notable for electrical storms, during which many barns were struck and burned and horses and cattle killed. August (with the exception of August 1881) was the driest in 16 years. Thus a wet May was followed by three months of severe drought, causing short crops and scant pastures.<sup>178</sup>

There were destructive floods in the Punjab, *India* in May; and in *Hungary* in June 1894.<sup>97</sup>

During May 1894 in the *United States*, 45 persons were killed by lightning; 34 persons were struck and severely injured; 12 barns were set on fire, with an estimated loss of \$35,000; 37 dwellings, 4 churches, and 1 schoolhouse were struck and damaged to greater or less extent; 58 horses and 22 cows were killed. During June 1894, 96 persons were killed and 102 severely injured by lightning; 69 barns were struck, with an estimated loss of \$49,000; 49 horses, 30 cows, and 15 sheep were killed; 80 dwellings were struck and more or less damaged; 22 churches, 1 railroad depot, 1 oil tank, 1 grain elevator, and 6 mills and factories were struck, the damage in the case of the eight last named being not less than \$257,500 [\$6.4 million in today's dollars]. During July 1894, 59 lives were lost and 94 persons injured by lightning; 41 barns, with a minimum loss of \$45,000, were struck; 33 dwellings, 12 churches, 2 academies, 3 mills or factories, and 2 railroad depots were struck; 24 horses, 13 cows, 5 mules, and 6 sheep were killed. During August 1894, 78 lives were lost and 76 persons injured by lightning; 81 barns, with a minimum loss of \$129,800 [\$3.2 million in today's dollars], were struck; 41 dwellings, 5 churches,

2 academies, and 2 mills or factories were struck; 22 horses and 15 cows, not in stables, were killed. During September 1894, 29 persons were killed and 14 severely injured by lightning; 56 barns were struck, with a loss of not less than \$141,350 [\$3.5 million in today's dollars]; 42 dwelling houses were struck and a number of churches, several schoolhouses, 1 armory, and 1 railroad depot. During October 1894, 7 persons were killed and 2 severely injured by lightning; 2 barns, 2 dwellings, 3 churches, and 2 car stables burned.<sup>116</sup>

On 3 June 1894, a tornado passed through the counties of Harney, Grant and Union in eastern Oregon in the *United States*. There was a very unusual hailstorm that accompanies the tornado. The formation was more in the nature of sheets of ice than simple hailstones. The sheets of ice averaged 3 to 4 inches square and from  $\frac{3}{4}$  of an inch to  $1\frac{1}{2}$  inches thick. They had smooth surface and in falling gave the impression of a vast field or sheet of ice suspended in the atmosphere and suddenly broken into fragments about the size of the palm of the hand.<sup>116</sup>

On 7 June 1894, there was a violent hailstorm at Vienna, *Austria* and other parts of *Hungary*, with loss of life, vineyards destroyed.<sup>94</sup>

On 27 June 1894, violent local storms, with characteristics of tornadoes, occurred at the following places in Minnesota and South Dakota in the *United States*: Cedar Mills, Cold Springs, Willmar, Colledgeville, Echo, Sleepy Eye, Fergus Falls, Forest City, Holland, Litchfield, Minneapolis, Montrose, Raymond, St. Paul, Selma, and Pipe Stone, Minnesota; Aberdeen, Alpena, Bath, Bonilla, Huron, Hitchcock, St. Lawrence, and Sisseton Agency, South Dakota. Ten persons were killed in Minnesota and 6 in South Dakota.<sup>116</sup>

The following are the highest temperatures observed during July 1894 in the *United States*:<sup>116</sup>

Montgomery, Alabama	( 98° F, 36.7° C)
Mobile, Alabama	( 95° F, 35.0° C)
Tucson, Arizona	(106° F, 41.1° C)
Yuma, Arizona	(113° F, 45.0° C)
Little Rock, Arkansas	(103° F, 39.4° C)
Fort Smith, Arkansas	(105° F, 40.6° C)
San Francisco, California	( 76° F, 24.4° C)
San Diego, California	( 77° F, 25.0° C)
Sacramento, California	(104° F, 40.0° C)
Denver, Colorado	( 96° F, 35.6° C)
Pueblo, Colorado	( 97° F, 36.1° C)
New Haven, Connecticut	( 94° F, 34.4° C)
New London, Connecticut	( 90° F, 32.2° C)
Wilmington, Delaware	(101° F, 38.3° C)
Washington, D.C.	( 97° F, 36.1° C)
Pensacola, Florida	( 93° F, 33.9° C)
Key West, Florida	( 90° F, 32.2° C)
Augusta, Georgia	( 92° F, 33.3° C)
Savannah, Georgia	( 94° F, 34.4° C)
Payette, Idaho	(107° F, 41.7° C)
Lewiston, Idaho	(105° F, 40.6° C)
Chicago, Illinois	( 96° F, 35.6° C)
Cairo, Illinois	( 95° F, 35.0° C)
Indianapolis, Indiana	( 97° F, 36.1° C)
Lafayette, Indiana	(100° F, 37.8° C)
Dubuque, Iowa	(102° F, 38.9° C)
Keokuk, Iowa	(102° F, 38.9° C)
Logan, Iowa	(110° F, 43.3° C)

Topeka, Kansas	(101° F, 38.3° C)
Elk City, Kansas	(115° F, 46.1° C)
Dodge City, Kansas	(106° F, 41.1° C)
Louisville, Kentucky	( 96° F, 35.6° C)
Lexington, Kentucky	( 93° F, 33.9° C)
New Orleans, Louisiana	( 99° F, 37.2° C)
Shreveport, Louisiana	(101° F, 38.3° C)
Eastport, Maine	( 91° F, 32.8° C)
Portland, Maine	( 97° F, 36.1° C)
Baltimore, Maryland	( 97° F, 36.1° C)
Boston, Massachusetts	( 97° F, 36.1° C)
Nantucket, Massachusetts	( 85° F, 29.4° C)
Marquette, Michigan	(100° F, 37.8° C)
Detroit, Michigan	( 96° F, 35.6° C)
Saint Vincent, Minnesota	(100° F, 37.8° C)
Saint Paul, Minnesota	(100° F, 37.8° C)
Vicksburg, Mississippi	(100° F, 37.8° C)
Saint Louis, Missouri	( 98° F, 36.7° C)
Billings, Montana	(103° F, 39.4° C)
Helena, Montana	( 94° F, 34.4° C)
North Platte, Nebraska	(103° F, 39.4° C)
Omaha, Nebraska	(106° F, 41.1° C)
Winnemucca, Nevada	( 94° F, 34.4° C)
Carson City, Nevada	( 90° F, 32.2° C)
West Milan, New Hampshire	( 90° F, 32.2° C)
New Brunswick, New Jersey	(100° F, 37.8° C)
Cape May, New Jersey	( 90° F, 32.2° C)
Santa Fe, New Mexico	( 84° F, 28.9° C)
Albany, New York	( 97° F, 36.1° C)
New York City, New York	( 96° F, 35.6° C)
Charlotte, North Carolina	( 93° F, 33.9° C)
Kitty Hawk, North Carolina	( 90° F, 32.2° C)
Bismarck, North Dakota	(101° F, 38.3° C)
Williston, North Dakota	(100° F, 37.8° C)
Cincinnati, Ohio	( 95° F, 35.0° C)
Columbus, Ohio	( 97° F, 36.1° C)
Oklahoma City, Oklahoma	(104° F, 40.0° C)
Fort Sill, Oklahoma	(108° F, 42.2° C)
Anadarko, Oklahoma	(114° F, 45.6° C)
Roseburg, Oregon	( 93° F, 33.9° C)
Portland, Oregon	( 94° F, 34.4° C)
Erie, Pennsylvania	( 91° F, 32.8° C)
Philadelphia, Pennsylvania	( 97° F, 36.1° C)
Block Island, Rhode Island	( 84° F, 28.9° C)
Charleston, South Carolina	( 91° F, 32.8° C)
Columbia, South Carolina	( 97° F, 36.1° C)
Shiloh, South Dakota	(113° F, 45.0° C)
Nashville, Tennessee	( 96° F, 35.6° C)
Knoxville, Tennessee	( 92° F, 33.3° C)
San Antonio, Texas	(106° F, 41.1° C)
Galveston, Texas	( 97° F, 36.1° C)
Salt Lake City, Utah	( 96° F, 35.6° C)
Burlington, Vermont	( 92° F, 33.3° C)
Lynchburg, Virginia	( 95° F, 35.0° C)
Norfolk, Virginia	( 94° F, 34.4° C)
Olympia, Washington	( 96° F, 35.6° C)



Spokane, Washington	( 95° F, 35.0° C)
Morgantown, West Virginia	( 97° F, 36.1° C)
Milwaukee, Wisconsin	( 96° F, 35.6° C)
La Crosse, Wisconsin	(100° F, 37.8° C)
Cheyenne, Wyoming	( 94° F, 34.4° C)

The following are the highest temperatures observed during July 1894: <sup>116</sup>

Ciudad Porfirio Díaz, <i>Mexico</i>	(104° F, 40.0° C)	(now Piedras Negras, Coahuila)
Leon de Aldamas, <i>Mexico</i>	( 88° F, 31.1° C)	(now León, Guanajuato)
Mexico City, <i>Mexico</i>	( 78° F, 25.6° C)	
Puebla, <i>Mexico</i>	( 79° F, 26.1° C)	
Topolobampo, <i>Mexico</i>	( 95° F, 35.0° C)	
Vera Cruz, <i>Mexico</i>	( 90° F, 32.2° C)	
Mazatlan, <i>Mexico</i>	( 90° F, 32.2° C)	
St. John, New Brunswick, <i>Canada</i>	( 77° F, 25.0° C)	
Hamilton, <i>Bermuda</i>	( 85° F, 29.4° C)	

On 26 & 27 July 1894, the maximum temperature at Spirit Lake, Iowa in the *United States* was 109° F (42.8° C).<sup>111</sup>

During the summer of 1894, there was a drought over the northern half of the *United States*. July 1894 was the driest month ever experienced in Iowa, breaking all previous records. Many areas in Iowa experienced temperature from 100° F to 109° F. The temperature in many areas of Iowa on the 26<sup>th</sup> was the highest for at least the past 33 years. There were many prairie and forest fires. Because of the excessive heat and the great deficiency of rainfall in July, the weather did great injury to the crops.<sup>116</sup>

There was a drought in Iowa and Missouri in the *United States* during the summer of 1894. The grass crop suffered most serious damage by the great drought of the past summer. The output of hay was cut short over 50% and the pastures were rendered practically worthless for grazing for a period of nearly three months. To a large extent the roots were destroyed by the intense heat and close grazing of the hungry stock. There was a general failure of the streams, reservoirs and wells, and dairymen were obligated to skirmish around at a lively rate to provide water as well as forage for their suffering herds.<sup>111</sup>

The great drought of 1894 in the *United States* began to show its effects about the middle of May, and during that month, the eastern and middle States and the northwestern States were saturated, while the Mississippi and Missouri valleys were comparatively dry. In June, there was a large amount of rainfall in the middle [Rocky Mountain] slope, and a great deficiency in the upper Mississippi valley and east Gulf States. In July, there were heavy rains in the south Atlantic and east Gulf States, and a general deficiency throughout the northern half of the *United States*, intensified in the west by the hot winds during the last week of the month. In August, the drought and hot weather covered the greater portion of the country, except the south Atlantic and Gulf States, which were saturated with excess; and there were also excessive rains in western Texas, causing heavy floods in the valley of the Rio Grande.<sup>111</sup>

The great drought of 1894 in the *United States* was not merely the drought of July and August but that of at least seven months or more. The deficit of rainfall in the various regions of the country at the end of 1893 were as follows: New England, 3.6 inches; middle Atlantic States, 1.3 inches; Ohio Valley and Tennessee, 2.9 inches; lower Lake region, 2.1 inches; upper Lake region, 2.6 inches; extreme northwest, 1.0 inch; upper Mississippi valley, 4.4 inches; Missouri Valley, 4.5 inches; northern slope, 2.5 inches; middle slope, 7.5 inches.<sup>116</sup>

The extensive fires during July and August 1894, principally in Minnesota, Wisconsin, Michigan, Pennsylvania, and New York in the *United States*, and the absence of extensive strong winds, had



conspired to cover a large portion of the country with an unusually thick cloud of smoke. The actual area covered by the forest fires of August did not exceed 5,000 square miles (3.2 million acres, 1.3 million hectares) whereas the area covered by the smoke was not less than 1,000,000 square miles (2.6 million square kilometers). This smoke overhung the country from Minnesota southward to Missouri and eastward to the Atlantic [Ocean].<sup>116</sup>

On 31 July 1894, New York in the *United States* reached a high temperature of 105° F (40.6° C).<sup>97</sup>

On 12 August 1894, there was a destructive cyclone at Herencia in central *Spain*, causing a great loss.<sup>94</sup>

On 13 September 1894, floods were reported at Lucknow in northern *India*. Houses were submerged underwater.<sup>97</sup>

On 20 September 1894, a tropical hurricane passed westward between *Dominica* and *Guadeloupe*. The center passed over the southern portion of San Domingo [Santo Domingo, *Dominican Republic*] and *Haiti* and along the southern coast of *Cuba*, finally crossing that island and emerging between Habana [Havana] and Matanzas, *Cuba* on the morning of the 24<sup>th</sup>; it passed northward between Key West and Tortugas, a little east of Titusville, Florida in the *United States* in the morning of the 26<sup>th</sup>, between Savannah, Georgia and Charleston, South Carolina on the morning of the 27<sup>th</sup>, near Morehead City, North Carolina on the morning of the 28<sup>th</sup>, and on the 30<sup>th</sup> the storm center was south of Rhode Island and east of New Jersey.<sup>116</sup>

On 23-25 September 1894, a hurricane struck *Cuba* causing 200 deaths.<sup>141</sup>

On 21 September 1894, there was a disastrous cyclone [tornado] over Iowa, Minnesota, and Wisconsin towns in the *United States*. It caused great destruction and much loss of life.<sup>94</sup>

On this evening and night of 21 September 1894, a very remarkable series of wind-rushes and tornadoes visited the northern part of Iowa, extreme southeast Minnesota, and west-central Wisconsin in the *United States*. Fifty-three lives were lost in Iowa and 5 in Minnesota. Losses to buildings were approximately as follows: In Iowa, Cerro Gordo County, \$3,000; Hancock County, \$40,000; Kossuth County, \$30,000 to \$50,000; Emmetsburg, \$7,000 to \$9,000; Fertile, \$1,000; New Haven, \$2,700; Osage, \$9,000; Ruthven, \$1,100; St. Ansgar, \$15,000; Thompson, \$3,500. In Minnesota: Eyota, \$2,000; Greenleaf, \$1,000; Homer, \$2,000; Hutton, \$700; Laird, \$2,000 to \$4,000; Le Roy, \$120,000; Spring Valley, \$59,875; Richland Center, Wisconsin, \$4,000. This makes the total estimated and reported loss as \$312,000; the whole loss was probably less than \$350,000. [In present currency, that would make the whole loss in the order of \$8.7 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>116</sup>

In October 1894, in general the rivers in the interior of the *United States* reached extreme low water levels during the month and in some cases, these were lower than at any time during the past fifty years.<sup>116</sup>

On 11 October 1894, a violent gale was reported off Newfoundland, *Canada*. There were many [ship] wrecks and loss of life.<sup>94</sup>

On 20-25 October 1894, there was a severe gale on the northeast coast of *England* and in the *British Channel*. Several vessels were driven ashore with loss of life. The gale also struck the *Bristol Channel*.<sup>94</sup>

On 23 October 1894, a severe drought was reported in New Orleans, Louisiana in the *United States*.<sup>97</sup>

On 31 October 1894, floods were reported in *France* and *Belgium*. About 100,000 hands [people] were out of work due to the floods.<sup>97</sup>

On 11-13 November 1894, there were destructive storms with much rain and floods in southeastern and western *England*, and on the *European Continent*. The storms stopped telegraphic communication.<sup>94</sup>

On 12-13 November 1894, there were heavy rains that caused the overflow of the River Avon at Bath, *England*. The floods caused much damage.<sup>97</sup>

On 15 November 1894, there was an overflow of the River Thames from Windsor to Oxford in *England*. Railway were stopped and there was much damage.<sup>97</sup>

On 20 December 1894 an electrical windstorm struck Port Laramie, Wyoming in the *United States* lasting from 10:15 a.m. until 7 p.m. The maximum velocity of wind occurred at about 1:30 p.m., when three houses were unroofed and substantial steel tower windmill was blown down.<sup>116</sup>

— The wind was phenomenal in that it would remove and break to pieces the most solid woodwork of buildings and leave adjoining frail parts of the woodwork undisturbed. Reliable information, obtained from over a section of country extending 12 miles south and 20 miles east, states that the electrical current was freely felt in many localities embraced in that area.

— Mr. Silas Doty, living 8 miles south, reports that he discovered a fence post on fire 200 yards north of his house, and upon going to it to extinguish the fire found it burnt more than half through where one of the fence wires was fastened, and partly burned where another wire was in contact with it. Other fence posts were slightly marked by the electric sparks.

— Mr. John P. Barnes, living 11 miles south of here, states that in going from his stable to his house he caught hold of a fence wire to assist him in walking against the strong wind and received a severe electric shock from which he was some time recovering. He had a strong healthy cow in a lot enclosed with wire fence. The wind drifted the cow into a corner against the fence and held her there, where Mr. Barnes found her dead late in the evening. He thinks that long contact with the heavily charged wires killed her, as there was no mark of violence or internal derangement to cause death.

— Mr. E. B. Hudson, 20 miles east of here, reports that two of his employees when going from work to house, soon after the commencement of the windstorm, were severely shocked when crossing a wire fence. One of the men caught hold of a wire and received a shock, which numbed and weakened his hand to such an extent that he was unable to take it from the wire but had to release it with his other hand. The injured hand and arm remained nearly helpless for several moments.

— The above account reminds one at first of the electricity attending the sand storms or the hot simoon, which is usually attributed to the friction of the particles of hot, dry sand. But electric phenomena is also observed in snowstorms that is formed in strong winds of dry, cold air, as has been frequently observed in North America, Kamchatka, Siberia, and Russia, and we may, therefore, attribute the electricity to the formation of snow, even though it be of small amount and mostly in the clouds above us.

On 21-22 December 1894, there was a violent gale over the *United Kingdom*, Holland [now *the Netherlands*] and *Belgium*. The gale caused great loss of life, much shipping and other property destroyed. The damage was especially severe in Liverpool, Hull, Leeds, Manchester, Belfast, Aberdeen, and other places.<sup>94</sup> [Liverpool, Hull, Leeds, and Manchester are located in *England*. Belfast is in *Northern Ireland*. Aberdeen is in *Scotland*.]

On 28-30 December 1894, another gale struck [*Great Britain*] with loss of life.<sup>94</sup>

In 1894 during the period 1-30 August, floods struck Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing and Hopei (now Hebei province) in northern *China* at Nan-yüeh. At T'ai-p'ing, the dikes were damaged. During the period between 1 August and 26 November, a severe drought engulfed Anhwei province at T'ai-p'ing.<sup>153</sup>

*Also refer to the section 1890 A.D. – 1900 A.D. for information on the drought in South Africa during that timeframe.*

**Winter of 1894/ 1895 A.D.** There was a severe frost in *Britain* and on the [*European*] Continent. The cold began on 30 December 1894. It was mild from 14-21 January 1895. Then to 5 March 1895, there was [severe cold] and many deaths. On 9 February the temperature dropped down to 1° F (-17.2° C) in Loughborough in Leicestershire in east Midlands *England*, and 13° F (-10.6° C) in London, *England*.<sup>94</sup>

During the winter of 1894, very severe storms with heavy winds and snow prevailed in the *United Kingdom* and portions of the continent.<sup>111</sup>

At Thompson, Connecticut in the *United States*, the first snowstorm of the season in 1894 occurred on 5-6 November and was called the "election" snowstorm. It was the most severe in many years so early in the season. The depth of snow was 8 to 10 inches.<sup>116</sup>

During the winter of 1894-95 in Bradford County, Pennsylvania in the *United States*, there were light snowfalls in November. The first 22 days of December, the weather was unusually warm. Cold weather set in with a snowstorm on the 26<sup>th</sup>. The morning of the 29<sup>th</sup> was the coldest part of winter when the temperature in the county ranged from -16° F to -24° F [-27° C to -31° C]. January was very cold and sleighing was continuous from the end of December until February. A great four-days snowstorm and blizzard struck from 7-11 February. The storm created drifts 10 and 15 feet [3.0 – 4.6 m] deep and covered the roads everywhere. In cuts the snow was from 20 to 30 feet [6.1 – 9.1 m] and in one place 40 feet [12.2 m] deep. Such hills of snow had never before been known. On February 9<sup>th</sup>, temperatures dropped to -7° F [-22° C]. February was cold and a month of tremendous snowdrifts that blocked travel. Ice in the Susquehanna River passed out March 2<sup>nd</sup>. The first thunderstorm occurred on 25 March and the last snow squall on 15 April.<sup>178</sup>

On 27 and 28 December 1894, a cold wave swept down from the northwest carrying freezing temperatures to the Gulf of Mexico extending down to the Indian river country in Florida in the *United States*. The damage to the oranges and other fruit of that region amounted to millions of dollars. It was said to be the coldest weather experienced in that section within the past sixty years.<sup>111</sup>

Severe freezes in Florida in the *United States* occurred in the winters of 1747, 1766, 1774, 1799, 1828, 1835, 1850, 1857, 1880, 1884, 1886, 1894-95.<sup>137</sup>

On 27-29 December 1894, severe frost occurred in the southern portion of the *United States*. The low temperature and the severity of the frost in Florida were quite unprecedented in recent years, and the following extracts from the reports of observers are worthy of record:<sup>116</sup>

Montgomery, Alabama — December 28<sup>th</sup>, a light flurry of snow occurred in the morning. The temperature at 8 a.m. was 20° F. The day was bitter cold and blustery, causing considerable discomfort to people. The diurnal range of temperature was remarkably small, the maximum temperature only reached 23.2° F, which was the lowest maximum on record.

Mobile, Alabama — December 28<sup>th</sup>, freezing temperature prevailed all day, and much apprehension was felt over the safety of farm and garden produce. The 29<sup>th</sup>, very high pressure and cold weather, the minimum temperature being 16.1° F, second to the lowest that ever occurred at this station during the month of December.

Savannah, Georgia — December 29<sup>th</sup>, the temperature this morning fell to 12° F, the lowest ever recorded at this station in the month of December, and as low as ever recorded since the establishment of the Weather Bureau in 1871. 12° F was reached but once before, on January 12, 1886.

Jacksonville, Florida — December 27<sup>th</sup>, cold wave; temperature fell from 60° F at 8 a.m. of 26<sup>th</sup>, to 36° F at 8 a.m. on the 27<sup>th</sup>. The cold wave continued on the 28<sup>th</sup>, temperatures ranged from 27° F to 38° F: at midnight of the 28<sup>th</sup> the temperature had fallen to 19.5° F, and was going down at the rate of about 1° F an hour; from sunset to 10:30 p.m., ice three-quarters of an inch thick froze on a bucket of water on the office roof. On the 29<sup>th</sup>, the temperature fell to 14° F about 7 a.m., the lowest point recorded since the station was established, and 1.3° lower than the memorable freeze of January 12, 1886. The maximum temperature reached on the 29<sup>th</sup> was 34° F; ice 2½ inches thick froze on water in a bucket in the office.

Titusville, Florida — December 29<sup>th</sup>, the temperature fell rapidly during the night, minimum being 18.5° F, which was the lowest recorded at this station since it was established, and probably the lowest that has occurred in a great many years. At 8 a.m. the temperature was 20° F and partly cloudy, with brisk northwest winds which kept up during the greater part of the day.

Tampa, Florida — December 29<sup>th</sup>, weather last night was extremely cold, and this morning a minimum temperature of 18.9° F was recorded. This was 1° F lower than the minimum of January 1880. Everything in the shape of vegetation was frozen. Ice to the thickness of from 1½ to 2 inches was general, and in several dwellings ice formed to the thickness of ½ an inch. On the 30<sup>th</sup>, freezing weather continued throughout the night, the minimum temperature at 8 a.m. was 22.9° F.

Jupiter, Florida — December 29<sup>th</sup>, coldest weather since the establishment of the station in 1888. Minimum temperature, 24° F. Next coldest day, 3 March 1890, minimum temperature 33° F.

Key West, Florida — December 29<sup>th</sup>, day opened cloudy and very cold; cleared between 9 and 10 a.m., and remained clear. At 11 a.m., the minimum temperature, 43.6° F was recorded; after this there was a slow but steady rise. Since the establishment of this station 43.6° F was the lowest temperature recorded during the month of December.

The following are the lowest temperatures observed during January 1895 in the *United States*:<sup>115</sup>

Montgomery, Alabama	( 15° F, -9.4° C)
Mobile, Alabama	( 21° F, -6.1° C)
Tucson, Arizona	( 28° F, -2.2° C)
Yuma, Arizona	( 35° F, +1.7° C)
Little Rock, Arkansas	( 12° F, -11.1° C)
Fort Smith, Arkansas	( 5° F, -15.0° C)
San Francisco, California	( 38° F, +3.3° C)
San Diego, California	( 36° F, +2.2° C)
Denver, Colorado	( -7° F, -21.7° C)
Pueblo, Colorado	( -7° F, -21.7° C)
New Haven, Connecticut	( 5° F, -15.0° C)
New London, Connecticut	( 7° F, -13.9° C)
Wilmington, Delaware	( 12° F, -11.1° C)
Washington, D.C.	( 4° F, -15.6° C)
Pensacola, Florida	( 22° F, -5.6° C)
Key West, Florida	( 53° F, +11.7° C)
Augusta, Georgia	( 11° F, -11.7° C)
Savannah, Georgia	( 23° F, -5.0° C)
Swan Valley, Idaho	(-31° F, -35.0° C)
Lewiston, Idaho	( 2° F, -16.7° C)
Chicago, Illinois	( -9° F, -22.8° C)
Cairo, Illinois	( -2° F, -18.9° C)
Indianapolis, Indiana	(-13° F, -25.0° C)
Lafayette, Indiana	(-24° F, -31.1° C)
Dubuque, Iowa	(-20° F, -28.9° C)
Keokuk, Iowa	(-11° F, -23.9° C)
Topeka, Kansas	( -8° F, -22.2° C)
Dodge City, Kansas	( 2° F, -16.7° C)
Louisville, Kentucky	(-10° F, -23.3° C)
Lexington, Kentucky	(-12° F, -24.4° C)
New Orleans, Louisiana	( 27° F, -2.8° C)
Shreveport, Louisiana	( 18° F, -7.8° C)
Eastport, Maine	( -4° F, -20.0° C)
Portland, Maine	( -4° F, -20.0° C)
Baltimore, Maryland	( 9° F, -12.8° C)
Boston, Massachusetts	( 4° F, -15.6° C)
Nantucket, Massachusetts	( 10° F, -12.2° C)
Marquette, Michigan	(-10° F, -23.3° C)
Detroit, Michigan	( -4° F, -20.0° C)

Saint Vincent, Minnesota	(-32° F, -35.6° C)
Saint Paul, Minnesota	(-22° F, -30.0° C)
Vicksburg, Mississippi	( 19° F, -7.2° C)
Saint Louis, Missouri	( -8° F, -22.2° C)
Billings, Montana	(-32° F, -35.6° C)
Helena, Montana	(-15° F, -26.1° C)
North Platte, Nebraska	(-11° F, -23.9° C)
Omaha, Nebraska	(-12° F, -24.4° C)
Winnemucca, Nevada	(-14° F, -25.6° C)
Carson City, Nevada	( -4° F, -20.0° C)
West Milan, New Hampshire	(-29° F, -33.9° C)
New Brunswick, New Jersey	( 8° F, -13.3° C)
Cape May, New Jersey	( 15° F, -9.4° C)
Santa Fe, New Mexico	( -4° F, -20.0° C)
Albany, New York	( -4° F, -20.0° C)
New York City, New York	( 10° F, -12.2° C)
Charlotte, North Carolina	( 3° F, -16.1° C)
Kitty Hawk, North Carolina	( 22° F, -5.6° C)
Bismarck, North Dakota	(-32° F, -35.6° C)
Williston, North Dakota	(-36° F, -37.8° C)
Cincinnati, Ohio	(-10° F, -23.3° C)
Columbus, Ohio	( -8° F, -22.2° C)
Oklahoma City, Oklahoma	( -1° F, -18.3° C)
Fort Sill, Oklahoma	( -6° F, -21.1° C)
Roseburg, Oregon	( 20° F, -6.7° C)
Portland, Oregon	( 25° F, -3.9° C)
Erie, Pennsylvania	( -5° F, -20.6° C)
Philadelphia, Pennsylvania	( 10° F, -12.2° C)
Block Island, Rhode Island	(-10° F, -23.3° C)
Charleston, South Carolina	( 22° F, -5.6° C)
Columbia, South Carolina	( 10° F, -12.2° C)
Yankton, South Dakota	(-16° F, -26.7° C)
Nashville, Tennessee	( -3° F, -19.4° C)
Knoxville, Tennessee	( -3° F, -19.4° C)
San Antonio, Texas	( 25° F, -3.9° C)
Galveston, Texas	( 31° F, -0.6° C)
Salt Lake City, Utah	( 0° F, -17.8° C)
Burlington, Vermont	( -9° F, -22.8° C)
Lynchburg, Virginia	( -3° F, -19.4° C)
Norfolk, Virginia	( 15° F, -9.4° C)
Olympia, Washington	( 25° F, -3.9° C)
Spokane, Washington	( 10° F, -12.2° C)
Morgantown, West Virginia	(-11° F, -23.9° C)
Milwaukee, Wisconsin	(-12° F, -24.4° C)
La Crosse, Wisconsin	(-17° F, -27.2° C)
Cheyenne, Wyoming	(-12° F, -24.4° C)

The following are the lowest temperatures observed during January 1895 in the *Mexico*:<sup>115</sup>

Ciudad Porfirio Díaz	( 28° F, -2.2° C) (now Piedras Negras, Coahuila)
Leon de Aldamas	( 32° F, 0.0° C) (now León, Guanajuato)
Mexico City	( 33° F, 0.6° C)
Puebla	( 39° F, 3.9° C)
Topolobampo	( 55° F, 12.8° C)

On the night of 11/12 January 1895, an unusual weather phenomena, called a snowdust storm, struck Indiana, Kentucky and southern counties of Illinois in the *United States*. Over 100 weather monitors reported this phenomenon. The dust appears to have been intermingled with the snow as it fell. Samples were sent to the Division of Vegetable Pathology for analysis. The dust analysis indicated, "The soil is made up of silt, mixed with organic matter. A number of fresh water algae could be distinguished; through they had evidently been dead and dried for a long time. Two of these, viz, Coleochaete and a Desmid, possibly *Closterium*, indicate that the source of the 'dirt' was the bottom of some shallow lake, pond, or marsh that dried up."<sup>115</sup> [In the 1960's in Dallas, Texas, I witnessed a similar strange weather phenomena, a mud storm. It rained mud for approximately 15 minutes, coating everything with about 1/8<sup>th</sup> inch of mud. It was caused by a collision of a rainstorm and a dust storm.]

The winter at Ivigtût [now Ivittut], *Greenland* has been very mild during the winter of 1894-95, so that it was possible to work in the open mines until January 10, when the winter commenced, but without severe frost. "We believe this season will form an exceptional one in the Arctic, and it will be possible for a ship to reach whale Sound without much difficulty. The winter was so mild the ice did not solder and was constantly moving south; hence its early appearance (February 22) along the southwestern coast of Greenland. Our ships have been trading to Ivigtût for the past eighteen years, and the mild winter and early appearance of ice on the coast is a rare exception."<sup>115</sup>

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#### **1895 A.D. – 1903 A.D. Australia. Drought**

Between 1895-1903 a severe drought struck *Australia*. The drought was most devastating in terms of livestock losses. The drought caused the population of sheep to be cut in half and the population of cattle was cut by 40%.<sup>99</sup>

An Australian newspaper in 1900 reported:<sup>100</sup>

The last four years were known in the eastern colonies of Australia as the Great Australian drought.

Draw a line from Lake Torrens in South Australia, in a southeasterly direction into New South Wales; continue it at a distance of about 50 miles north of the Murray as far as Deniliquin, and then extend it right through New South Wales and Queensland, at a distance of about 300 miles from the coast, until it bends round to the northern territory of South Australia. On the coast side of that line the seasons have been fairly normal. On the inland side of that line there has, until quite recently, been practically no rain for four or five years.

Half of New South Wales and Queensland is now a veritable desert, where sheep and cattle have perished in millions. Everywhere the ground is absolutely destitute of herbage. This condition prevails over a portion of land equivalent in size to France or Spain. Since the beginning of the drought there have several times been sufficient falls of rain to germinate the grass seed in the bare soil; but the new herbage has immediately been cut down with frosts, burnt up with the sun, or eaten off by the starving survivors of the sheep and the rabbits.

During 1895-1903, *Australia* experienced a national drought.<sup>101</sup>

The severe drought affected all areas of New South Wales. Central and southern regions were badly hit. The drought was most severe from September 1901 to November 1902. The Lachlan River stopped flowing at Condobolin. The Macquarie River dried up at Bathurst and above Warren. Lake George was almost dry by September 1902. Livestock losses were heavy. The number of cattle dropped by 1.5 million head. In 1902 the wheat yield was down to 3.28 bushels per acre, which was a record low.<sup>101</sup>

The drought also affected Tasmania, *Australia*. The state was very dry, especially in the north until 1902. In 1897, there were severe brushfires.<sup>101</sup>



The drought was very severe on the coast of Queensland. By 1899, the drought was prevalent in central Queensland and by 1902 the central and southeastern regions were affected. Between 1893 and 1902, the population of sheep was reduced by 14.5 million, and cattle fell by 4 million. In 1902, the wheat yield was down to 3.28 bushels per acre. Sugar cane production also declined.<sup>101</sup>

The drought severely affected the northern regions of Victoria, especially between April and November 1902. Gippsland and the western areas of Victoria were also affected. River transport on the Murray River halted between Echuca and Murray Bridge. Water for irrigation was cut off. Even drinking water in the Mallee was almost exhausted by May of 1902. Between 1894 and 1904, the population of sheep was reduced by 3 million. During 1902-03, the wheat yield was down to 1.29 bushels, the lowest since recordkeeping began to that date.<sup>101</sup>

The drought severely affected the entire region of South Australia. By 1896, the region was experiencing heavy livestock and crop losses. By 1902, the region that was formally pastureland became a desert. In 1902, the sheep population was down to 4.88 million, the lowest since 1872. During 1896-97, the wheat yield was down to 1.66 bushels per acre, the lowest since recordkeeping began to that date.<sup>101</sup>

Between 1891 and 1903, the coastal, northern and central regions of Western Australia were severely affected by the drought.<sup>101</sup>

Between 1896-1903 the drought was severe in the central regions of the Northern Territory. Heavy summer rains provided some relief in 1898 and 1901. Between 1897 and January 1903, the population of sheep was reduced by greater than 50% in the Northern Territory.<sup>101</sup>

The dryness of this drought may have exasperated brush fires. For a week, the Hobart area in Tasmania, *Australia* had bushfires that became very dangerous on 31 December 1897. At least 6 people died in the fires, which began on Mt. Wellington and moved quickly southwards to Longley, Sandfly, Kettering, Woodbridge and Gordon. Colebrook, north of Hobart, also had serious fires. At Longley, towards Huon, 22 settlers were burnt out; including the Longley Hotel, coaching stables, the police station, 2 churches & private residences. At Kettering, in the vicinity of Oyster Cove, 21 homesteads were destroyed & 2 men died in the fires.<sup>99</sup>

On 31 December 1897, there was a three-day bushfire in Tasmania, *Australia* later known as *Black Friday*. The bushfire killed 6 people, hundreds of animals and destroyed many houses and buildings. The fires began on Mount Wellington, then spread south to Langley, Sandfly, Kettering, Woodridge and Gordon. Another bushfire spread from Colebrook to the north of Hobart.<sup>101</sup>

In January 1898 in Victoria, *Australia*, brushfires burned for more than a week in Gippsland and Gisborne.<sup>101</sup>

The *Red Tuesday* bushfires, which began in February 1898, were widespread throughout South Gippsland in Victoria, *Australia* causing twelve deaths, over 2,000 buildings destroyed and 642,500 acres (260,000 hectares) burnt. There were 15,000 people affected by the fires and 2,500 people made homeless.<sup>99</sup>

A heat wave in the nation's southern regions of *Australia*, from December 1895 to January 1896, killed 437 people and injured about 5,000. At Bourke, western New South Wales alone, it lasted 13 days and killed 47 people. The daily maximum temperature averaged 116.6° F (47° C).<sup>99</sup>

There was a great heat wave in New South Wales, *Australia*. In January 1896, the temperature averaged 112° F (44.4° C), which caused 35 deaths. Then on 22 January, the temperature rose to 125° F (51.7° C)

resulting in 10 additional deaths.<sup>97</sup>

On 3 January 1896, the high temperature in Perth, *Australia* reached 112° F (44.4° C). During the summer of 1895-96, there were 11 days when the temperature was 100.0° F or greater.<sup>102</sup>

On 26 December 1897, there was a heat wave in Victoria and New South Wales, *Australia*, where the temperature measured in the shade averaged 107° F (41.7° C).<sup>97</sup>

In Adelaide, *Australia*, on 1 January 1900, the temperature reached 112.2° F (44.6° C).<sup>97</sup>

Droughts, famines and epidemics are fairly often intertwined. [Wild rodents in certain areas around the world are infected with plague. Their infection is transmitted to humans through the bites from infected fleas. In recent times, human bubonic plague occurrences are mostly associated with scattered cases in rural areas or communities.] This severe drought may have forced this wild rat populations to flee their natural habitat in the wild and migrated into villages and cities with their grain stores and food supplies. This rat migration may have been the trigger that activated an epidemic of the bubonic plague in Australia.

During the year 1900 bubonic plague outbreak in Sydney, *Australia*, an estimated 200,000 rats were destroyed by rat catchers and householders in a bid to end the epidemic.<sup>99</sup>

Bubonic plague caused 165 deaths (of a total 550) in the first year (1900) of the epidemic. The majority of the 1,200 cases reported were in Sydney, New South Wales, *Australia*. The disease affected people for a period of 10 years. Cases were reported in New South Wales, Victoria, Queensland, Western Australia and Northern Territory.<sup>99</sup>

On 22 August 1902, the drought in New South Wales, *Australia* ends in the northern districts.<sup>97</sup>

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**1895 A.D.** On 12 January 1895, there was a disastrous gale on the northern and southeastern coast [of *Great Britain*]. The gale caused wrecks and loss of life.<sup>94</sup>

During the night of 20 January 1895, a lightning dust storm struck Oklahoma in the *United States*. According to Dr. J.C. Neal, "During the morning of January 20 the sky was filled with cirrus clouds, very feathery and white. In the afternoon it became hazy, then dark, and looked like rain. Wind in puffs from the southwest. At nightfall the sky cleared, but somewhat hazy. At 8 p.m., seventy-fifth meridian time, the wind changed to the west, and a gale began; by 9 p.m. it was frightful. The dust passed along in columns fully 1,000 feet high, the wind arose to a speed of 35, then 45 miles per hour, with gusts reaching 55 miles, the temperature fell rapidly, and we saw for the first time (about 9 p.m.) flashes of light that apparently started from no particular place, but pervaded the dust everywhere. As long as the wind blew, till about 2 a.m., January 21, this free lightning was everywhere but there was no noise whatever. It was a silent electrical storm. This morning the sky is clear and except that the dirt is piled up over books, windows, and in all the house, no one would know what a fierce raging of wind and sky we had."<sup>115</sup>

On 21 January 1895, there were destructive floods in the Thames valley and southwest counties of *England* and in *Wales*.<sup>97</sup>

On 24 March 1895, there was a destructive southwest gale over the *United Kingdom*. The gale was very severe in London and the midlands, with loss of life.<sup>94</sup>

During March and April of 1895, the Lalitpur subdivision in *India* suffered from rust and then were struck with a severe hailstorm.<sup>185</sup>

Duststorms struck many regions of the *United States* in April 1895. In Oklahoma, high winds and dust or sand storms at Healdton, Alva, Ponca City, and Pond Creek on the 14<sup>th</sup> and 15<sup>th</sup> and over most of Oklahoma on the 5<sup>th</sup>. In Minnesota, exceeding disagreeable duststorms were frequent, those of the 12<sup>th</sup>, 14<sup>th</sup>, and 21<sup>st</sup> were especially severe. In South Dakota, severe sand or dust storms were recorded as having occurred on the 4<sup>th</sup>, 5<sup>th</sup>, 14<sup>th</sup>, 25<sup>th</sup>, and 27<sup>th</sup> over portions of the State; the most severe in general occurred on the 14<sup>th</sup>. In North Dakota, furious and damaging duststorms at Ellendale, Gallatin, Lakota, and Steele on the 14<sup>th</sup>. The eastern section of Washington state was visited on the 1<sup>st</sup> by a violent duststorm, the severest ever known there, which unroofed some buildings, broke windows, carried away fences, etc. In Colorado, the voluntary observer, Mr. W.H. Powless, at Alma reports that on the evening of April 14 the sky had a peculiar brazen color; the snow that fell was tinged with pink. Those who were out in this snow reported their clothing covered with a deposit resembling mud [snowy mudstorm]. From newspapers we learn that on the 15<sup>th</sup> a terrible storm of sand and rain afflicted southern and western Kansas, Oklahoma, and the Panhandle of Texas. Egyptian darkness was said to have prevailed in western Oklahoma and the Panhandle. Showers of mud fell in Oklahoma, severe lightning occurred, and crops were badly damaged. The number of cattle killed was estimated at 5,000, and a score of these were smothered. Drifts of sand 6 feet deep were reported along the railroad tracks of western Kansas. A tornado occurred near Cherokee, Kansas, in the evening.<sup>115</sup>

On 21 April 1895, floods were reported on the lower Danube River. Villages were submerged. There was much suffering and some deaths.<sup>97</sup> [The lower Danube River commences at the Iron Gates Gorge on the east-central *Serbian*/southwestern *Romanian* border, then passes through *Bulgaria* and the *Ukraine*.]

On 27 April 1895, a reservoir in the Vosges in northeastern *France* burst.<sup>97</sup>

On 1 May 1895, there were destructive cyclonic storms [tornadoes] in Kansas, Iowa, Dakota, and the Sioux centre in the *United States* causing great loss of life.<sup>94</sup>

On 1 May 1895, tornadoes struck Halstead, Kansas in the *United States* killing 11 persons and injuring 12 more and another one struck Patterson, Nebraska killing 8 persons.<sup>115</sup>

Severe frost struck late in the season in many regions of *United States* in May 1895. New York and Pennsylvania were especially hard hit. The frosts of the 13<sup>th</sup>, 14<sup>th</sup>, 19<sup>th</sup>, 20<sup>th</sup> and 21<sup>st</sup> in Pennsylvania and western New York were said to have been nearly as severe as the great freeze of the 4<sup>th</sup> and 5<sup>th</sup> of June 1859. The frosts of the 12<sup>th</sup> and 20<sup>th</sup> in northwestern Pennsylvania, grapes, early apples, pears, cherries, early roses, strawberries, corn, and tomatoes, so far as they were above ground, were pretty generally killed. From Sunday night (May 12) to Tuesday night (May 21) the thermometer at nighttime ranged from 21° F to 22° F, and was nowhere above 24° F; in the daytime the range was from 44° F to 50° F. The frost killed the greater portion of the grape crop. The previous warm weather had brought vegetation forward remarkably; the grape shoots that were now all gone were 6 and 10 inches long. [Many of the states experienced great fluctuations of temperatures during the month. For example, Pennsylvania went from high temperatures during the beginning of the month to frost conditions and then later to high temperatures towards the end of the month. For example, at Hollidaysburg, Pennsylvania, the temperature reached 110° F on May 30.]<sup>115</sup>

Many observers and correspondents in the *United States* mentioned a general scarcity of birds in 1895. Analysis by the weather bureau indicated that while the seed-eating birds like the scarlet hanger, flycatcher, the sparrows, and warblers, which winter mostly in the West Indies or farther south, were about as numerous as usual, the insect-eating birds which winter within the limits of the United States were unusually scarce. In many places where there were normally plenty of bluebirds, phoebes, robins and thrushes, one could search for hours and not find a bird or nest. It was thought the unusually cold

weather during the previous winter and spring in the Southern States killed some birds, and many of the insects that they feed on, so caused the indirect death of many more. With the absence of these birds the Weather Bureau speculated a large increase in the insect pests in New England, unless the farmers take extra care to destroy them, and their destructiveness will probably be more marked next season in 1896 than in 1895.<sup>115</sup>

The following are the highest temperatures observed during July 1895 in the *United States*:<sup>115</sup>

Montgomery, Alabama	( 96° F, 35.6° C)
Mobile, Alabama	( 95° F, 35.0° C)
Tucson, Arizona	(105° F, 40.6° C)
Yuma, Arizona	(113° F, 45.0° C)
Little Rock, Arkansas	( 96° F, 35.6° C)
Fort Smith, Arkansas	( 96° F, 35.6° C)
San Francisco, California	( 83° F, 28.3° C)
San Diego, California	( 74° F, 23.3° C)
Denver, Colorado	( 95° F, 35.0° C)
Pueblo, Colorado	( 95° F, 35.0° C)
New Haven, Connecticut	( 89° F, 31.7° C)
New London, Connecticut	( 84° F, 28.9° C)
Wilmington, Delaware	(100° F, 37.8° C)
Washington, D.C.	( 94° F, 34.4° C)
Pensacola, Florida	( 93° F, 33.9° C)
Key West, Florida	( 91° F, 32.8° C)
Augusta, Georgia	( 95° F, 35.0° C)
Savannah, Georgia	( 98° F, 36.7° C)
Swan Valley, Idaho	( 96° F, 35.6° C)
Lewiston, Idaho	(105° F, 40.6° C)
Chicago, Illinois	( 92° F, 33.3° C)
Cairo, Illinois	( 93° F, 33.9° C)
Indianapolis, Indiana	( 94° F, 34.4° C)
Lafayette, Indiana	( 94° F, 34.4° C)
Dubuque, Iowa	( 98° F, 36.7° C)
Keokuk, Iowa	( 96° F, 35.6° C)
Topeka, Kansas	( 99° F, 37.2° C)
Dodge City, Kansas	( 97° F, 36.1° C)
Louisville, Kentucky	( 96° F, 35.6° C)
Lexington, Kentucky	( 94° F, 34.4° C)
New Orleans, Louisiana	( 94° F, 34.4° C)
Shreveport, Louisiana	( 96° F, 35.6° C)
Eastport, Maine	( 78° F, 25.6° C)
Farmington, Maine	( 96° F, 35.6° C)
Baltimore, Maryland	( 95° F, 35.0° C)
Boston, Massachusetts	( 85° F, 29.4° C)
Nantucket, Massachusetts	( 80° F, 26.7° C)
Marquette, Michigan	( 86° F, 30.0° C)
Detroit, Michigan	( 93° F, 33.9° C)
Saint Vincent, Minnesota	( 87° F, 30.6° C)
Saint Paul, Minnesota	( 94° F, 34.4° C)
Vicksburg, Mississippi	( 95° F, 35.0° C)
Saint Louis, Missouri	( 96° F, 35.6° C)
Billings, Montana	(101° F, 38.3° C)
Helena, Montana	( 94° F, 34.4° C)
North Platte, Nebraska	( 96° F, 35.6° C)
Omaha, Nebraska	( 98° F, 36.7° C)
Winnemucca, Nevada	( 94° F, 34.4° C)

Carson City, Nevada	( 92° F, 33.3° C)
West Milan, New Hampshire	( 89° F, 31.7° C)
New Brunswick, New Jersey	( 94° F, 34.4° C)
Cape May, New Jersey	( 91° F, 32.8° C)
Santa Fe, New Mexico	( 87° F, 30.6° C)
Albany, New York	( 90° F, 32.2° C)
New York City, New York	( 89° F, 31.7° C)
Charlotte, North Carolina	( 97° F, 36.1° C)
Kitty Hawk, North Carolina	( 94° F, 34.4° C)
Bismarck, North Dakota	( 94° F, 34.4° C)
Williston, North Dakota	( 96° F, 35.6° C)
Cincinnati, Ohio	( 95° F, 35.0° C)
Columbus, Ohio	( 97° F, 36.1° C)
Oklahoma City, Oklahoma	(100° F, 37.8° C)
Fort Sill, Oklahoma	(101° F, 38.3° C)
Roseburg, Oregon	( 98° F, 36.7° C)
Portland, Oregon	( 94° F, 34.4° C)
Erie, Pennsylvania	( 91° F, 32.8° C)
Philadelphia, Pennsylvania	( 94° F, 34.4° C)
Block Island, Rhode Island	( 79° F, 26.1° C)
Charleston, South Carolina	( 95° F, 35.0° C)
Columbia, South Carolina	( 96° F, 35.6° C)
Yankton, South Dakota	( 94° F, 34.4° C)
Nashville, Tennessee	( 95° F, 35.0° C)
Knoxville, Tennessee	( 94° F, 34.4° C)
San Antonio, Texas	( 99° F, 37.2° C)
Galveston, Texas	( 92° F, 33.3° C)
Salt Lake City, Utah	( 95° F, 35.0° C)
Burlington, Vermont	( 88° F, 31.1° C)
Lynchburg, Virginia	( 97° F, 36.1° C)
Norfolk, Virginia	( 95° F, 35.0° C)
Olympia, Washington	( 92° F, 33.3° C)
Spokane, Washington	( 93° F, 33.9° C)
Morgantown, West Virginia	( 98° F, 36.7° C)
Milwaukee, Wisconsin	( 90° F, 32.2° C)
La Crosse, Wisconsin	( 92° F, 33.3° C)
Cheyenne, Wyoming	( 92° F, 33.3° C)

The following are the highest temperatures observed during July 1895 in the *Mexico*:<sup>115</sup>

Ciudad Porfirio Díaz	(100° F, 37.8° C)	(now Piedras Negras, Coahuila)
Leon de Aldamas	( 85° F, 29.4° C)	(now León, Guanajuato)
Mexico City	( 78° F, 25.6° C)	
Puebla	( 83° F, 28.3° C)	
Topolobampo	( 96° F, 35.6° C)	

During the period between 3-8 July 1895 in the *United States*, the eastern slopes of the Rocky Mountains from central Kansas to the Lakes, and southerly from Iowa to central Texas, was visited by storms that caused great loss of human life and widespread and enormous destruction of property. The damage was done by tornados and floods. Railroad embankments and bridges were washed away, farms and villages flooded, and at two locations violent winds added to their destructive powers killing and maiming, and also tearing buildings to pieces. The casualties approached 100, including over forty deaths.

Conservative estimates place the loss of property during the four days at more than a million dollars. [In present currency, that would be equivalent to \$26 million using CPI inflation.] Growing crops were at their best, the wheat harvest had begun, and the season had so far passed as to preclude reseeding. The greatest destruction occurred at Baxter Springs, Kansas and Winona, Missouri on the 5<sup>th</sup>.<sup>115</sup>

On the afternoon of the 5<sup>th</sup>, a tornado swept over Baxter Springs, Kansas followed by a deluge of rain. Five persons were killed outright, and more than double that number were injured, some fatally' churches, schoolhouses, business structures, dwellings, and barns, with the contents of all, were destroyed.

On the same evening a cloudburst brought death and desolation to Winona, Missouri. Rain began falling about 10 o'clock, and an hour later a small stream passing through the town had become a raging torrent that submerged the village near its banks to a depth of four feet. Twelve were drowned and many others received severe injuries. Only the lightning flashes enabled the frightened inhabitants to partly see and avoid the dangers that surrounded them. Buildings standing on high ground or in the outskirts of the town alone escaped. Loss of life and property from violent storms on the same date occurred in other towns in Missouri, Kansas and Arkansas.

On 6 July 1895, there were destructive tornadoes in Kansas and Missouri in the *United States* with loss of life.<sup>94</sup>

On the afternoon of 13 July 1895, a tornado swept over the country in the vicinity of New York City in the *United States*. Fatalities occurred at Woodhaven in Long Island, New York and Cherry Hill, New Jersey. The town of Cherry Hill was practically demolished; three persons were killed and many more were hurt; 25 families were left homeless, and other losses of property resulted. Four dwellings and a depot were destroyed and 26 other buildings partly shattered. Amount of damage estimated at \$50,000 [\$1.3 million in today's dollars]. At Woodhaven one person was killed, nearly 30 were injured and a large amount of property was destroyed. The damage to a schoolhouse and other buildings was estimated at \$43,000 [\$1.1 million in today's dollars].<sup>115</sup>

On the afternoon of 19 July 1895 rain succeeded by hail and terrific winds, wrought losses in the Ohio oil fields near Findlay in the *United States*, amounting to \$500,000 within the town, and injured property in the surrounding country to about the same extent.<sup>115</sup> [In present currency, that would be equivalent to approximately \$26 million using CPI inflation.]

On the afternoon of 22 July 1895, five inches of rain fell at Silver City, New Mexico in the *United States* and a large portion of the town was carried away by the flood.<sup>115</sup>

On 26 and 27 July 1895, disastrous storms struck North Dakota, eastern Missouri, Iowa, Illinois, and Indiana in the *United States*. On the 26<sup>th</sup>, the hail in four counties destroyed many thousand acres of wheat, and a tornado followed, killing one man and adding largely to the loss of property. The storm track was estimated at 200 miles in length, and at places 4 miles in width.<sup>115</sup>

On 31 July 1895, Socorro, New Mexico in the *United States* was overwhelmed by water pouring from a cloudburst on the mountain side above the city. Six lives were lost, and the losses in and near the town were estimated at more than \$100,000 [\$2.6 million in today's dollars]. A similar disaster from the same cause, was reported on that date from Casper, Wyoming; two persons drowned, but the damage to property was less than at Socorro.<sup>115</sup>

A letter from the fleet of whalers in the Behring Sea [*Bering Sea*] of 14 August 1895 reads: "On sailing northward in July from Unalaska ice was met within about 100 miles, and was always present until reaching Port Clarence, and that it had never before been seen so near to Unalaska by any one. From Port Clarence to Point Barrow the vessel's progress was exceedingly slow on account of the drifting ice, scarcely a mile having been made in the first fifteen days of August. The northeast wind that usually keeps this ice off shore has been wanting." Dr. Sheldon Jackson reports a similar experience by the revenue cutter *Bear* while north of Behring Straits [*Bering Straits*]. The southern edge of the arctic ice pack had remained so far south as to prevent any passage north of Icy Cape from July 19 to August 22.



Parties from Point Barrow who had traveled down the coast for their mail, report that the past winter, 1894-95, had not been very cold, the lowest temperature being  $-30^{\circ}$  F.<sup>115</sup> [Unalaska is on Unalaska Island in the Aleutian Islands off of mainland Alaska. Port Clarence is on the east-central coast of Alaska. Point Barrow or Nuvuk is a headland on the Arctic coast in the U.S. State of Alaska. It is the northernmost point of all the territory of the United States. Dr. Sheldon Jackson was a Presbyterian missionary, who together with Captain Michael A. Healy of the United States Revenue Cutter Service, commander of the USRC Bear, made numerous trips into Siberia and helped import nearly 1,300 reindeer to bolster the livelihoods of Native Alaskan people. Icy Cape is north of Wainwright on the northeast coast of Alaska.]

From the Los Angeles Express of 26 November 1895, we learn that the British ship *Anglesey* arriving at San Francisco on that date, like every other vessel that has arrived at that city after rounding Cape Horn [*Chile*] during the summer and autumn of 1895, reports an unusual quantity of ice in that region, and corresponding unusual storms and freezing weather and snow. Usually a northwest wind drives the Antarctic ice southward, just as a southwest wind drives the Arctic ice northward.<sup>115</sup>

Over the period from 1892-1896 in Merzifon, *Turkey*, the coldest temperature observed was  $-2.2^{\circ}$  F ( $-19.0^{\circ}$  C) on 10 February 1893 and the hottest temperature was  $99.5^{\circ}$  F ( $+37.5^{\circ}$  C) on 6 August 1895.<sup>137</sup>

On 11 August 1895, a severe storm struck Baltimore, Maryland in the *United States* destroying buildings including an unfinished church, and telegraph and telephone lines to the value of about \$150,000 [\$3.9 million in today's dollars]. At the same time, a storm raged over four counties in Pennsylvania, where the loss in two boroughs was estimated at \$50,000 [\$1.3 million in today's dollars], caused in part by lightning and hail, but chiefly by wind.<sup>115</sup>

On 17-22 August 1895, there were severe thunderstorms in London and southwestern counties of *England*. The storms caused loss of life and produced much destruction of property. Again on 6-7 September 1895, a series of thunderstorms struck, especially over London and southern *England*.<sup>94</sup>

A hurricane moved from *Dominica* on 22 August 1895 to south of the middle of *Cuba* on the 25<sup>th</sup>, to between the west end of Cuba and Yucatan on the 26<sup>th</sup>, to Brownsville, Texas in the *United States* on the 29<sup>th</sup>.<sup>115</sup>

On the afternoon and night of 3 September 1895, a heavy rain, generally accompanied by wind, lightning, and hail, fell over central Indiana and Illinois, eastern Missouri, and southeastern Iowa in the United States. At Indianapolis, Indiana the losses by floods were estimated as high as \$100,000 [\$2.6 million in today's dollars], exclusive of injury to public works. Nearly 7 inches of water fell within eleven hours. Business streets were flooded and families rescued from drowning by the police. At many other towns the rain was heavy. In the country districts, corn was swept to the ground, outbuildings were leveled, farm animals drowned and killed by lightning, which also destroyed stacks and barns. At Peoria, Illinois, the storm was mentioned as the most severe of many years. At Bloomington, Illinois the rainfall during the night exceeded 6 inches; sewers were choked and streets and basements overflowed; in the vicinity cattle were killed and buildings and stacks burned by lightning. At New London, Missouri, hail fell during nearly two hours; some of the masses weighed 8 ounces, and the destruction of glass was large. At Clinton, Iowa, and in the surrounding country the storm was furious, and the losses by hail and lightning were serious.

On 6 September 1895, at Baltimore, Maryland in the *United States*, occurred the heaviest rainfall that had visited that city in twenty-five years. From 2 o'clock a.m. to 6 o'clock p.m., there was little cessation. For the sixteen hours the record of precipitation was 4.76 inches. Streets were flooded, one woman and a team of horses were drowned, and buildings thrown down and made dangerous by the undermining of the

foundations. There was little wind and no thunder or lightning. The damages were roughly estimated at \$100,000 [\$2.6 million in today's dollars]. A cloudburst near Glenn Falls Station, 23 miles from the city, carried away the railroad embankment for a long distance, and made the west branch of the Patapsco (ordinarily a few feet in width) a torrent an eighth of a mile wide, which inundated fields and destroyed the crops for several miles along the valley of the river. The excessive precipitation above referred to was not confined to Baltimore alone, but was common to a considerable portion of Maryland.<sup>115</sup>

On the afternoon of 6 September 1895, the worst storm of wind, rain, thunder, and lightning visited Joplin, Missouri in the *United States* that the town had experienced since 1875. Streets and houses were flooded and occupants of the latter driven out, a large water main was burst, mines were filled, and trains could not reach the city over the submerged tracks for several hours. Similar storms prevailed at Macon, Missouri, Girard and Fort Scott, Kansas, St. Paul, Minnesota, and Water Valley, Mississippi. In the vicinity of Water Valley, serious damage was done to corn and cotton.<sup>115</sup>

In the afternoon of 8 September 1895, southeastern Kansas in the *United States* was swept by a wind and rain storm of almost unprecedented force; several lives were lost and much property destroyed. In Gridley, a village of 400 inhabitants, many of the best buildings were wrecked and but four were uninjured. This was the work of the wind, and the contents of the ruined structures were quickly soaked by rain. The storm raged from the north to the line of the county, destroying churches, houses, barns, and granaries. At Emporia, a wing of the State Normal School was ruined, entailing a loss of \$25,000 [\$650,000 in today's dollars]. Considerable injury was also wrought to business buildings. The rainfall during the night was reported at 8 inches. The Neosho Valley for ten miles above Emporia was flooded, fields of shocked corn and thousands of tons of hay in stacks were washed away and the inhabitants driven to higher ground. Elk City was inundated, houses were washed away and hundreds left homeless. Neosho Rapids was flooded and fine business structures were ruined. Fort Scott, Fredonia, Independence, and many smaller towns and their surrounding farms suffered severely. In seven counties buildings, railroads, and highways were injured. A box standing isolated near the center of the storm path, 14 inches deep, was full of water on the morning of the 9<sup>th</sup>.<sup>115</sup>

On the 11 September 1895, Cape Vincent, New York in the *United States* experienced a terrific storm, attended by thunder and lightning. The railroad roundhouse and station were blown down killing 2 persons and injuring 14 others. Several business blocks were unroofed, buildings were set on fire by lightning, and rain washed away roads and flooded cellars. A similar, though less destructive storm, prevailed at Watertown, a few miles distant. At and near Turners Falls, Massachusetts, "a cloudburst of hail " covered the ground to a depth of 2 feet with hailstones, many of them " as large as a man's fist." In a territory about 1 mile by 6 miles, windows were riddled and all exposed vegetables destroyed.<sup>115</sup>

On 20 September to 1 October 1895, a hurricane struck *Cuba* causing 56 deaths.<sup>141</sup>

About midnight of 30 September 1895, hurricane wind began at La Paz, *Mexico* at the lower end of the Peninsula of California, and continued until 5 p.m. of October 1. This storm totally destroyed the city, and did much damage to the shipping. Reports from Guaymas, *Mexico*, state that the hurricane moved slowly northward during four days, September 30 to October 3, prostrating telegraph lines, and doing great damage to property and shipping.<sup>115</sup>

— At Topolobampo, *Mexico*, all buildings were greatly damaged. The Ahomy River overflowed its banks.

— In *Mexico*, the State of Sinaloa lost the entire sugar-cane crop, and so also the State of Sonora.

— The town of Culiacan, the capital of Sinaloa, on the interior plateau, experienced a cloudburst, and was greatly injured. The tremendous rain on the ridge of high mountains back of the city filled the canyons and descended thence to the plateau with fierceness never before known in that part of *Mexico*.

— At Mazatlan, *Mexico* many residences were damaged.

— At La Paz the storm and tide combined to raise the waters in the bay to an unprecedented height, flooding the lower part of the city.

— The steamer *Progreso* met the storm in the open ocean. She left San Francisco for Panama on September 24. Her course was a little farther off shore than that followed by the Pacific mail boats, and she was in rather light trim, therefore set rather high out of water. On the fifth day out, after strange barometric changes and a gale of wind, the hurricane burst upon the steamer from the southeast, but veered rapidly to the northwest. As the waves were growing higher and higher, and although there was but little daylight under the storm cloud yet a monster wave could be made out coming toward the vessel. Fortunately the *Progreso* was then headed bow on, and the wave passed clear over the bridge and the tops of the mid-ship houses, and over the whole length of the vessel, leaving a complete wreck of the deck, but without otherwise injuring the vessel.

On 1-2 October 1895, there was a destructive gale on the western coast of *England*, with loss of life.<sup>94</sup>

During the 18-20 October 1895, sand and dust storms, with low temperature and the wind at 50 miles per hour, prevailed over Minnesota and the Dakotas in the *United States*, and Manitoba, *Canada* and the inconveniences of such a blizzard were intensified by the alkaline character of the dust. Numerous prairie fires occurred in southwestern Minnesota and South Dakota, but especially on either side of the Red River Valley.<sup>115</sup>

On 21 October 1895, a hurricane struck *Cuba* taking some lives.<sup>141</sup>

On 31 October 1895, a great gale was raging at Buenos Ayres [Buenos Aires] on the coast of *Argentina*.<sup>115</sup>

By the end of October the *United States* had realized one of the longest and most extensive droughts on record. The States of West Virginia, Kentucky, southern Ohio, and western Pennsylvania had suffered more than any other region. Rains had fallen sufficiently to secure good crops in a portion of eastern Ohio and portions of Arkansas, Indiana, Iowa and Nebraska, Missouri and Kansas, but in general, throughout the watershed of the Mississippi and its tributaries, the drought of August, September, and October had been very severe. On the Atlantic Coast the total rainfall during this growing season has also been small, but as the crops depend upon the proper distribution of the rain throughout the season, the effect of the drought were not so disastrous as it might have been. The general rains of the Middle States and New England interrupted the drought in that region during the third week of October, but did not supply water to the western slopes of the Alleghenies [mountain range] in sufficient quantity to improve the navigation of the Ohio, which, at that time, was little better than a succession of pools. In eastern Pennsylvania the drought was considered as the most severe since 1869. On the 19<sup>th</sup> Captain E.P. Chancellor reported that the Ohio River from Pittsburg to Cincinnati was lower than he had ever known it, and could be waded anywhere above Cincinnati. On the eastern side of the Alleghenies, the Potomac River, and especially the Chesapeake and Ohio Canal, were lower than ever before recorded. At Cumberland, October 11, below the dam, the bed of the river was perfectly dry from shore to shore, and there was not enough depth of water in the intake lock of the canal basin to float an empty boat. Navigation was closed until the water should rise. At Portsmouth, Ohio, the lowest watermark at the close of October 1895 was 2 inches below that of 1881, but not yet down to that of 1838. A special correspondent of *The Evening Star*, writing from Gallipolis, Ohio on November 7, stated that over four or five counties in the extreme southern part of Ohio and on occasional trips into West Virginia and Kentucky he found the same condition everywhere. No rainfall since the snows of February; the effects of the drought were already felt in May, and by the first of June farmers were full of fear. Notwithstanding this, both wheat and corn gave good crops, and on the bottomlands, crops were of the finest quality. Potatoes, oats, and hay gave light crops, but the apple crop was the best ever known. July, August, and September were exceedingly hot, and up to this time there had not been a single heavy rain that would wet the soil to the depth of an inch. Local showers, of very limited area and short duration, had occurred at rare intervals. People commonly said "the showers have all been going around us all

summer; they had a good rain north or south of us, but we had not a drop." Very often the correspondent had a chance to test such reports, and generally found them erroneous; each locality considered itself an exceptional sufferer; but his wider observation showed that there was very little partiality in the distribution of those showers, except that they were a little more frequent and copious near the river. At Uniontown, Kentucky, the Ohio River was so low that it was said that an old vein of coal under the riverbed was worked and thousands of bushels taken out daily. Possibly, however, this was a partial error. The coal may have been dug out at Uniontown very much as it was at Milton, Kentucky, where the wrecks of old coal barges were uncovered and tons of coal taken out by the farmers. In connection with the drought of 1895 in the United States, the following items relative to other countries are quoted from newspaper reports:<sup>115</sup>

British Columbia, Canada — The Columbia River was lower than ever before known. The woods bordering on Puget Sound are very dry and suffering from forest fires. In some regions but one or two showers had fallen during July, August, September, and October.

Alaska — The rain and cloudiness had been about normal during August and September in the southern part of the Territory.

Europe — A drought had prevailed similar to that in the United States.

Australia — A very severe drought and great distress during July, August, and September, especially in New South Wales.

Greenland — The summer of 1895 was the mildest ever known in the neighborhood of Ivigtut. The mountains for the first time ever known were bare of ice and snow. Wild animals accustomed to the extreme cold have been compelled to go farther north. Blueberries were plentiful for the first time in many years. The water about the southern coasts was warm enough to bath in and apparently not colder than on the Jersey coast.

On 10-11 November 1895, gale and floods struck in different parts of *British Isles*, with loss of life. On 23-25 November 1895, northeastern gale struck the [*English*] *Channel*, with loss of life.<sup>94</sup>

On 23-25 December 1895, a southeast gale struck over the *United Kingdom* causing a great loss of life.<sup>94</sup>

In 1895-96 in Chhindwara, *India*, the rains stopped prematurely, but the autumn harvest was satisfactory. The spring crops did not germinate well on account of the hardness of the ground, and wheat only produced about a half of a normal crop. The poorer tracts were distressed but in the richer grounds of Sausar and Chhindwara tahsils, many farmers profited by the higher prices and either cleared themselves of debt or laid by a balance in cash.<sup>180</sup>

In 1895 during the period between 22 July and 19 August, a drought engulfed Anhwei (now Anhui province) in eastern *China* at T'ai-p'ing.<sup>153</sup>

*Also refer to the section 1890 A.D. – 1900 A.D. for information on the drought in South Africa during that timeframe.*

*Also refer to the section 1895 A.D. – 1903 A.D. for information on the drought in Australia during that timeframe.*

**Winter of 1895 / 1896 A.D.** The River Thames in London, *England* froze.<sup>29</sup>

Two incidences of a natural weather phenomenon called "snow rollers" were observed in the *United States* during December 1895.<sup>115</sup>

— The passengers on the *Flint and Pere Marquette Railroad* in Michigan on December 10 observed snow rollers. They report that in large level fields hundreds of snowballs, some of them of colossal size, were rolled together by the action of the wind. The fields were covered with them.

— A similar phenomenon was reported from Spokane, Washington. The *Spokesman Review* of December 23 read: The wind has been playing strange with the snow in the vicinity of the waterworks on both sides of the river during the last few days, producing hundreds of snow cylinders of uniform size and as perfectly formed as though they had been cast in a mould. These cylinders were from 12 to 16 inches long and from 6 to 10 inches in diameter, and were hollow, except in the middle. The hollow in each end was funnel-shaped, being widest at the end where the cylinder

was quite thin, growing smaller as it nears the middle where there was a solid space. E.E. Alexander, whose farm was near the waterworks on the south side of the river, says there were hundreds of these cylinders near his place and also in the neighborhood of Minnehaha Park. "It is a strange and beautiful spectacle," said Mr. Alexander yesterday, "and I never saw anything of the kind before. I judge that the conditions under which these cylinders are formed are exceedingly rare. Most of them seem to have been formed Thursday night. For a time the wind blew from the southeast, then it suddenly changed to the southwest, and where there were fence posts or inequalities in the ground these drifts were broken into small sections, which the wind gathered up and started to rolling. The snow was just soft enough to ball, and as these little masses were pushed slowly along by the wind they began to roll, gathering more snow as they went, till the cylinders were formed. They rolled all the way from 20 to 100 feet, and looked like things of life as they sped along until stopped by their own weight. They could only roll about so far, when they became so heavy that the wind would no longer move them, and this accounts for their uniform size."

During the winter of 1895-96 in Bradford County, Pennsylvania in the *United States*, although there was a flurry of snow on October 9<sup>th</sup>, fall in general was warm and farmers continued plowing until January. There was a freeze around the middle of December but it soon warmed and the end of December produced summer-like weather. On January 6<sup>th</sup>, the temperature dropped to -12° F [-24° C] at South Hill and -18° F [-28° C] at Le Raysville. Snow followed the cold wave but not enough for sleighing. On February 6<sup>th</sup>, there was a thunderstorm with lightning, and on the 8<sup>th</sup>, a snowfall that supported sleighing. On the 15<sup>th</sup> of February it was again warm with rainfall. This was followed by the coldest blast of winter, when on the morning of the 17<sup>th</sup>, temperature in the county ranged from -14° F [-26° C] at Towanda to -25° F [-32° C] at Le Raysville. There was sleighing only on the highlands until the 11<sup>th</sup> of March when the deepest snowfalls of winter occurred. On 13 March, the temperature fell to -20° F [-29° C] at "Foot of Plane". March 29, 30 and 31 produced beautiful spring days and the robins were warbling their welcome songs. After the first week, it turned warm in April, the temperature rising to 100° F [38° C] at Towanda on the 13<sup>th</sup>.<sup>178</sup>

The following are the lowest temperatures observed during January 1896 in the *United States*:<sup>118</sup>

Montgomery, Alabama	( 19° F, -7.2° C)
Mobile, Alabama	( 22° F, -5.6° C)
Tucson, Arizona	( 21° F, -6.1° C)
Yuma, Arizona	( 31° F, -0.6° C)
Little Rock, Arkansas	( 15° F, -9.4° C)
Fort Smith, Arkansas	( 14° F, -10.0° C)
San Francisco, California	( 40° F, +4.4° C)
San Diego, California	( 39° F, +3.9° C)
Denver, Colorado	( 0° F, -17.8° C)
Pueblo, Colorado	( 5° F, -15.0° C)
New Haven, Connecticut	( -8° F, -22.2° C)
New London, Connecticut	( -2° F, -18.9° C)
Millsboro, Delaware	( 6° F, -14.4° C)
Washington, D.C.	( 8° F, -13.3° C)
Pensacola, Florida	( 22° F, -5.6° C)
Key West, Florida	( 55° F, +12.8° C)
Augusta, Georgia	( 18° F, -7.8° C)
Savannah, Georgia	( 22° F, -5.6° C)
Swan Valley, Idaho	(-11° F, -23.9° C)
Lewiston, Idaho	( 12° F, -11.1° C)
Chicago, Illinois	( -9° F, -22.8° C)
Cairo, Illinois	( 8° F, -13.3° C)
Indianapolis, Indiana	( -5° F, -20.6° C)
Lafayette, Indiana	(-12° F, -24.4° C)
Dubuque, Iowa	(-10° F, -23.3° C)
Keokuk, Iowa	( -4° F, -20.0° C)
Topeka, Kansas	( 1° F, -17.2° C)



Dodge City, Kansas	( 2° F, -16.7° C)
Louisville, Kentucky	( 3° F, -16.1° C)
Lexington, Kentucky	( 0° F, -17.8° C)
New Orleans, Louisiana	(28° F, -2.2° C)
Shreveport, Louisiana	(19° F, -7.2° C)
Eastport, Maine	(-13° F, -25.0° C)
Portland, Maine	(-13° F, -25.0° C)
Baltimore, Maryland	( 9° F, -12.8° C)
Boston, Massachusetts	(-10° F, -23.3° C)
Nantucket, Massachusetts	( 3° F, -16.1° C)
Marquette, Michigan	(-13° F, -25.0° C)
Detroit, Michigan	( -6° F, -21.1° C)
Saint Vincent, Minnesota	(-39° F, -39.4° C)
Saint Paul, Minnesota	(-18° F, -27.8° C)
Koochiching, Minnesota	(-49° F, -45.0° C)
Vicksburg, Mississippi	(22° F, -5.6° C)
Saint Louis, Missouri	( 5° F, -15.0° C)
Billings, Montana	(-20° F, -28.9° C)
Helena, Montana	(-20° F, -28.9° C)
Kipp, Montana	(-41° F, -40.6° C)
North Platte, Nebraska	(-14° F, -25.6° C)
Omaha, Nebraska	( -8° F, -22.2° C)
Winnemucca, Nevada	(11° F, -11.7° C)
Carson City, Nevada	(12° F, -11.1° C)
West Milan, New Hampshire	(-27° F, -32.8° C)
New Brunswick, New Jersey	( -1° F, -18.3° C)
Cape May, New Jersey	(11° F, -11.7° C)
Santa Fe, New Mexico	(11° F, -11.7° C)
Albany, New York	(-14° F, -25.6° C)
Lowville, New York	(-32° F, -35.6° C)
New York City, New York	( -3° F, -19.4° C)
Charlotte, North Carolina	(14° F, -10.0° C)
Kitty Hawk, North Carolina	(16° F, -8.9° C)
Bismarck, North Dakota	(-23° F, -30.6° C)
Willow City, North Dakota	(-40° F, -40.0° C)
Williston, North Dakota	(-24° F, -31.1° C)
Cincinnati, Ohio	( -1° F, -18.3° C)
Columbus, Ohio	( -3° F, -19.4° C)
Oklahoma City, Oklahoma	(11° F, -11.7° C)
Fort Sill, Oklahoma	(10° F, -12.2° C)
Roseburg, Oregon	(31° F, -0.6° C)
Portland, Oregon	(23° F, -5.0° C)
Erie, Pennsylvania	( 2° F, -16.7° C)
Philadelphia, Pennsylvania	( 4° F, -15.6° C)
Block Island, Rhode Island	( -4° F, -20.0° C)
Charleston, South Carolina	(27° F, -2.8° C)
Columbia, South Carolina	(15° F, -9.4° C)
Yankton, South Dakota	(-10° F, -23.3° C)
Nashville, Tennessee	(10° F, -12.2° C)
Knoxville, Tennessee	(10° F, -12.2° C)
San Antonio, Texas	(27° F, -2.8° C)
Galveston, Texas	(32° F, 0.0° C)
Salt Lake City, Utah	( 9° F, -12.8° C)
Burlington, Vermont	(-17° F, -27.2° C)
Lynchburg, Virginia	(11° F, -11.7° C)
Norfolk, Virginia	(14° F, -10.0° C)



Olympia, Washington	( 23° F, -5.0° C)
Spokane, Washington	( 1° F, -17.2° C)
Morgantown, West Virginia	( -1° F, -18.3° C)
Milwaukee, Wisconsin	(-12° F, -24.4° C)
Hayward, Wisconsin	(-39° F, -39.4° C)
La Crosse, Wisconsin	(-16° F, -26.7° C)
Cheyenne, Wyoming	( -4° F, -20.0° C)

The following are the lowest temperatures observed during January 1896 in the *Mexico*:<sup>118</sup>

Ciudad Porfirio Díaz	( 22° F, -5.6° C) (now Piedras Negras, Coahuila)
Leon de Aldamas	( 36° F, 2.2° C) (now León, Guanajuato)
Mexico City	( 36° F, 2.2° C)
Puebla	( 41° F, 5.0° C)

The thickness of ice in rivers and harbors in the *United States* on Monday, 27 January 1896 is as follows:<sup>118</sup>

*Missouri River* — Miles City, 16 inches; Williston, 25.5 inches; Bismarck, 30 inches; Pierre, 19 inches; Yankton, 18.5 inches; Sioux City, 15 inches; Omaha, 10 inches; Kansas City, 2.0 inches.

*Red River of the North* — Moorhead, 30 inches.

*Upper Mississippi* — St. Paul, 17 inches; La Crosse, 15 inches; Dubuque, 10.5 inches; Davenport, 9 inches; Keokuk and Hannibal, 0 inches.

*Hudson River* — Albany, 11 inches.

*Lake Superior* — Duluth, 21.5 inches; Sault Ste. Marie, 7 inches.

*Lake Michigan* — Green Bay, 13 inches; Milwaukee, 6 inches; Chicago and Grand Haven, 0 inches.

*Lake Huron* — Alpena, 9.5 inches; Port Huron, 6.0 inches.

*St. Clair River* — Detroit, 12 inches.

*Lake Erie* — Toledo, 4 inches; Sandusky, 4 inches; Cleveland, 4 inches; Erie, 7.5 inches; Buffalo, 4 inches.

*Lake Ontario* — Oswego and Rochester, 4 inches.

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**1896 A.D.** On 26-27 January 1896, a cyclone struck *Australia*. It ripped a path of destruction between Townsville and Brisbane. The storm killed 18 people in Townsville. The storm caused heavy flooding. In February during the flooding of Brisbane, the ferryboat, *Pearl*, that had replaced the damaged Victoria Bridge, was driven into the bow of another ship and sunk. Thirty lives were lost in this accident.<sup>101</sup>

On 26 January 1896, a tropical cyclone *Sigma* caused a path of destruction from Townsville to Brisbane, *Australia*. In Townsville 18 people were killed, ships were wrecked in the harbor, fences blown down and verandahs ripped from houses. Trees up to 6 feet (2 meters) in circumference were uprooted. The storm surge swept upstream for three miles in the rivers and creeks causing many of the deaths.<sup>99</sup>

A storm skirted the middle Atlantic Coast of the *United States* on 6 February 1896. The rain and winds combined damaged and destroyed an immense amount of property throughout eastern Pennsylvania, New Jersey, and southern New England. The lowlands of New Jersey were inundated, and many towns and villages were flooded. Bridges were washed away and 11 lives were lost by drowning: 8 at Bristol, Connecticut; 2 at Pottstown, Pennsylvania; and 1 at Bound Brook, New Jersey. At Bound Brook, the water stood 6 feet deep in the principal streets of the village. In a number of other towns and villages the inhabitants were forced to take refuge in the second stories of their dwellings.<sup>118</sup>

On 10-17 February 1896, the Brisbane River flooded in Queensland, *Australia*. Following flood damage to the Victoria Bridge, the wooden steamer 'Pearl' (while being used as a ferry) was carrying passengers across the swollen Brisbane River when she was swept against the anchor chains of the yacht *Lucinda* and sunk on 13 February 1896. Twenty-eight bodies were recovered and identified but at least another 20 were never found.<sup>99</sup>

On 19 February 1896, violent storms were reported in the *Black Sea*. Three Russian, 4 foreign steamers, and 18 sailing ships were wrecked, over 100 lives lost.<sup>94</sup>

On 2 March 1896, there was a great loss of life and destruction of property reported from the overflow of the Tigris River, in *Mesopotamia*.<sup>97</sup> [Tigris River flows through southeastern *Turkey* and *Iraq*. Mesopotamia corresponds to modern day *Iraq*, northeastern *Syria*, southeastern *Turkey* and southwestern *Iran*.]

In March 1896, there were floods in many parts of *Switzerland*, through snow and heavy rains.<sup>97</sup>

On 29 March 1896, heavy rains in eastern Tennessee and southwestern Virginia in the *United States* caused a number of landslides and the loss of bridges throughout that region. Five persons were drowned by the floods in Russell County, Virginia; two others near Abrams Falls; and two lives were lost in Clay County, Kentucky, by the sudden flooding of Sextons Creek. The water was reported to have risen so rapidly that it seemed as if it were a solid wall 15 or 20 feet high. Several other dwelling houses and a number of outbuildings in the valley of the creek were washed away.<sup>118</sup>

On 20 April 1896, a tornado occurred in Sandusky County, Ohio, near Fremont in the *United States*; 3 killed and about 20 injured. The loss in this county alone was estimated at \$100,000 [\$2.6 million in today's dollars]. The greatest destruction was in spots, the tornado lifting from the ground and descending again several miles distant.<sup>118</sup>

On 25 April 1896, a destructive tornado struck the eastern edge of Cloud County, Kansas in the *United States*, passing eastward into Clay County, through a thickly settled and prosperous portion of the two counties; 8 people were killed and 20 injured. The path of the storm was nearly a ½ mile wide and about 20 miles long. Houses, barns, granaries, and fences were demolished, and the fragments strewn broadcast over the path of the storm. Newspaper reports state that hail fell, in some cases, 7½ inches in circumference, by actual measurement. A conservative estimate of the loss to the buildings alone, 27 dwellings being totally destroyed and many more injured was estimated at \$15,000.<sup>118</sup>

On 15 May 1896, a very destructive series of tornadoes struck in Denton and Grayson counties, Texas in the *United States*; 61 people were killed at Sherman, and 150 injured; 3 were killed at Gribble Springs, 2 at Justin, and 12 at Howe and vicinity. The property loss was variously estimated at from \$150,000 to \$200,000 [\$3.9 million to \$5.2 million in today's dollars].<sup>118</sup>

On 15 May 1896, destructive cyclones [tornadoes] produced great loss of life at Sherman, Texas in the *United States*. Then on 27 May 1896, they struck at St. Louis, Missouri. Then on 30 May 1896, another struck at Seneca, Missouri causing 30 deaths.<sup>94</sup>

On 17 May 1896, a series of tornadoes struck Kentucky, Kansas and Nebraska in the *United States*. At Elva, Kentucky, the tornado killed an entire family of 5 persons. At Frankfort, Kansas, 40 dwellings were either razed to the ground or badly damaged, but no one was killed, the people had fled to caves and cellars on the approach of the tornado. Twenty-five lives were lost in Kansas and Nebraska, and 73 injured. Property damage was estimated at \$300,000 [\$7.8 million in today's dollars].<sup>118</sup>

On 24-25 May 1896, severe storms with tornadoes, visited Iowa on the night of the 24<sup>th</sup> and the morning of the 25<sup>th</sup>, and northern Illinois in the early morning of 25<sup>th</sup> in the *United States*. The greatest destruction was in Polk and Jasper counties, Iowa, and near Chicago, Illinois. An independent series of tornadoes also occurred in Oakland, Macomb, and Lapeer counties, Michigan; 19 people were killed in Iowa; 8 in Illinois, and 47 in Michigan. The property loss in Iowa was about \$75,000; in northern Illinois, about \$15,000; near Chicago, about \$80,000; and in Michigan, nearly \$400,000. [In present currency, the total

damage from these storms would be equivalent to \$14.7 million based on the Consumer Price Index (CPI) inflation rates.]<sup>118</sup>

In the *United States* on 25 May 1896, very destructive tornadoes struck southeastern Michigan in the evening.<sup>118</sup>

The path of the storm was distinctly marked at Thomas (Oakland County), Michigan. The south side of the storm showed all the trees, houses, and fences thrown to the northeast, while in the center of the path, which was probably an eighth of a mile in width at this point, the debris was laid to the east. It was noticed in the center of the path that the grass was pounded down into the earth as though it had been washed into the earth by a heavy flow of water. The small trees on the south side of the path were stripped of their bark, even to the twigs, as though done by the careful hand of an experienced artisan. On one side of the road which runs north, at Thomas, the house of Mr. Kidder was carried bodily for about 300 feet, and then smashed into the earth, the contents of the house scattered beyond finding, while across the road, some 600 feet to the north, the frame house of Mr. Copland was taken free from the stone foundation, and the debris were found from 2 to 10 miles farther east-northeast. All that was left of his house was a square piano, which was standing on its side some 200 feet directly north of the foundations of the house, one end being pounded full of grass. One peculiarity of the freaks of this storm was the unroofing of the post office at Thomas, leaving only the lower story standing, and in the window was still displayed the weather forecast card of the day: "Severe local thunderstorms this afternoon and tonight; showers followed by fair, Tuesday." The forecast had been terribly fulfilled in this section.

Tornadoes occurred, or windstorms were reported, at about 6 p.m., local time, and at about 20 localities in the following Michigan counties: Montcalm, Kalkaska, Midland, Bay, Tuscola, Genesee, Lapeer, Oakland, Macomb, St. Clair, Sanilac, and Wayne, the most damage occurring in the counties of Oakland, Lapeer, and Genesee, in the order named. In Kalkaska County the tornado simply cut a path through the woods, and did not touch any houses.

The reports from all sources indicate that there were 45 lives lost, about 100 persons injured more or less severely, and about \$400,000 in damages to houses, barns, etc. [In present currency, that would be equivalent to \$10.3 million in damages based on the Consumer Price Index (CPI) inflation rates.]

In the *United States* on 27 May 1896, the most destructive tornado in the history of the country passed over Saint Louis, Missouri, at 6.10 p.m.<sup>118</sup>

#### Recapitulation of Saint Louis Tornado of 27 May 1896<sup>118</sup>

<u>Location</u>	<u>Lives Lost</u>	<u>Value of Property Destroyed in 1896 Dollars</u>
St. Louis, Missouri	137	\$ 10,239,000
East St. Louis, Illinois	118	\$ 2,000,000
St. Louis County	--	\$ 100,000
Curryville, Missouri	1	\$ 90,000
Audrain County, Missouri	6	--
High Hill, Missouri	1	--
Washington, Missouri	1	\$ 15,000
Chamois, Missouri	2	\$ 200
Clayton, Missouri	1	\$ 5,000
New Baden, Illinois	13	--
Birkner, Illinois	8	--
New Minden, Illinois	11	\$ 200,000
Harmony Station, Illinois	2	--
Mascoutah, Illinois	1	\$ 125,000
Germantown, Illinois	1	--
Richview, Illinois	1	\$ 10,000

Jefferson County, Illinois	2	--
Clark, Missouri	--	\$ 3,500
Renick, Missouri	--	\$ 22,000
Sturgeon, Missouri	--	\$ 200
Mexico, Missouri	--	\$ 50,000
Vandalia, Missouri	--	\$ 45,000
<b>Total</b>	<b>306</b>	<b>\$ 12,904,900</b>

[In present currency, that would be equivalent to \$334 million in damages based on the Consumer Price Index (CPI) inflation rates.]

The tornado, which passed through Saint Louis late in the afternoon of May 27, was the culmination of a protracted period of abnormally high temperatures, intensified during the latter portion of the time by unusually high humidity. The bricks and stones in the buildings and streets became an enormous storehouse of heat, free radiation at night being prevented by smoke and dust.

The storm entered St. Louis from the west between the Missouri Pacific Railroad tracks on the north and one or two blocks south of the poorhouse on the south, a width of about 1¼ miles. The path through the city was almost exactly in a due easterly direction, reaching the Mississippi River, about 6 miles distant, at 6.20 p.m.

The width of the storm track remained generally the same as it moved eastward until 2<sup>nd</sup> Carondelet Avenue was reached, when it narrowed to somewhat less than one mile, and thereafter continued within that limit. When the high ground at Grand Avenue and Compton Hill Reservoir was reached the storm apparently lifted so that the district north to Caroline Street, and east to California Avenue was touched but lightly, except along Lafayette Avenue, which was damaged considerably as far west as Compton Avenue. This Compton Hill district is about 25 feet higher than the surrounding neighborhood.

The district immediately to the south of the reservoir did not escape, and Russell Avenue between the reservoir and California Avenue was particularly unfortunate.

There was no evidence of the inward spiral rotary motion of the winds west of California Avenue, but in the district east of this avenue, south to Geyer Avenue and north to Lafayette Avenue, the position of the debris indicated the presence of the whirling motion, and from this section eastward the greatest destruction was wrought, the width of the path traversed by the whirl remaining the same.

The storm attained its maximum severity in Lafayette Park and the district immediately surrounding. The park is about two blocks square, and was thickly covered with trees, mostly of mature growth. Every tree, except perhaps a dozen small and very pliable ones, was either twisted or broken off, and in some cases uprooted. The bark was also stripped off of many. The debris lay in every direction, showing that the center of the whirl must have passed directly through the park. At the City Hospital, a short distance east of the park, the lower edge of the whirl evidently passed through the northwest half of the grounds where there was nothing but a complete and confused mass of wreckage to be found; while in the southeast half the inner walls were blown out toward the north, and almost all of the outer walls remained standing.

During the progress of the storm across the city, many who were directly within its limits heard a rumbling noise similar to that made by a long train of cars while passing through a tunnel. No unusual noises, however, were heard at the Weather Bureau station. A very noticeable characteristic of this storm was the comparatively uniform height of its lower edge above the ground, the distance being about 30 feet, rarely more or less. In a great majority of the houses, which were struck the damage was above the first floor, except in the cases of collapse in the center of the track, and of crushing of lower floors by the weight of debris falling from above. Hundreds of walls were blown out above the first floors, while the lower walls remained

practically intact. In Lafayette Park nearly all of the trees were broken or twisted off at an elevation of about 30 feet. Numerous other evidences of this uniform height were also observed.

The evidence of unusual heat, which often accompanies tornadoes, was observed at only one place, Lafayette Park. Here many of the branches and twigs bore signs of having been seared, as if by a hot iron.

Much damage appears to have been caused by great differences in the atmospheric pressure within very limited areas, creating, as it were, numberless small secondary whirls. For instance, single stones and bricks were taken out of walls. A wagon loaded with lumber and having two horses attached was standing near the river; the wagon was not even overturned, while the horses were carried away. In numerous instances the walls of a house would be blown outward, while its neighbor escaped practically untouched. Another point noticed was that in the storm track, whenever an opportunity was afforded to more or less equalize the pressure between the insides and outsides of structures, the damage was proportionately less than where there was no such opportunity. This was remarked in some houses where the windows had been left open, and also in others roofed with slate or shingles when compared with those roofed with tin. A patch of slate or shingles would be torn away, allowing the air to escape from within, and the remainder of the roof would escape injury. Not so, however, with tin roofs; being of one piece and more securely fastened, they were entirely taken away.

It was noted also by comparison with the data at other points that the storm increased in intensity as it entered Saint Louis, and again decreased after it left East Saint Louis. The immense increase of surplus heat which had been stored in the walls and streets of the city during the seven weeks previous, combined with that liberated by the heavy rainfall, may have contributed to this. As the storm left the city for the open country, its supply of fuel was greatly decreased, resulting in a corresponding loss of energy.

Regarding the actual intensity of the storm, there has been much difference of opinion, particularly among architects, civil engineers, and others whose opinions are of value. Many insist that no structure in the city could have withstood the full force of the tornado, and point to the disaster at Lafayette Park and the Saint Louis Bridge as confirmations of their theory. The evidence afforded by the park is probably satisfactory proof, but not so that afforded by the Saint Louis Bridge. Here some of the heavy masonry on the south side of the East Saint Louis approach was torn away, but it is extremely difficult to believe that it was done by direct application of air pressure. Competent and experienced engineers have assured me that the masonry on this bridge, supported as it was above and below, could withstand a pressure of at least 2,000 pounds to the square foot. The pressure per square foot on an absolute vacuum at sea level is only about 2,100 pounds, and it is not reasonable to suppose that even in the very center of the tornado whirl did anything approaching a perfect vacuum exist. Consequently pressure alone, or even pressure combined with a twisting motion, could not have produced the damage to the bridge. Probably the correct solution of the matter is that the supports were first torn out and then the unsupported columns of masonry were not sufficiently strong to withstand the pressure. Consequently they were blown down. If the supports had remained intact, there would have been no damage done to the columns.

In other portions of the city the greater part of the damage was unquestionably due to comparatively weak construction. In the vicinity of Lafayette Park, where most of the houses were well built, instances of total destruction were infrequent as compared with those in the districts farther east and in East Saint Louis.

Again, instances of heavy bodies, such as roofs, etc., being carried for a considerable distance (a frequent occurrence in tornadoes), were quite rare in this storm. In some instances roofs were pushed over to one side, and in others they simply settled down on the debris or lower walls after the upper ones had fallen or been blown outward. I have heard of none that were carried away. Neither did I hear of any trees being moved more than a few feet.

Probably the most remarkable evidence of the force of the storm was the following: On the long East Saint Louis approach to the Saint Louis Bridge a white pine plank, 2 by 8 inches, was driven into the south side of a steel girder with such velocity that it punched a hole in the web and remained sticking in the girder.

The meteorological conditions attending the tornadoes of May 27, 1896, showed that massive thunderstorm was of very considerable extent, embracing the whole of the States of Iowa and Missouri, the greater portion of Illinois, and extending eastward and southeastward into Kentucky, Tennessee, and West Virginia. The path of greatest destruction in the St. Louis tornado extended from Randolph County, Missouri to Jefferson County, Illinois, a distance of about 200 miles. After leaving Saint Louis a score or more of towns and villages was passed over and an additional 39 lives were lost before the fury of the storm abated.

When the Saint Louis tornado of 27 May 1896 reached the Mississippi River, it wrecked nearly every boat and filled the water with people struggling for life. Steamboats, wharf boats and barges were swept from their moorings and cast adrift in almost a solid line. These included 25 steamers (10 large passenger steamers, 5 ferryboats, 2 transfer boats, 2 tugboats and half a dozen small pleasure barges.) Some of the boats overturned and sunk immediately. Other boats were blown to the other side of the river where they crashed and wrecked.<sup>126</sup>

The steamer *J. J. Odil* broke loose from its mooring and was blown against the second pier of the Eads Bridge. The ship's boiler then blew up and the boat sank. Nine of the crew of twelve along with the Captain and 3 women passengers went missing.

The towboat *Dolphin #2* was blown free from her wharf boat at the foot of Morgan Street and dashed against the first pier. The collision caved in the starboard side. The towboat floated down the river for about 3 blocks and then sank. Eleven people who had fled the Steamers *Pittsburg* and *Libbie Conger* for safety aboard the towboat were tossed into the river where they clung to driftwood and floated downriver towards Pittsburg dike. These people, including 3 women, were then caught in an eddy and pulled under.

The *Bald Eagle* was blown downriver and capsized and sunk. Nothing has been heard of the 20 people aboard. The tugboat *Baton Rouge Belle* was forced from its mooring into the middle of the river where it rolled over and over. When it reached the foot of Chouteau Avenue, the boat crashed against the Wiggins Ferry Company wharf and sunk in ten feet of water. The *Exporter* and the *Harvester* were set adrift along with the main wharf boat and a number of barges. One of the boats was sunk at the foot of Arsenal Street. The tug *Rescue #2* sunk at the foot of Onve Street. The *City of Cairo* and the *Arkansas City* broke loose from their moorings at Choteau Avenue and Carroll Street respectively. They had few crew aboard. They disappeared.

The *City of Monroe* was ready to leave for New Orleans. She had a large crew and about 35 passengers. The tornado destroyed her upper decks. The winds drove her across the river where she lodged opposite the foot of Choteau Avenue. Even though the ship was dashed against the shore, it did not sink. The captain (Ziegler) told the crew not to jump overboard. He said, "There is no danger". Those were his last words. He was blown into the river where he drowned.

A few of the boats remained afloat after the tornado passed but their upper decks were torn away. Four boats and two ice barges lay at the foot of Cass Avenue. The *Polar Wave* had its pilothouse and part of her cabin blown off. The *Vinton* had its cabin blown off. The *Jack Frost* and the *Charlotte Boeckeler* lost their smokestacks and cabins. The ice barges *Ione* and *Snow* had their roofs blown off.



The *Libbie Conger* went down sideways. The boat missed the pier and floated down the river without her topsails. The harbor boat smashed into the dump boat, which prevented it from colliding with the pier. It floated down the river. Both of its chimneys were blown off.

At Jefferson Barracks during the night a large quantity of wreckage was seen floating down the river. Sometimes the wrecks were individual ships and other times a tangled mass. One large steamboat with a black smokestack, with only the pilothouse above water floated down the river. There were no signs of life aboard. Then a barge with 15 to 20 people aboard floated by. They were wildly waving lanterns for assistance. The wreckage that floated by consisted of boats, wharves, houses, furniture, logs, and lumber.

On 27 May 1896, a great tornado struck St. Louis, Missouri in the *United States*. The following is an account from Professor E. S. Holden, Director of the Lick Observatory, who was an eyewitness of the destruction.<sup>118</sup>

On the afternoon of May 27, I was in Forest Park in St. Louis with one of my daughters, about 3 o'clock, and the aspect of the sky at once reminded both of us of the "tornado-skies" we had been used to see. The upper sky was covered with a faint veil of grayish clouds parted into regular shapes roughly rectangular and some four or five degrees on a side. Between these figures were darker lanes, of gray-blue color. All around the visible horizon, from north, through west, to south, there was a rim of brassy lurid sky. In the west, or a little north of west and also in the southwest, were two heavy, black, towering clouds, roughly rectangular in figure. The aspect of these clouds was carefully watched to see if they sent out fibrous, twisted offshoots downward; and the brassy rim of sky next the horizon was examined to see if the color deepened toward green.

Either of these signs would, so far as our previous experience went, have indicated the coming of a veritable tornado. So long as they were absent the indications were for a severe thunderstorm later in the evening. It was "hurricane weather" and not "tornado weather" at first. A little before 4 o'clock, the sky looked decidedly more threatening and I decided to take my daughter to the Southern Hotel, which I knew to be one of the stoutest structures in the city. My rooms were on the eastern side, the safer side, which relieved the slight feeling of anxiety somewhat.

My own experience was sufficiently exciting. As I have said, our rooms were on the lee side of the hotel facing a street running north and south. Loaded wagons in the street below were blown on their wheels, and the horses thrown down. The heavy iron cornice of a tall building in course of construction was hurled to the street and destroyed; another building was set on fire by lightning, which entered by the wires on the roof; the hotel chimneystack was blown down, causing damage to glass, etc., of some \$5,000 and wounding several employees, etc.

The wind first blew violently up the street (north) and after the center of the storm had passed it suddenly changed direction and blew south, and this change of direction made new wrecks. The winds in such a storm blow circularly round, or toward the vortex, and when their direction is suddenly reversed like this, one recognizes that at least the crisis is half over. I saw very little hail. The occurrence of a violent storm in a city produces any number of strange happenings, freaks, and the published accounts of it usually dwell on these comparatively unmeaning details—freaks—which give no real idea even of the violence of the wind.

I took the time to visit, personally, the ruined parts of the city. The chief damage was done, not by the direct force of the winds from outside, but by the bursting of the houses from the inside. The barometric pressure in the vortex was very low. The pressure inside the houses was comparatively high. It was usually relieved by the bursting of the walls and windows. When these were uncommonly strong the roofs were lifted and, so soon as the pressure was equalized, dropped down nearly in their former positions. Whole blocks and squares were ruined in this fashion, so that not one house in ten was even habitable. The trees in Lafayette Park were mostly overthrown. The leaves on those left standing were blown into tatters, so that only the midrib with ragged

portions on each side were left. This instance will, I think, illustrate the force of the wind as well as any other. The gyrotory forces were by no means so well marked in this storm as in others that I have studied. It was not a typical tornado, though it partook of the tornado character.

Tornadoes are caused somewhat as follows: The atmosphere above a considerable region of country is in unstable equilibrium. The colder and heavier air is above, the warmer below. Anywhere in this large region tornadoes may occur. Tornadoes are local effects caused by the effort to establish a stable equilibrium quickly. They partake of the rotation of the large circular air movement, and revolve, as these do, in a direction counter-clockwise. Such rotations are produced in the large movements by the earth's rotation, but tornadoes are too small to be directly affected by the rotation of the earth. Their rotatory motion is probably determined by that of the general mass of air of which they form a part. The centrifugal force of their rotation tends to produce a vacuum in the center of the tornado. The surrounding air cannot enter at the sides of the gyrating column; it therefore rushes in at the bottom and blows towards the center and upwards. In violent tornadoes the barometer may be about three inches below the normal. (At St. Louis, it was about an inch lower.) The local tornado, thus inadequately and summarily described, is usually less than three hundred yards wide, and the winds within it and around it blow a hundred or more miles per hour. The storm itself travels in the general direction from S.W. to N.E. seldom more than 40 or 50 miles per hour.

On 27 May 1896, a tornado struck St. Louis, Missouri and East St. Louis, Illinois in the *United States*. More than 300 persons were killed and more than a thousand injured from the tornado. A great portion of East St. Louis was razed to the ground. Initial estimates placed the property damage at \$50 million. [In present currency, that would be equivalent to \$1.4 billion in damages based on the Consumer Price Index (CPI) inflation rates.] The destruction during the last two weeks of May, however, beginning with the tornado in Sherman [On 15 May, a tornado struck Sherman, Texas killing 60 people and injuring another 150.] and other points in the Southwest and ending with those in St. Louis, Missouri and vicinity, and including the waterspouts and other meteorological disturbances, broke all records in the *United States* for any equal period.<sup>197</sup>

On 6 June 1896, destructive rain and wind storms occurred in Minnesota, Wisconsin, Iowa, Illinois, and Missouri in the *United States*. Five persons were drowned, a number were injured by the wind; hundreds of cattle, sheep, and hogs were drowned. Newspaper estimates place the damage at half a million dollars [\$13 million in today's dollars].<sup>118</sup>

The following are the highest temperatures observed during July 1896 in the *United States*:<sup>118</sup>

Montgomery, Alabama	(101° F, 38.3° C)
Mobile, Alabama	( 99° F, 37.2° C)
Tucson, Arizona	(104° F, 40.0° C)
Yuma, Arizona	(110° F, 43.3° C)
Little Rock, Arkansas	(103° F, 39.4° C)
Fort Smith, Arkansas	(103° F, 39.4° C)
San Francisco, California	( 72° F, 22.2° C)
San Diego, California	( 80° F, 26.7° C)
Fresno, California	(111° F, 43.9° C)
Denver, Colorado	( 96° F, 35.6° C)
Pueblo, Colorado	( 96° F, 35.6° C)
New Haven, Connecticut	( 90° F, 32.2° C)
New London, Connecticut	( 88° F, 31.1° C)
Millsboro, Delaware	( 92° F, 33.3° C)
Washington, D.C.	( 94° F, 34.4° C)
Pensacola, Florida	( 99° F, 37.2° C)
Key West, Florida	( 90° F, 32.2° C)
Augusta, Georgia	(100° F, 37.8° C)

Savannah, Georgia	(101° F, 38.3° C)
Pollock, Idaho	(107° F, 41.7° C)
Lewiston, Idaho	(105° F, 40.6° C)
Chicago, Illinois	( 93° F, 33.9° C)
Cairo, Illinois	( 98° F, 36.7° C)
Indianapolis, Indiana	( 96° F, 35.6° C)
Lafayette, Indiana	( 95° F, 35.0° C)
Dubuque, Iowa	( 97° F, 36.1° C)
Keokuk, Iowa	( 95° F, 35.0° C)
Topeka, Kansas	( 99° F, 37.2° C)
Dodge City, Kansas	(100° F, 37.8° C)
Louisville, Kentucky	( 98° F, 36.7° C)
Lexington, Kentucky	( 94° F, 34.4° C)
New Orleans, Louisiana	( 96° F, 35.6° C)
Shreveport, Louisiana	(102° F, 38.9° C)
Eastport, Maine	( 84° F, 28.9° C)
Portland, Maine	( 92° F, 33.3° C)
Baltimore, Maryland	( 96° F, 35.6° C)
Boston, Massachusetts	( 93° F, 33.9° C)
Nantucket, Massachusetts	( 82° F, 27.8° C)
Marquette, Michigan	( 92° F, 33.3° C)
Detroit, Michigan	( 91° F, 32.8° C)
Dawson, Minnesota	(100° F, 37.8° C)
Saint Paul, Minnesota	( 95° F, 35.0° C)
Vicksburg, Mississippi	(100° F, 37.8° C)
Saint Louis, Missouri	( 98° F, 36.7° C)
Billings, Montana	(101° F, 38.3° C)
Helena, Montana	( 95° F, 35.0° C)
North Platte, Nebraska	( 95° F, 35.0° C)
Omaha, Nebraska	( 96° F, 35.6° C)
Winnemucca, Nevada	( 98° F, 36.7° C)
Carson City, Nevada	( 97° F, 36.1° C)
West Milan, New Hampshire	( 89° F, 31.7° C)
New Brunswick, New Jersey	( 96° F, 35.6° C)
Cape May, New Jersey	( 90° F, 32.2° C)
Santa Fe, New Mexico	( 82° F, 27.8° C)
Albany, New York	( 94° F, 34.4° C)
New York City, New York	( 89° F, 31.7° C)
Charlotte, North Carolina	( 98° F, 36.7° C)
Kitty Hawk, North Carolina	( 95° F, 35.0° C)
Bismarck, North Dakota	(103° F, 39.4° C)
Williston, North Dakota	( 92° F, 33.3° C)
Cincinnati, Ohio	( 95° F, 35.0° C)
Columbus, Ohio	( 95° F, 35.0° C)
Oklahoma City, Oklahoma	(101° F, 38.3° C)
Fort Sill, Oklahoma	(103° F, 39.4° C)
Roseburg, Oregon	( 99° F, 37.2° C)
Portland, Oregon	( 93° F, 33.9° C)
Erie, Pennsylvania	( 88° F, 31.1° C)
Philadelphia, Pennsylvania	( 93° F, 33.9° C)
Block Island, Rhode Island	( 82° F, 27.8° C)
Charleston, South Carolina	( 98° F, 36.7° C)
Columbia, South Carolina	(100° F, 37.8° C)
Yankton, South Dakota	(100° F, 37.8° C)
Nashville, Tennessee	( 98° F, 36.7° C)
Knoxville, Tennessee	( 94° F, 34.4° C)

San Antonio, Texas	(100° F, 37.8° C)
Galveston, Texas	( 93° F, 33.9° C)
Salt Lake City, Utah	( 97° F, 36.1° C)
Saint George, Utah	(111° F, 43.9° C)
Burlington, Vermont	( 93° F, 33.9° C)
Lynchburg, Virginia	( 96° F, 35.6° C)
Norfolk, Virginia	( 98° F, 36.7° C)
Olympia, Washington	( 93° F, 33.9° C)
Spokane, Washington	(100° F, 37.8° C)
Fort Simcoe, Washington	(112° F, 44.4° C)
Morgantown, West Virginia	( 93° F, 33.9° C)
Milwaukee, Wisconsin	( 94° F, 34.4° C)
La Crosse, Wisconsin	( 94° F, 34.4° C)
Cheyenne, Wyoming	( 90° F, 32.2° C)

The following are the highest temperatures observed during July 1896 in the *Mexico*:<sup>118</sup>

Ciudad Porfirio Díaz	( 99° F, 37.2° C)	(now Piedras Negras, Coahuila)
Leon de Aldamas	( 89° F, 31.7° C)	(now León, Guanajuato)
Mexico City	( 82° F, 27.8° C)	
Puebla	( 85° F, 29.4° C)	
Topolobampo	( 94° F, 34.4° C)	

The year 1896 produced extreme temperatures at Northfield, Massachusetts in the *United States*. A heat wave began on 16 April 1896 when the maximum temperature reached was 96.5° F. The heat wave ended around 23 September when the temperature fell to 31° F and then on 24 September when the temperature fell to 27° F. During the summer, the peak temperatures were warmer than 90° F on sixty-four days; during the hot spell in August, 100° F was recorded twice; 100° F recorded three times during summer. The weather was the driest on record for April to August, inclusive. On 25 December the temperature fell to -15° F and on 28 December it fell to -16° F.<sup>138</sup>

On 7 July 1896, a severe windstorm began on the west Florida coast of the *United States* in the morning, increasing in force as the day advanced. The maximum velocity of the wind at Pensacola (72 miles per hour from the southeast) was reached at 11.45 a.m. Much damage was done in that city. About 35 houses were unroofed, and there was a general destruction of signs, awnings, telegraph and telephone wires, smokestacks, windmills, etc. The greatest destruction, however, occurred in the harbor, and on the waterfront. Nine fishing smacks were sunk; one brig dragged her anchor and was washed ashore; two barks were badly damaged and a number of smaller craft wrecked and sunk.<sup>118</sup>

The most violent rains are the cloudbursts of the mountainous and arid regions of the west in the *United States*. These storms are not confined to any particular state or region but may occur in mountainous localities throughout the entire territory bounded by the British possessions on the north [Canada], the Mexican border on the south, the foothills of the Rockies on the east and the Sierras on the west. In the true cloudburst the rain seems to pour down rather than fall in drops, and, as a rule, the downpour of water covers an extremely small area. It often happens that the downpour occurs over rather narrow basins or on mountain slopes whose outlets are canyons or gorges leading to a valley or plain below. In these cases almost the entire amount of water quickly finds its way into the drainage channel, and, as a result, a wave of water rushes down the outlet with considerable velocity and in sufficient volume to destroy everything in its path. Such a flood wave almost swept away the town of Eureka, Nevada, in 1874, and caused the loss of 15 lives. A far greater disaster occurred in Bear Creek Canyon, Colorado, in July 1896. Thirty lives were lost and property valued at more than \$100,000 was destroyed. [In present currency, that would be equivalent to \$2.6 million in damages based on the Consumer Price Index (CPI) inflation rates.] The amount of rain that falls in one of these torrential downpours has never been

ascertained. A cloudburst passed over the edge of the little town of Palmetto, Nevada, in August 1890. A rain gauge that was not exposed to the full intensity of the storm caught 8.80 inches of water in an hour. In August 1891, two storms passed over Campo, California, within a few minutes of each other. The second storm was a veritable cloudburst. The observer succeeded in measuring the rainfall of the first shower and a portion of the second. Eleven and a half inches were measured within an hour. The rain gauge and support were carried away by the torrent of water in the second storm and the full record was not obtained.<sup>137</sup>

On 26 July 1896, an unusually destructive hailstorm passed over a strip of country about 60 miles in length, and from 5 to 10 miles in width, in the southeastern part of South Dakota, in the *United States*. The storm originated in the eastern part of Bon Homme County, traveled southeast through the counties of Yankton, Clay, and Union, across the Big Sioux River near Akron, and was last reported in the northwestern part of Plymouth County, Iowa. Another destructive hailstorm passed through Jerauld County, South Dakota, destroying every vestige of crops in its path, in a strip about 20 miles long and 4 miles wide. The damage in Jerauld County was estimated at \$25,000; the damage in Yankton County was estimated at \$100,000; no reports have been received as regards the damage in Clay and Union counties. [In present currency, that would be equivalent to \$650,000 damage at Jerauld County and \$2.6 million damage at Yankton County using CPI inflation.] The following is a description of the storm in Yankton County, by Henry Swinhoe, station agent, Weather Bureau, Yankton, South Dakota:<sup>118</sup>

I have the honor to report that a hailstorm of great severity occurred in this locality yesterday (July 26), doing an immense amount of damage, estimated in this county alone at \$100,000. The path of the storm included the best farming section of the county, from Lesterville on the west to Gayville on the east, and varying in width from 5 to 10 miles. This portion is practically laid waste, a few spots being less seriously damaged. The crops were beaten into the ground, the leaves and branches were stripped from the trees, and numbers of hogs and chickens were killed. Probably a small portion of the oats, which were in shock, may be saved; but the wheat, standing in the field, is completely destroyed where the hail occurred, and the thousands of acres of fine corn are now reduced to leafless stumps. The crops were the best that have been raised here for the last five or six years, and the loss to many of the farmers will be irreparable. Many specimens of hailstones and broken corn stalks were brought in by farmers this morning. Some of the stones measured 1 ½ inches in diameter sixteen hours after they had fallen; they were of very rugged appearance. Farmers from the worst part of the storm report a sea of ice and mud many miles in extent, the hail in the ravines being 2 feet in depth. The "storm appeared to travel from east to west several miles north of Yankton during the forenoon of Sunday, the atmosphere being very sultry, and a light breeze from the southeast. The storm appeared to remain stationary in the northwest till between 2 and 3 p.m., when it commenced to approach, and at the same time divided into two parts, one going south into Nebraska, and the other going east, at about 4 miles north of Yankton. This station, lying between the two main parts of the storm, received 0.74 of an inch of rain, and a maximum wind velocity of 38 miles per hour. No hail fell here, and no damage was done. The temperature was highest (86.9° F) about one hour before the storm; during the storm the temperature fell to 64.5° F. The color of the clouds in the distance was an inky black, changing on a near approach to a dark green, while the roar of the hail sounded at this station like distant thunder. I am told that some of the hailstones weighed 1 pound, twenty hours after the storm. They were composed of a number of very hard lumps of ice about one-half inch in diameter each, held together by soft ice, forming a mass sometimes 3 inches in diameter. Large holes were made through shingle roofs, and the overhanging eaves of buildings were chipped off.

Severe storms struck Indiana in the *United States* from the evening of the 27 July 1896 to the morning of the 28<sup>th</sup>. Approximately 6 inches of rain fell in Elwood, Fowler, Newcastle, and Anderson. At Bluffton, one hailstone weighed one pound and seven ounces. At Montpelier, the hailstones were 17 inches in circumference.<sup>118</sup>

Abnormal heat prevailed over the eastern two-thirds of the *United States* during the last few days of July and the first twelve days of August 1896. This heat wave caused a high number of deaths due to sunstroke. The number of deaths attributed to sunstroke during August is provided below:

Boston, Massachusetts	66
New York, New York	726
Brooklyn, New York	319
Philadelphia, Pennsylvania	218
Baltimore, Maryland	98
Washington, D.C.	36
Worcester, Massachusetts	4
Rochester, New York	2
Buffalo, New York	2
Pittsburg, Pennsylvania	5
Cincinnati, Ohio	13
Columbus, Ohio	2
Chicago, Illinois	178
Muskegon, Michigan	1
Davenport, Iowa	2
Keokuk, Iowa	1
St. Paul, Minnesota	1
St. Louis, Missouri	132
Chattanooga, Tennessee	1
New Orleans, Louisiana	9
Phoenix, Arizona	1
Additional Newspaper Accounts	207
Additional Special Reports	14
<b>Total</b>	<b>2,038</b>

This large number of fatal cases was collected as follows: 1,817 deaths reported by health officials of the cities named; 207 from newspaper notices that were not included in the foregoing; 14 from special reports. Large as this number is it must fall far short of the actual number of victims because many cities were absent from the tabulation. Many cases of sunstroke do not end in death. Only approximately 16.6% did from the analysis of data. If this mortality rate is assumed as an index of the general mortality rate from sunstroke, obtaining, in general, during this epidemic, then the 2,038 fatalities would represent the occurrence of 12,277 cases of sunstroke of varying degrees of severity, and even this may be far below the truth.<sup>118</sup>

On 6-7 August 1896, Richmond, Indiana in the *United States* was visited by a storm of lightning, thunder, and rain. The rainfall was excessive, amounting almost to a cloudburst. The damage resulting was estimated at between \$75,000 and \$100,000 [\$1.9 million and \$2.6 million in today's dollars].<sup>118</sup>

On 10 August 1896 due to the high temperature in Chicago, Illinois in the *United States*, there were 51 deaths.<sup>97</sup>

On 11 August 1896, the temperature reached 97° F (36.1° C) in New York in the *United States*. As a result there were many deaths.<sup>97</sup>

On 18 August 1896, a small whirlwind struck a big wooden freight shed, which was being constructed by the railroad company in Boston, Massachusetts in the *United States* and caused it to collapse, burying 35 men among the timbers. One man was killed and nine badly injured.<sup>118</sup>

On 10 September 1896, there was a tornado in Paris, *France*.<sup>94</sup>

On 25 September 1896, there were destructive gales over the southwestern region of the *United Kingdom*,



with loss of life. Again another gale struck on 6-7 October 1896.<sup>94</sup>

On 28-29 September 1896, a hurricane struck Florida, Georgia and South Carolina in the *United States*. [Various accounts give differing fatality figures of >130, 114, >100, and 100.]<sup>141</sup>

On 29 September 1896, there was a disastrous storm in the eastern *United States*, with much loss of life. The bridge at Columbia was destroyed. The town of Cedar Keys was destroyed.<sup>94</sup>

On 29-30 September 1896, one of the severest West India hurricanes ever experienced in the *United States* struck the Florida coast at Cedar Keys about 3.30 a.m., September 29. It passed thence to Lake Ontario and the St. Lawrence Valley in twenty-four hours at a rather uniform rate of about 46 miles per hour. As is usual in storms of this class the path of relatively great destruction was quite narrow, not extending over 50 miles at any part of its course. The loss of life and property from this storm is summarized below:<sup>118</sup>

<u>State</u>	<u>Loss of Life</u>	<u>Loss of Property in 1896 Currency</u>
Florida	68	\$ 2,225,000
Georgia	25	\$ 983,000
South Carolina	5	\$ 25,000
North Carolina	0	\$ 20,000
Virginia	5	\$ 695,000
Washington D.C.	1	\$ 443,000
Maryland	8	\$ 500,000
Pennsylvania	2	\$ 2,140,000
New York	0	\$ 50,000
<b>Total</b>	<b>114</b>	<b>\$ 7,031,000</b>

[In present currency, that would be equivalent to \$182 million in damages based on the Consumer Price Index (CPI) inflation rates.]

The storm pursued a northeasterly direction through Florida and Georgia. When near Savannah it seemed to curve slightly to the northward, passing thence almost due north to the St. Lawrence Valley.

The force of the wind varied greatly within quite narrow limits; places 50 to 100 miles on either side of the central path were not exposed to winds of unusual severity. The greatest violence was manifested in Florida during the early morning of the 29<sup>th</sup>. The second period of great violence began in Virginia about 9 p.m., and continued until a little after midnight when the storm had reached central Pennsylvania. There was then another lull in the violence of the storm, and a subsequent renewal of intensity during the early morning of the 30<sup>th</sup> at Syracuse, and other points in Cayuga and Cortland counties, New York.

The form and color of the clouds as observed in Washington D.C. during the early part of the storm greatly resembled ground fog driven by a high wind. They were very low, scarcely above the housetops, and of a pure white. With the shift of wind from southeast to south and southwest the form and color of the clouds changed, but the darkness soon became so intense that further observations could not be made. The display of atmospheric electricity was almost continuous, and in the form of broad diffused flashes, though not of marked brilliancy or intensity. The flashes were very similar to the well-known phenomenon of sheet lightning in summer. There was no thunder at Washington D.C. Thunder and lightning were not observed elsewhere in the storm's path except at a very few places.

During the evening of 29 September 1896, the severest storm or "wind-rush" ever experienced struck Washington D.C. Wind velocities at times reached 70 miles per hour. The most remarkable fact noted was that the destruction was in well-marked streaks and not universal. In hundreds of instances a well-constructed roof, rafters and all, was blown off, while close by very frail structures at the same height were uninjured. In some cases this effect was undoubtedly

heightened by the formation of eddies in the streets, and by the reinforcement of the wind blowing along streets running north and south, but making due allowance for all such cases, there was the clearest evidence that there was not a steady blow over the whole region, but that there were streaks or wind-rushes at various points and along certain well-defined lines. There was also evidence to show that the wind did not bear a definite relation to the baric gradient, for it died down quite rapidly after the maximum period had passed, while the gradient continued for a much longer time.

At the Abert building on Pennsylvania Avenue in Washington D.C., the west wall of the two top stories was blown out, and falling upon a low building it broke through the roof and killed one man. This building had been built very recently, and had not, up to that time, received the glass in either front (south) or back (north) windows, but these were covered with cotton cloth. The singular fact is that the cloth in the back windows was not disturbed. The east and west walls trended about 20° east of north and west of south, and the southeast wind struck them almost at right angles. It seems possible that the blow from the wind was so sudden that the west wall gave way and relieved the pressure before the cloth could be blown out of the back windows.

On K Street, N.W., between Thirty-First and Thirty-Second Streets in Washington D.C., two walls were forced out under peculiar conditions. Both walls were on the east side of buildings with a hip roof, the ridgepole running east and west. The windows were all closed so that the pressure on the inside must have been insignificant. Each wall gave way under its roof, which remained intact.

The steeple of the New York Avenue Presbyterian Church in Washington D.C. was blown down and appeared almost as if it had been picked up, turned upside down, and dashed down on its point. In the country about Washington there were two streaks of destruction that were well marked. One of them was about 2 miles beyond Cabin John Bridge on the Conduit road, and the other near the Tennallytown Pike. A careful search along Seventh Street and the Chevy Chase Road showed very slight action. On either side of Fourteenth Street, however, there was serious destruction to trees and roofs.

In Alexandria, Virginia the unroofing of houses and factories along the riverfront was quite serious. A church at the corner of Princess and Patrick Streets had its roof crushed in, but singularly enough, the tower, which was much taller than the church, was not injured in the least. Four lives were lost. In one case the west brick wall of a 3-story house was drawn out by the wind and crushed through the roof of a lower neighboring house, killing a man in the top story.

On 30 September 1896, a terrific windstorm swept over the central part of Bradford County Pennsylvania in the *United States*. The gale continued for about two hours and brought wreck and ruin on every side. People become frightened and arose from their beds to watch the fury of the great storm. Buildings were blown down, houses unroofed, chimneys blown away, trees uprooted, sheds and outbuildings demolished, fruit stripped from the trees, fences thrown down and some livestock killed. The force of the storm fell upon the towns along the Susquehanna River—Ulster, Sheshequin, the Towandas, Wysox, Asylum, Standing Stone, Terry, Wilmot and Wyalusing. Other localities that suffered severely were Monroe, Overton, LeRoy, Canton, Columbia, Burlington, Smithfield, Ridgebury, Orwell, Herrick, Pike and Tuscarora.<sup>178</sup>

On 6-8 October 1896, great floods, accompanied by a heavy gale, were reported in northern *Wales*. Railway traffic was suspended. Houses were flooded. There was much suffering at Llanelly. Damage estimates were over 100,000*l*.<sup>97</sup>

A West India hurricane moved slowly northeastward, but at some distance from the Atlantic coastline of the *United States* on 10-13 October 1896, causing very high tides and dangerous gales, especially on the New Jersey, Long Island, and the New England coasts. Much damage was done to bulkheads, wharves,

piers, and other property on the immediate shoreline. Beach property on the New Jersey and Long Island coasts suffered heavily. Probably half a million dollars was required to repair and replace the property damaged and destroyed [\$13 million in today's dollars].<sup>118</sup>

On 20 October 1896, there were destructive floods caused by heavy rains in *Italy* and *France*.<sup>97</sup>

On 4 November 1896, there were destructive floods, with loss of life, in Sao Miguel, *Azores*.<sup>97</sup> [São Miguel Island in the Portuguese Azores archipelago, is in the middle of the North Atlantic Ocean.]

On 26 November 1896, there was a destructive storm at Athens in southwest mainland *Greece*.<sup>94</sup>

On 4-5 December 1896, there were destructive gales on the eastern and southern *English Channel* coasts.

On 6-7 December 1896, the gales struck in Bordeaux and Dieppe in *France* and in the *Mediterranean Sea*.<sup>94</sup>

On 23 December 1896, there were great floods, with loss of life, in northern *Greece*. This flooding increased and villages were submerged by 31 December 1896.<sup>97</sup>

On 29 December 1896, it was reported that Nevertire, *Australia* was destroyed by a cyclone.<sup>97</sup>

*Also refer to the section 1890 A.D. – 1900 A.D. for information on the drought in South Africa during that timeframe.*

*Also refer to the section 1895 A.D. – 1903 A.D. for information on the drought in Australia during that timeframe.*

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**Winter of 1896 / 1897 A.D.** On 16-30 November 1896, a cold spell struck Montana and Northwest States in the *United States*. At Havre, Montana, on the 18<sup>th</sup>, the temperature dropped to -54° F. The next day, it was -51° F.<sup>118</sup>

A voluntary weather observer, Mr. A. B. Cox, reported from Kipp, Montana in the *United States*, how the Chinook came in 1896.<sup>118</sup>

Picture to yourself a wild waste of snow, wind beaten and blizzard furrowed until the vast expanse resembles a billowy white sea. The frigid air, blowing half a gale, is filled with needle-like snow and ice crystals [rare long prism diamond dust ice crystals] which sting the flesh like the bites of poisonous insects, and sift through the finest crevices. The sun, low down in the southern horizon, looks like a frozen globe, with halves, crescents, and bright prismatic bars encircling it.

Great herds of range cattle, which roam at will and thrive on the nutritious grasses indigenous to the northern Slope, wander aimlessly here and there, or more frequently drift with the wind in vain attempts to find food and shelter; moaning in distress from cold and hunger, their noses hung with bloody icicles, their legs galled and bleeding from breaking the hard snow crust as they travel—they appeal to the hardest heart for pity. It is sure death for human beings to be caught out in one of these awful blizzards, with the temperature down to -30° F or -50° F, unless rescue is speedy. Yet, such conditions frequently exist in this latitude, as they did for fifteen days in November 1896, when it seemed as if the elements had conspired to bring about another ice age, and annihilate every living thing.

Would the "chinook" never come? The wind veered and backed, now howling; as if in derision, and anon becoming calm, as if in contemplation of the desolation on the face of nature, while the poor dumb animals continued their ceaseless tramp, crying with pain and starvation. At last, on December 1, at about the hour of sunset, there was a change which experienced plainsmen interpreted as favorable to the coming of the warm southwest wind. At sunset the temperature was only -13° F, the air scarcely in motion, but occasionally seemed to descend from overhead. Over

the mountains in the southwest a great bank of black clouds hung, dark and awesome, whose wide expanse was unbroken by line or break; only at the upper edge, the curled and serrated cloud, blown into tatters by wind, was seen to be the advance courier of the long-prayed for "chinook." How eagerly we watched its approach! How we strained our hearing for the first welcome sigh of the gentle breath! But it was not until 11:35 p.m. that the first influence was felt. First, a puff of heat, summer-like in comparison with what had existed for two weeks, and we run to our instrument shelter to observe the temperature. Up goes the mercury, 34° F in seven minutes. Now the wind has come with a 25-mile velocity. Now the cattle stop traveling, and with muzzles turned toward the wind, low with satisfaction. Weary with two weeks standing on their feet they lie down in the snow, for they know that their salvation has come; that now their bodies will not freeze to the ground.

The wind increases in strength and warmth; it blows now in one steady roar; the temperature has risen to 38° F, the great expanse of snow 30 inches deep on a level is becoming damp and honeycombed by the hot wind, and we retire satisfied that the "chinook" is a genuine and lasting one.

Twelve hours afterward there are bare brown, hills everywhere; the plains are covered with floods of water. In a few days the wind will evaporate the moisture, and the roads will be dry and hard. Were it not for the "chinook" winds the northern Slope country would not be habitable, nor could domestic animals survive the winters.

The winter of 1896-97 in Bradford County, Pennsylvania in the *United States* was open and mild with little snow. There was a light snowfall on 12-13 November but not enough for sleighing. Thanksgiving was an ideal summer's day. It turned colder in the beginning of December and the snow on the 22-23<sup>rd</sup> permitted the first short period of sleighing. The 28<sup>th</sup> of December and the 1<sup>st</sup> of February were the coldest days of winter when the temperature fell below zero degrees Fahrenheit. The snowfall of 12-13 February permitted sleighing for a day or two. Bluebirds and robins appeared in early March. There was a thundershower on the 20<sup>th</sup> of March. Many farmers were plowing the fields during the end of March. On 19 April, it froze ice an inch [2.5 cm] thick. There was a heavy frost on the night of the 26<sup>th</sup> and an inch [2.5 cm] of snow in some places on the 27<sup>th</sup>. There was a heavy frost on the night of 21 May that caused some damage to early gardens and fruit. On 1 June, there was light snow in Western Bradford County.<sup>178</sup>

On 2 December 1896, a severe snowstorm covered Virginia, North and South Carolina, and Georgia in the *United States*. Rain on the night of the 1<sup>st</sup> turned to sleet, and later to snow. As a result the trees, telegraph and telephone poles throughout South Carolina and Georgia were so heavily coated with ice that they broke under the great weight. Telegraphic communication with the outside world was interrupted for more than 24 hours over a considerable portion of Georgia and South Carolina. Electric light and fire alarm systems were also completely disabled. In South Carolina on the morning of the 2<sup>nd</sup> at points within 50 miles of the coast; an ice storm covering everything with a coating of ice ½ to 1¼ inches thick. Snowfall measured 3 to 8 inches occurred over the central portion of South Carolina on the 2<sup>nd</sup>.<sup>118</sup>

During January 1897, Huron, South Dakota was struck by severe blizzards. January 1897 was remarkable because more precipitation occurred by far than during any other January since the local weather station was established in 1881, and also because one of the steadiest and most persistent periods of very low temperature that ever visited the station. The total depth of snowfall was 26.7 inches. Storms of more or less severity, commonly known as blizzards, occurred on the January 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 16-17<sup>th</sup>, and 23<sup>rd</sup>-24<sup>th</sup>. From the 23<sup>rd</sup> to 29<sup>th</sup>, inclusive, the daily mean temperature ranged from 4° to 22° F below zero, with steady high winds. During the 3<sup>rd</sup>, in the daytime, the air was at times so full of fine, dry snow that objects, such as buildings, 50 feet away, were distinguishable only by outline. In the late afternoon and at night the air was at times literally full of flour-like snow as dense as fog and it was dangerous for persons

to be out, especially in the more sparsely built up portion of the city, as the swirling snow was blinding and bewildering. There were several instances at night of persons losing their way for a time in the residence portion of town. During the night of the 3<sup>rd</sup> the air was highly charged with electricity and contact with stoves or other metal produced a spark and quite a shock. For a time the tips of three twigs were illuminated by bright sparks and in some instances trees (box alder variety) appeared as though illuminated by numerous tiny electric lights. This storm continued on the 4<sup>th</sup> without abatement until 3 p.m., when there were signs of its force breaking. The snow ended at 10.20 p.m. making a storm of forty-eight hours' duration. The snow drifted heavily and by the evening of the 4<sup>th</sup>, there were drifts in the principal streets from 4 to 16 feet deep. Local business was almost entirely suspended, railroad and other traffic abandoned and complete train movement impossible for several days after. In some cases business houses could not be entered until a passage way was cut through the snowdrifts. Over the residence district, barns, sheds and other outbuildings were more or less, and in some cases entirely, covered. The snow was so very fine and dry that it penetrated buildings through the slightest openings, more so than in any other storm in the history of the town. In the country there was some loss of livestock, principally sheep, by sheds caving in with the weight of the snow, and the snow drifting into the buildings and smothering the stock.<sup>137</sup>

The thickness of the ice in rivers and harbors in the *United States* at the end of January 1897 was as follows: Sioux City, Iowa 19.0 inches; Bangor, Maine 16.5 inches; Eastport, Maine 18.0 inches; Gardiner, Maine 14.6 inches; Lewiston, Maine 20.0 inches; Concord, Massachusetts 14.0 inches; Duluth, Minnesota 24.0 inches; Moorhead, Minnesota 28.0 inches; St. Paul, Minnesota 23.0 inches; Valentine, Nebraska 21.0 inches; Bismarck, North Dakota 33.0 inches; Pierre, South Dakota 20.0 inches; Yankton, South Dakota 20.0 inches; Brattleboro, Vermont 12.5 inches; Green Bay, Wisconsin 10.5 inches; and at La Crosse, Wisconsin 13.0 inches. At the close of the month the Mississippi and tributaries were frozen up as far south as Quincy on the Mississippi River, Louisville on the Ohio River, and Hermann on the Missouri River.<sup>137</sup>

In many portions of British Columbia, *Canada* in January 1897, there was no snow on the level ground at the end of the month and the amount of snow on the mountains was not as great as usual. In Alberta, Assiniboia, Saskatchewan, and Manitoba, the precipitation was a little above the average in some localities and a little below in others; in southern Alberta and southwestern Assiniboia the amount of snow on the ground at the end of the month was only from 1 to 3 inches, but elsewhere it was considerable, as Edmonton reports 16 inches; Prince Albert and Winnipeg, 18 inches; and Minnedosa, 30 inches. The snow on ground in Ontario and Quebec was generally not up to the average; special stations reported as follows: Owen Sound, 42 inches; Southampton, 48 inches; Father Point, 22 inches; Anticosti, 34 inches; Chatham, 17 inches; Yarmouth, 19 inches; Sydney, 18 inches; and Charlottetown, 9 inches.<sup>137</sup>

In January 1897, the thickness of ice in rivers and harbors of *Canada* was: In Assiniboia, Regina and Medicine Hat, 30 inches. In Ontario; Port Arthur, 30 inches; Parry Sound, 10 inches; Port Stanley, 8 inches; Kingston, 15 inches; Midland, Bobcaygeon, and Gravenhurst, 14 inches; Sarnia, 10 inches; Barrie, 10 inches; Owen Sound, 12 inches; Sparrow Lake, 13 inches; Wiarton, 8 inches. In the Maritime Provinces: St. Andrews, 20 inches; Shippigan [Shippagan], 22 inches; Port Hastings, 16 inches; Georgetown, 11 inches.<sup>137</sup>

In March 1897, the thickness of ice in rivers and harbors of *Canada* was: Alberta, Bow River, Calgary, 36 inches. Saskatchewan, Battleford, 24 inches. Assiniboia, Swift Current Creek, Swift Current, 28 inches. Ontario, Lake Superior, Thunder Bay, 16 inches; White River, White River station, 18 inches; Lake Ontario, Bay of Quinte, Kingston, 8 inches; Ottawa River, Rockcliffe, 18 inches; Georgian Bay, Midland, 16 inches. New Brunswick, Miramichi River, Chatham, 14 inches. Prince Edward Island, Hillsborough Bay, Charlottetown, 7 inches. Cape Breton, Sydney River, Sydney, 18 inches. New Brunswick, Passamaquoddy Bay, St. Andrews, 20 inches.<sup>137</sup>

The following were the lowest temperatures observed during January 1897 in the *United States*: <sup>137</sup>

Montgomery, Alabama	( 14° F, -10.0° C)
Mobile, Alabama	( 18° F, -7.8° C)
Tucson, Arizona	( 26° F, -3.3° C)
Yuma, Arizona	( 39° F, +3.9° C)
Little Rock, Arkansas	( 12° F, -11.1° C)
Fort Smith, Arkansas	( 7° F, -13.9° C)
San Francisco, California	( 40° F, +4.4° C)
San Diego, California	( 40° F, +4.4° C)
Fresno, California	( 30° F, -1.1° C)
Denver, Colorado	(-14° F, -25.6° C)
Pueblo, Colorado	(-16° F, -26.7° C)
New Haven, Connecticut	( 5° F, -15.0° C)
New London, Connecticut	( 5° F, -15.0° C)
Millsboro, Delaware	( 3° F, -16.1° C)
Washington, D.C.	( 8° F, -13.3° C)
Pensacola, Florida	( 17° F, -8.3° C)
Key West, Florida	( 51° F, +10.6° C)
Augusta, Georgia	( 12° F, -11.1° C)
Savannah, Georgia	( 17° F, -8.3° C)
Idaho Falls, Idaho	(-17° F, -27.2° C)
Boise Barracks, Idaho	( 5° F, -15.0° C)
Rexburg, Idaho	(-39° F, -39.4° C)
Chicago, Illinois	(-20° F, -28.9° C)
Cairo, Illinois	( 4° F, -15.6° C)
Indianapolis, Indiana	(-14° F, -25.6° C)
Lafayette, Indiana	(-22° F, -30.0° C)
Dubuque, Iowa	(-23° F, -30.6° C)
Keokuk, Iowa	(-16° F, -26.7° C)
Topeka, Kansas	( -4° F, -20.0° C)
Dodge City, Kansas	( -3° F, -19.4° C)
Louisville, Kentucky	( -4° F, -20.0° C)
Lexington, Kentucky	( -6° F, -21.1° C)
New Orleans, Louisiana	( 23° F, -5.0° C)
Shreveport, Louisiana	( 13° F, -10.6° C)
Eastport, Maine	(-14° F, -25.6° C)
Portland, Maine	( -8° F, -22.2° C)
Baltimore, Maryland	( 8° F, -13.3° C)
Boston, Massachusetts	( 2° F, -16.7° C)
Nantucket, Massachusetts	( 10° F, -12.2° C)
Marquette, Michigan	(-15° F, -26.1° C)
Detroit, Michigan	(-16° F, -26.7° C)
Duluth, Minnesota	(-29° F, -33.9° C)
Minneapolis, Minnesota	(-26° F, -32.2° C)
Saint Paul, Minnesota	(-26° F, -32.2° C)
Vicksburg, Mississippi	( 17° F, -8.3° C)
Saint Louis, Missouri	( -2° F, -18.9° C)
Havre, Montana	(-38° F, -38.9° C)
Poplar, Montana	(-46° F, -43.3° C)
Helena, Montana	(-24° F, -31.1° C)
North Platte, Nebraska	( -9° F, -22.8° C)
Omaha, Nebraska	(-13° F, -25.0° C)
Winnemucca, Nevada	( 10° F, -12.2° C)
Carson City, Nevada	( 10° F, -12.2° C)
West Milan, New Hampshire	(-24° F, -31.1° C)



New Brunswick, New Jersey	( 2° F, -16.7° C)
Cape May, New Jersey	( 10° F, -12.2° C)
Santa Fe, New Mexico	( -1° F, -18.3° C)
Albany, New York	( -4° F, -20.0° C)
New York City, New York	( 5° F, -15.0° C)
Charlotte, North Carolina	( 6° F, -14.4° C)
Kitty Hawk, North Carolina	( 16° F, -8.9° C)
Bismarck, North Dakota	(-30° F, -34.4° C)
Williston, North Dakota	(-32° F, -35.6° C)
Cincinnati, Ohio	(-10° F, -23.3° C)
Columbus, Ohio	(-10° F, -23.3° C)
Oklahoma City, Oklahoma	( 3° F, -16.1° C)
Fort Sill, Oklahoma	( 5° F, -15.0° C)
Roseburg, Oregon	( 31° F, -0.6° C)
Portland, Oregon	( 22° F, -5.6° C)
Erie, Pennsylvania	( -5° F, -20.6° C)
Philadelphia, Pennsylvania	( 7° F, -13.9° C)
Block Island, Rhode Island	( 9° F, -12.8° C)
Charleston, South Carolina	( 19° F, -7.2° C)
Columbia, South Carolina	( 10° F, -12.2° C)
Aberdeen, South Dakota	(-34° F, -36.7° C)
Nashville, Tennessee	( 3° F, -16.1° C)
Knoxville, Tennessee	( -3° F, -19.4° C)
San Antonio, Texas	( 18° F, -7.8° C)
Galveston, Texas	( 21° F, -6.1° C)
Salt Lake City, Utah	( 9° F, -12.8° C)
Burlington, Vermont	(-15° F, -26.1° C)
Lynchburg, Virginia	( 8° F, -13.3° C)
Norfolk, Virginia	( 11° F, -11.7° C)
Olympia, Washington	( 10° F, -12.2° C)
Spokane, Washington	( 3° F, -16.1° C)
Beckley, West Virginia	(-18° F, -27.8° C)
Milwaukee, Wisconsin	(-18° F, -27.8° C)
La Crosse, Wisconsin	(-23° F, -30.6° C)
Cheyenne, Wyoming	(-21° F, -29.4° C)

The following were the lowest temperatures observed during January 1897: <sup>137</sup>

Saint John, New Brunswick, <i>Canada</i>	(-13° F, -25.0° C)	
Ciudad Porfirio Diaz, <i>Mexico</i>	( 22° F, -5.6° C)	(now Piedras Negras, Coahuila)
Leon de Aldamas, <i>Mexico</i>	( 34° F, +1.1° C)	(now León, Guanajuato)
Topolobampo, <i>Mexico</i>	( 55° F, +12.8° C)	
Mexico City, <i>Mexico</i>	( 37° F, +2.8° C)	
Aguascalientes, <i>Mexico</i>	( 35.6° F, +2.0° C)	
Guadalajara, <i>Mexico</i>	( 34.2° F, +1.2° C)	
Jalapa, <i>Mexico</i>	( 41.5° F, +5.3° C)	
Lagos, <i>Mexico</i>	( 28.7° F, -1.8° C)	
Merida, <i>Mexico</i>	( 54.5° F, +12.5° C)	
Monterey, <i>Mexico</i>	( 23.9° F, -4.5° C)	
Morelia, <i>Mexico</i>	( 37.4° F, +3.0° C)	
Oaxaca, <i>Mexico</i>	( 39.4° F, +4.1° C)	
Pachuca, <i>Mexico</i>	( 34.9° F, +1.6° C)	
Puebla, <i>Mexico</i>	( 39.9° F, +4.4° C)	
Saltillo, <i>Mexico</i>	( 21.2° F, -6.0° C)	
San Luis Potosi, <i>Mexico</i>	( 37.4° F, +3.0° C)	
Silao, <i>Mexico</i>	( 44.8° F, +7.1° C)	

Toluca, <i>Mexico</i>	( 31.6° F, -0.2° C)
Zacatecas, <i>Mexico</i>	( 29.8° F, -1.2° C)
Zapotlan, <i>Mexico</i>	( 44.4° F, +6.9° C)

The following provides the dates of the opening of navigation in the *Canadian* ports for the previous 20 years prior to 1897:<sup>137</sup>

Lake Superior, Port Arthur	Earliest: March 18	Latest: May 22
St. Marys River, Sault Ste. Marie	Earliest: April 8	Latest: May 12
St. Claire River, Sarnia	Earliest: March 7	Latest: May 3
Lake Erie, Port Colborne	Earliest: April 15	Latest: May 9
Lake Ontario, Burlington Bay	Earliest: March 1	Latest: April 28
Lake Ontario, Toronto	Earliest: February 13	Latest: April 25
Lake Ontario, Kingston	Earliest: March 6	Latest: April 24
St. Lawrence River, Montreal	Earliest: March 30	Latest: May 5

A curious phenomenon was witnessed on 14 January 1897, at the Black Eagle Falls of the Missouri River in the *United States*. "For several hours the river ceased to flow, leaving the bed of the stream bare. Factories depending on waterpower were obliged to shut down. The cessation of the flow of water was due to anchor ice. When the temporary obstruction was overcome the water came down with a magnificent rush, leaping several feet over the edge of the dam." The occurrence of anchor ice was frequently observed in European, and especially in Scotch rivers and lakes, as also in the rivers of New England. The nature and method of formation of anchor ice, which was also called ground ice or "ground-gru," has not yet been thoroughly investigated, but various hypotheses have been advanced concerning its formation substantially agree in the idea that the phenomena was caused by water cooled slightly below its freezing point and prevented from freezing by the rapid current of the river; when the eddies and movements of the water cease, or become sluggish, as at the bottom surface or behind any obstacle, then it freezes, and in so doing attaches itself to the obstacle as a nucleus or base which was usually, of course, considerably below the surface of the stream.<sup>137</sup>

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#### 1896 A.D. – 1900 A.D. India. Famine

A very severe famine in *India* in 1896-98.<sup>94</sup>

In 1896 in Chhindwara, *India* and elsewhere, the monsoon ended abruptly at the end of October. The ground was too hard in many places for the spring crops to be sown. Showers in November aided germination and the harvest was about half of normal. The next two seasons were favorable in Chhindwara but in 1899-1900, the rains failed completely. The rainfall in August was 4 inches and in September it was 1 inch. All crops failed.<sup>180</sup>

Almost the whole of *India* suffered from lack of rains and poor harvests [in 1896-1897] except in the districts irrigated by canal (in the North-Western Provinces, the Meerut Division notably).<sup>185</sup>

The famine in Moradabad in Uttar Pradesh, *India* was caused by the early cessation of the rains in 1896. The rainfall during the months of June through October for 1896 was compared to the average for the previous 5 years (1891-95). At Sultanpur, rainfall for those 5 months was 21.08 inches compared to the normal average of 48.08 inches. At Musafirkhana, the rainfall was 20.00 inches compared to the normal average of 51.08 inches. At Amethi, the rainfall was 20.50 inches compared to a normal average of 45.47 inches. At Kadipur, the rainfall was 23.47 compared to a normal average of 60.11 inches. The rains stopped short in the last week in August 1896 and there was no rain till January 1897.<sup>185</sup>

In Sultanpur Division in the state of Uttar Pradesh in *India*, the area that was most affected by the famine was the villages skirting the river Gumti on both sides from the northwest to the southeast corners of the district. The famine was caused by the cessation of rains in the last week of August 1896 with no real

rain until January 1897.<sup>185</sup>

The Lucknow District in the state of Uttar Pradesh in *India* was in distress [famine] in [1896-97]. This was caused by the failure of the rains after the third week in August 1896. The rabi harvest of 1896 was poor and the kharif harvest of 1895 was not much better owing to the cessation of rains in the middle of September 1895. The rice crop was short in 1895 and practically failed in 1896.<sup>185</sup>

During the famine of 1896-97, the Allahabad District in the state of Uttar Pradesh in *India* suffered distress due to the failure of the rains and the harvest. For about the last 20 years, the poverty of the people increased the severity of the famine.<sup>185</sup>

In the Gorakhpur Division in the state of Uttar Pradesh in *India*, the cause of the distress was primarily the shortage of winter rice in 1895, owing to the early cessation of rain, and the partial failure of the spring rice and almost total failure of winter rice by a deficient and early closing of the rainy season in 1896.<sup>185</sup>

In Jahangirabad and Bara Banki [now Barabanki] in the state of Uttar Pradesh in *India*, the distress [in 1896-97] was due to the untimely failure of the rains and the scantiness of several harvests. It rained 1/4<sup>th</sup> in comparison to past years and even that short supply of rain arrived out of season.<sup>185</sup>

The Rae Bareli [now Raebareli] district in the state of Uttar Pradesh in *India* was one of the most distressed districts in Oudh [now Awadh] during the 1896-97 famine. The years 1893-94 and 1894-95 were unfortunate crop years owing to excessive rainfall. The year 1895-96, though not as bad, was still none of the most favorable. The insufficient monsoon rains of 1896-97 proved a deathblow to the agricultural prospects of the district.<sup>185</sup>

At Tajpur and Bijnor, *India*, the distress was caused partly by failure of the rains and partly to the abnormally high prices for food. The July and Christmas rains, on which the harvests in this district depend, failed.<sup>185</sup>

In the North-Western Provinces of *India*, 34.5 million out of a population of 47 million people were famine stricken. The remainder suffered from scarcity and the increase of food prices. The famine was caused by a failure of the rains in 1896 following a succession of unfavorable seasons and bad harvests. The famine of 1897 stands without a parallel in the famine records of *India*, both as regards to the magnitude and intensity.<sup>185</sup>

The famine [of 1896-97] in the Jaunpur district in the state of Uttar Pradesh in *India* was caused by deficient rainfall. For two years before the famine, the rainfall was unsatisfactory (the rains did not fall at the proper time), and this resulted in poor harvests.<sup>185</sup>

The whole of the Azamgarh district in the state of Uttar Pradesh in *India* was affected by the famine. The distress was most acute in tahails Azamgarh, Muhammadabad and Deogaon. The distress was due to the failure of the rains in 1896 and the consequent failure of the crops. It was also due to the abnormally high prices prevailing in the grain market, which rose to an extent, which was beyond the purchasing power of the poorer classes of the population. During the period from June 1896 to May 1897, the area received 17.74 inches of rainfall compared to a normal average of 43.45 inches.<sup>185</sup>

In 1896 the distress in Bundelkhand [now the states of Uttar Pradesh and Madhya Pradesh in central *India*] was due to the failure of the rains and harvests. In 1897, the distress was caused by the failure of the rains & harvest along with high prices for food.<sup>185</sup>

About 7% of the population of the Jhansi district in the state of Uttar Pradesh in *India* suffered from famine during the period 1895-97. This was caused by three successive bad years due to the failure of the rains and harvests.<sup>185</sup>

In the Jalaun district in the state of Uttar Pradesh in *India*, the distress was due to successive failure of crops and other natural calamities, such as hail, red rust, etc., from the year 1889, as well as abnormally high prices during the years 1896-97. The scanty rainfall of 1896 and the severe drought of 1897 brought matters to a crisis and severe famine resulted. The prices of food grains were high even than those experienced in past famines so far back as 1837. Since the past 9 or 10 years, the seasons had been unsatisfactory and as a result, individuals pawned or sold their jewels and then mortgaged their property in order to survive. This debt increased due to the severe failure of crops.<sup>185</sup>

In the Hamirpur district in the Himalayan state of Himachal Pradesh, *India*, the distress was caused by failure of the rains, the harvests, and the high prices of food grains. The rainfall was only about 25% of normal and so also was the harvests. Some food grains did not grow at all.<sup>185</sup>

The whole of the Agra Division in the state of Uttar Pradesh in *India* was affected by scarcity during 1896-97. The Agra, Etawah and Muttra districts were affected by distress [famine] whereas in the Etah, Mainpuri and Farukhabad districts, the distress was at no time acute. The distress was caused by the failure of the rains in 1897, following upon rather short rains in 1896. Bah and Khairagarh were affected by distress in 1897. The ability to quickly transport grains by rail, helped to stabilize food prices in *India* during this famine.<sup>185</sup>

In the Shahjahanpur district in the state of Uttar Pradesh in *India*, there was much suffering due to famine [in 1896-97].<sup>185</sup>

In the Fatehpur district in the state of Uttar Pradesh in *India* in 1897, the greatest distress [due to famine] was in the region contiguous to the Jumna River, running the whole length of the district from west to east. There had been a partial failure of rain for two years preceding the famine [of 1897].<sup>185</sup>

In the Pratapgarh district of Uttar Pradesh in *India*, the distress [famine] was caused by the total failure of the rains that resulted in a failure of the harvests.<sup>185</sup>

The root cause of over 99% of the famines in India is due to drought. In *India*, this translates to a failure of the monsoon. But the India famine of 1896-1900, [in which approximately 1.5 million people starved to death] was made extremely grave by the actions of the British Government through the demonetization of silver in 1893, whereby a factitious value was given to the rupee. The laboring millions in India, the *ryots*, who are the cultivators of the land, had long been in the habit of putting all their savings into silver bangles or other silver ornaments, and it was upon these small hoards that they depended to enable them to bridge a season of short crops and famines. The effects of the demonetization robbed them of their marketable value. Thereafter all the uncoined silver in *India* was deprived of a natural exchange rate. And when the famine struck, the *ryots* lacked the means to survive.<sup>179</sup>

A famine in *India* from September 1899 to January 1901.<sup>94</sup>

There was a great famine in *India* during the years 1896-97. The crops of 1894-95 in some are of the Central Provinces were far below the average yield, but the people quietly struggled on in the mute but earnest hope that the crop of 1896 would be good. The early rains, also, were too heavy in many localities, and failed utterly in others. The latter rains failed and the country was suddenly plunged into the rigors of a great famine. The poor people had been for two years in want, and had become inured to the hardships of hunger and privation. The officials at Bombay, Calcutta and other chief cities could not

legally recognize a condition of famine so long as the [tax] revenue continued to come in from the rural districts, and therefore no effort was made by the government at first to prevent the inevitable result – a great mortality for want of food.<sup>155</sup>

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**1897 A.D.** On 6-7 January 1897, a great cyclone struck *Australia*. Trees were leveled for 100 miles (160 kilometers) southwest of Darwin and for 50 miles (80 kilometers) south of Darwin. Many lives were lost at sea.<sup>101</sup>

On 7 January 1897, it was reported that Port Darwin in the Northern Territory of *Australia* was wrecked by a hurricane; many deaths.<sup>94</sup>

In [6-7] January 1897, a cyclone struck Darwin in the Northern Territory of *Australia*. Around Darwin, a total of 28 people died on land or drowned at sea. Damage was estimated at £150,000. [In today's currency, that would be the equivalent of £12,600,000 or \$20,500,000 U.S. dollars using the retail price index.] The towns of Palmerston and Chinatown were both flattened. Of the 200 Chinese private dwellings only a few remained intact. A vast area of forest around Palmerston was devastated. Many people were left homeless. Due to poor hygiene and wet clothes after this massive disaster, many people succumbed to fever. Darwin Harbor's pearling fleet was decimated with 19 vessels sunk or wrecked and stranded in the mangroves. South of Palmerston, record floods were reported while the McKinlay River rose 16 feet (5 meters). There was severe erosion along the railway, which disrupted travel for at least a month. Trees are leveled for 100 miles (160 kilometers) south of Darwin. The severe gusts blew away half of the prison roof at the Fannie Bay Gaol [Jail]. Aboriginals that arrived at the Charles Point lighthouse in the weeks following the disaster reported deforestation, similar to Palmerston, all the way to Point Blaze, 40 miles (65 kilometers) to the southwest, including the offshore islands. They arrived at Charles Point in distress, for the country, which normally provided all their natural food was now barren. The ship warning beacons, which were placed around the promontory had disappeared in the storm. The beach was strewn with dead fish, birds and an opossum. The cyclone's extraordinary force ripped the bark off trees and stripped the paint off the lighthouse window frames. Further northeast, near Cape Don, the schooner Florence encountered gale force winds and heavy seas. Sheltering in a small bay, the Florence dragged two anchors. The huge waves threatened to smash the vessel on a reef. As a result, the skipper slipped the cables and ran the schooner onto a sandy beach.<sup>99</sup>

On 9 January 1897, there were floods in *Spain* through the rising of the Guadalquivir River.<sup>97</sup>

In early February 1897, there were extensive floods through heavy rains and snow, in southern midlands and eastern counties [in *England*].<sup>97</sup>

On 20 March 1897, there were destructive floods, with loss of life, in the Mississippi valley in the *United States*.<sup>97</sup>

In March 1897, there were remarkable rains in the watershed of the lower Mississippi River and its tributaries, culminating in a region of 18 inches of rain in the Valley of the Tennessee and causing the most destructive floods in the Mississippi River in the *United States*. From March 15<sup>th</sup> to the end of the month, a considerable portion of Arkansas and Missouri bordering on the Mississippi River and extending from Cairo, Illinois to Helena, Arkansas was flooded. At Memphis, Tennessee the river was about 40 miles in width. On the 20<sup>th</sup>, the river height read 37.1 feet at Memphis which was the highest ever known. From the foot of Chickasaw bluff, upon which Memphis stands, to the high ground on Crowley's Ridge, in Arkansas, there was one sheet of water. The people inhabiting the overflowed district were forced to abandon their homes, in many cases leaving their belongings behind and gladly escaping with their lives. The work of rescue was carried on as rapidly as possible, and every available steamer was pressed into the service. It was estimated that 6,000 people and 1,200 head of stock were brought to Memphis alone,

and many were carried to other places. Great suffering prevailed in the sparsely settled sections, owing to the difficulty of finding and reaching the imprisoned people, many of whom were exposed to the rain and cold for a considerable time before being discovered. Fortunately the number of deaths resulting from the flood was believed to be small. The money loss cannot be estimated. The people occupying the inundated districts were largely colored, and their possessions were of small value; but the aggregate loss in that direction, while not large, falls heavily on them. The destruction of railroad property, the delay of trains and total abandonment of some lines, the suspension of business, damage to plantations, and the inability to plant the season's crop generated a great loss to this region. The steamboat interests also suffered from the flood, owing to the fact that but few landings could be made, and those mostly by small boats, and to the general stagnation in business which necessarily prevails throughout the entire valley. During the last ten days of the month the seat of danger was south of Memphis, in Tunica, Bolivar, and Washington counties in Mississippi, and thence southward to Vicksburg. Through three crevasses [breaks] in Bolivar County, there flowed an immense stream of muddy water threatening to cover the greater portion of the Yazoo Delta. From Memphis to Vicksburg, the Mississippi River and tributary rivers were extremely high, reaching the highest waters ever known since the Weather Bureau records began. The most disastrous overflow of record occurred the latter part of the month by crevasses [breaks] in the levees of the Yazoo Delta, causing loss of stock, crops, and other property, and the suspension of railroad traffic, but fortunately no loss of life. The amount and extent of the disaster was inestimable because the area inundated is considered the garden spot of Mississippi if not of the entire cotton region. Other crevasses [levy breaks] were reported on the Arkansas side, which caused a like disaster to the counties north of the White River. Travel by boat was the only means of reaching the river stations along the Mississippi River. The new canal was used for a short cut to Yazoo City from Vicksburg.<sup>137</sup>

The Mississippi River in the *United States* reached 52.3 feet (1.2 feet above the previous high water mark) at Vicksburg, Mississippi on the 16 April 1897 and 19.6 feet (1.7 feet above the previous high water mark) at New Orleans, Louisiana on 8, 9 & 11 May. Because of heavy rainfall during the month, the Mississippi River swelled to 8 miles wide at Quincy, Illinois and 8 miles wide at Burlington, Iowa. By April 24<sup>th</sup>, about 200 square miles of land was submerged near Hannibal, Missouri. In Missouri, the smaller towns of Alexandria, Canton, La Grange and Gregory [Gregory Landing] were completely inundated by the floods. On April 30<sup>th</sup>, a very narrow strip of land could again be seen opposite Memphis, Tennessee for the first time since March 9<sup>th</sup>, a period of 52 days.

During the 19<sup>th</sup> century, the greatest flood of the Mississippi River in the *United States* in the upper Mississippi basin occurred in 1844 while the greatest flood on the Mississippi River south of the mouth of the Ohio River occurred in 1897. The highest water levels recorded in the principal cities in the Mississippi basin are as follows:<sup>123</sup>

City/State	Flood Stage	Date
St. Paul, Minnesota	19.7 feet	29 April 1881
Omaha, Nebraska	23.8 feet	24 April 1881
Kansas City, Missouri	24.9 feet	21 May 1892
Kansas City, Missouri	37 feet	20 June 1844
St. Louis, Missouri	41.4 feet	27 June 1844
Cincinnati, Ohio	71.1 feet	14 February 1884
Cairo, Illinois	52.2 feet	27 February 1883
Memphis, Tennessee	37.1 feet	19-21 March 1897
Vicksburg, Mississippi	52.3 feet	16 April 1897
New Orleans, Louisiana	19.5 feet	13 May 1897

On 30 March 1897, a severe tornado struck Chandler, Oklahoma in the *United States*, killing 14 people and injuring another 40. Property damage was estimated at \$100,000. [In present currency, that would be equivalent to \$2.6 million in damages based on the Consumer Price Index (CPI) inflation rates.] The path of greatest destruction was nearly half a mile wide and at least 10 miles long. On the next day, a tornado



passed through Orlando, Star City and Grady, Arkansas killing 7 people. This tornado was between  $\frac{1}{4}$  and  $\frac{1}{2}$  mile wide.<sup>137</sup>

The *Evening News of Detroit* newspaper gave the following account of an event taking place on 16 April 1897 at Lee, Michigan in the *United States*: “Between 10 and 11 o'clock the other night a bright light was seen emerging from the river. On first sight it was thought to be a lantern, but further investigation proved it to be a ball of light about as large as a large hen's egg floating through the air, about 10 feet from the ground, with whizzing sound and zigzag motion. It soon disappeared.” The weather service described this phenomena as Ignis Fatuus or Jack-O'-Lantern which are flickering flames and dancing balls of fire seen at nighttime in marshy places. The phenomenon appears to be rare in the United States, but common in some parts of Europe, probably owing largely to geological peculiarities as affecting the nature of surface soil. The light was undoubtedly caused essentially by the slow oxidation of gases containing some combination of phosphorus. Such gases, of course, result from the decomposition of animal and, more rarely, of vegetable matter.<sup>137</sup>

Heavy rains and winds struck eastern Texas in the United States on the 2 & 3 June 1897. This storm injured growing crops and wrecked possibly as many as 30 buildings, the greatest destruction at a single place occurring at Grand Prairie, within 13 miles of Dallas, Texas. Newspaper reports place the damage to crops at a quarter of a million dollars. [In present currency, that would be equivalent to \$6.5 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>137</sup>

On 15-16 June 1897, there was a destructive gale in *Irish Sea* and the west coast of *Great Britain*.<sup>94</sup>

On 24 June 1897, there was a very destructive hailstorm and cyclone in central Essex, *England*. Farmers were ruined and 70 square miles [181 square kilometers] devastated.<sup>94</sup>

On 24 June 1897, hailstorms struck Topeka and Pueblo, Kansas in the *United States* with extraordinary violence. The size of the hailstones was carefully determined at both places. At Topeka, they were described as “While the big hail was falling the observer placed a bucket over his head, and with another bucket ran out and scooped up a dozen balls. With a knife frequently steeped in hot water, these were cut in two and measured, giving the following diameters: One 4.75 inches, one 6.0, one 5.25, one 4.0, one 3.0, one 3.5, one 5.0, one 4.0, one 3.0, one 3.5, one 3.5, one 3.0, one 3.0, giving a mean for the whole lot of 4 inches.” In Topeka, 26 people were more or less severely injured by the hail. Much damage was done to roofs, skylights were broken to pieces, and the upper floors damaged by rain. The hailstones that fell in Pueblo were not quite so large as those that fell in Topeka, the largest measuring from 2 to 2.75 inches in diameter and weighing from 4 to 8 ounces.<sup>137</sup>

On 6 July 1897, the temperature at Northfield, Massachusetts in the *United States* reached 139° F in sun on sand, and 106° in shade. On 9 July the temperature peaked at 101° F. The unbroken heat wave in which temperatures equaled or exceeded 90° F ended July 12, having lasted twelve consecutive days, being the severest on record. The thermometer recorded 90° F or more from July 1 to July 25, inclusive, with two separate exceptions, being unequaled in twenty-one years of observation. On 16 October, at Central Vermont Railroad station [in Northfield, Massachusetts], the maximum temperature reached 92° F, being the highest on record there in October.<sup>138</sup>

In 1897, California in the *United States* suffered from a great drought caused by a lack of winter rains. In Ventura, a man shot all his range horses rather than see them die of starvation. Another rancher with a flock of 7,000 sheep killed 2,000 young lambs in order to save the lives of the ewes. Horses were taken to soap works and sold for \$2.50 each (The hides were worth \$1.50, the tails 50¢, and the balance was used in soap and land dressing). In Little Bear Valley, 1,500 sheep were abandoned by their owner, because he had no feed. Many farm workers sat idle and many grocery store clerks stood by empty

shelves, because there was no produce. Many farmers, ranchers and others became broke. Many had their land, ranches and homes foreclosed on.<sup>200</sup>

On 30 July-1 August 1897, there were destructive floods in *Silesia* in Central Europe and Saxony, *Germany*. The floods caused a great loss of life.<sup>97</sup> [*Silesia* is a historical region of Central Europe located mostly in *Poland*, with smaller parts also in the *Czech Republic*, and *Germany*. Saxony is now in northwest *Germany*.]

In 1897, a powerful cyclone struck Chittagong, *Bangladesh* causing 175,000 deaths.<sup>98</sup>

On 8 September 1897, a hurricane struck north central *Atlantic Ocean* causing 45 deaths.<sup>141</sup>

On 12 September 1897, there was a hurricane and great [tidal] wave at Port Arthur and Sabine Pass in Texas in the *United States*. Thirty-eight deaths were reported.<sup>97</sup>

On 21 September 1897, a cyclone struck near Brindisi, *Italy*. There was much damage and 45 deaths.<sup>94</sup>

On 25-27 September 1897, a hurricane struck *Cuba*. Some people died.<sup>141</sup>

On 29 October 1897, cumulus clouds formed over a forest fire at Arequipa in southern *Peru* (altitude 8,050 feet above sea level). At about 3:45 p.m. on that day there was observed behind the western flank of Mount Chachani (20,000 feet above sea level), and about 15 miles or so away, a column of smoke rising from a considerable fire of brushwood behind the mountain. The altitude above sea level of the fire was about 14,000 feet, judging by its relation to the height of the mountain. As the writer was looking at the smoke, which was rising to a considerable height, he noticed the formation of a small cumulus cloud directly over the smoke column, and approximately at a height of 17,000 or 18,000 feet above sea level, or 3,000 to 4,000 feet above the fire. The sky at this time was clear, except a trace of cirrus in the west and southwest. The wind at Arequipa was west about 15 miles an hour. The cloud was only a fragment, and disappeared very soon, drifting to the southeast. It was succeeded by another small cumulus, which again disappeared within five minutes. The smoke column was ascending apparently near vertically, but its top was blown somewhat toward the southeast. Successive cloudlets, rather fracto-cumulus than true cumulus, formed over the smoke, none of them lasting more than three minutes, and most of them only one minute. Eight distinct cloudlets were seen thus to form and dissolve within the space of half an hour, at the end of which time the smoke had disappeared.<sup>138</sup>

On 28-30 November 1897, there was a destructive gale over the *British Isles*, *Norway*, and *Denmark*. The gale caused many [ship] wrecks, with loss of life. Damage was done at London, Woolwich, Margate, Sheerness, Whitstable, and other places. Another gale struck on 3 December 1897.<sup>94</sup> [Woolwich is in south London. Margate is in eastern Kent in southeast *England*. Sheerness is in the northwest corner of the Isle of Sheppey in Kent, southeastern *England*. Whitstable is in Kent in southeastern *England*.]

On 28-30 November 1897, there were destructive floods and tidal waves on the *Kentish Coast*. Damage estimated of the loss were 30,000l.<sup>97</sup>

On 29 December 1897, there were severe gales in the *English Channel*, and elsewhere. Another gale struck on the west and northwest coasts on 1-2 February 1898.<sup>94</sup>

An analysis of thunderstorms in 1897 came to the following conclusions. In the northern hemisphere, August leads in the sheer number of thunderstorms followed closely by June and July. Thunderstorms are of great frequency in equatorial regions, but are not so frequent in northern latitudes. In *Java* the average number of thunderstorms for a year was 97; in *France*, 29; in *Finland*, 2; in *Iceland*, 1. In the rainless

area of *Peru* no thunder is ever heard, while at Pueblo, *Mexico*, in summer there is a thunderstorm every afternoon from 2 to 3 o'clock. Thunder can be heard about 10 miles; lightning can be seen about 200 miles. Thunder and lightning have always been objects of fear, and a recent investigator found "that of 298 classes of objects of fear to which 1,707 persons confessed, thunder and lightning lead all the rest." Lightning is a powerful destructive agent. Dr. Robert Bell, of the Geological Survey, considers lightning the commonest cause of forest fires, and supposes that such fires took place even in Pleistocene times. In our own time the destruction of life and property by this means is larger, perhaps, than is generally supposed. From 1880 to 1890 in the *United States* there were killed annually in this way 200 persons. In the eight years ending 1892 the fire losses [in the *United States*] due to lightning amounted to \$12,663,835. [In present currency, that would be equivalent to approximately \$327 million in damages based on the Consumer Price Index (CPI) inflation rates.] These figures were quoted from the "Chronicle Fire Tables," and considered reliable.<sup>138</sup>

*Also refer to the section 1890 A.D. – 1900 A.D. for information on the drought in South Africa during that timeframe.*

*Also refer to the section 1895 A.D. – 1903 A.D. for information on the drought in Australia during that timeframe.*

*Also refer to the section 1896 A.D. – 1900 A.D. for information on the famine in India during that timeframe.*

**Winter of 1897 / 1898 A.D.** The following were the minimum temperatures observed during January 1898 in the *United States*:<sup>138</sup>

Montgomery, Alabama	( 18° F, -7.8° C)
Mobile, Alabama	( 20° F, -6.7° C)
Tucson, Arizona	( 17° F, -8.3° C)
Yuma, Arizona	( 26° F, -3.3° C)
Little Rock, Arkansas	( 19° F, -7.2° C)
Fort Smith, Arkansas	( 21° F, -6.1° C)
San Francisco, California	( 36° F, +2.2° C)
San Diego, California	( 36° F, +2.2° C)
Fresno, California	( 24° F, -4.4° C)
Denver, Colorado	( -3° F, -19.4° C)
Pueblo, Colorado	(-11° F, -23.9° C)
New Haven, Connecticut	( 0° F, -17.8° C)
New London, Connecticut	( 2° F, -16.7° C)
Millsboro, Delaware	( 15° F, -9.4° C)
Washington, D.C.	( 17° F, -8.3° C)
Pensacola, Florida	( 20° F, -6.7° C)
Key West, Florida	( 46° F, +7.8° C)
Augusta, Georgia	( 18° F, -7.8° C)
Savannah, Georgia	( 23° F, -5.0° C)
Rexburg, Idaho	(-40° F, -40.0° C)
Boise Barracks, Idaho	( -6° F, -21.1° C)
Chicago, Illinois	( 6° F, -14.4° C)
Cairo, Illinois	( 12° F, -11.1° C)
Indianapolis, Indiana	( 5° F, -15.0° C)
Lafayette, Indiana	( 6° F, -14.4° C)
Dubuque, Iowa	( 4° F, -15.6° C)
Keokuk, Iowa	( 4° F, -15.6° C)
Topeka, Kansas	( 10° F, -12.2° C)
Dodge City, Kansas	( 0° F, -17.8° C)
Louisville, Kentucky	( 15° F, -9.4° C)
Lexington, Kentucky	( 11° F, -11.7° C)
New Orleans, Louisiana	( 30° F, -1.1° C)
Shreveport, Louisiana	( 24° F, -4.4° C)
Eastport, Maine	( -9° F, -22.8° C)

Portland, Maine	( -6° F, -21.1° C)
Baltimore, Maryland	( 17° F, -8.3° C)
Boston, Massachusetts	( 1° F, -17.2° C)
Nantucket, Massachusetts	( 10° F, -12.2° C)
Marquette, Michigan	( 2° F, -16.7° C)
Detroit, Michigan	( 2° F, -16.7° C)
Minneapolis, Minnesota	( -5° F, -20.6° C)
Saint Paul, Minnesota	( -2° F, -18.9° C)
Vicksburg, Mississippi	( 24° F, -4.4° C)
Saint Louis, Missouri	( 10° F, -12.2° C)
Billings, Montana	( -1° F, -18.3° C)
Helena, Montana	( -1° F, -18.3° C)
North Platte, Nebraska	( -6° F, -21.1° C)
Omaha, Nebraska	( 8° F, -13.3° C)
Winnemucca, Nevada	(-16° F, -26.7° C)
Carson City, Nevada	( -5° F, -20.6° C)
West Milan, New Hampshire	(-37° F, -38.3° C)
New Brunswick, New Jersey	( 7° F, -13.9° C)
Cape May, New Jersey	( 15° F, -9.4° C)
Santa Fe, New Mexico	( -6° F, -21.1° C)
Albany, New York	(-12° F, -24.4° C)
New York City, New York	( 5° F, -15.0° C)
Charlotte, North Carolina	( 15° F, -9.4° C)
Kitty Hawk, North Carolina	( 20° F, -6.7° C)
Bismarck, North Dakota	(-10° F, -23.3° C)
Williston, North Dakota	( -4° F, -20.0° C)
Cincinnati, Ohio	( 11° F, -11.7° C)
Columbus, Ohio	( 0° F, -17.8° C)
Oklahoma City, Oklahoma	( 17° F, -8.3° C)
Fort Sill, Oklahoma	( 15° F, -9.4° C)
Roseburg, Oregon	( 22° F, -5.6° C)
Portland, Oregon	( 25° F, -3.9° C)
Erie, Pennsylvania	( 10° F, -12.2° C)
Philadelphia, Pennsylvania	( 12° F, -11.1° C)
Block Island, Rhode Island	( 6° F, -14.4° C)
Charleston, South Carolina	( 27° F, -2.8° C)
Columbia, South Carolina	( 17° F, -8.3° C)
Yankton, South Dakota	( -1° F, -18.3° C)
Nashville, Tennessee	( 17° F, -8.3° C)
Knoxville, Tennessee	( 19° F, -7.2° C)
San Antonio, Texas	( 27° F, -2.8° C)
Galveston, Texas	( 36° F, +2.2° C)
Salt Lake City, Utah	( -3° F, -19.4° C)
Burlington, Vermont	(-17° F, -27.2° C)
Lynchburg, Virginia	( 15° F, -9.4° C)
Norfolk, Virginia	( 20° F, -6.7° C)
Olympia, Washington	( 24° F, -4.4° C)
Spokane, Washington	( 2° F, -16.7° C)
Wheeling, West Virginia	( 9° F, -12.8° C)
Milwaukee, Wisconsin	( 2° F, -16.7° C)
La Crosse, Wisconsin	( -1° F, -18.3° C)
Cheyenne, Wyoming	( -9° F, -22.8° C)

The following were the minimum temperatures observed during January 1898: <sup>138</sup>

Saint John, New Brunswick, *Canada* (-17° F, -27.2° C)

Ciudad Porfirio Díaz, <i>Mexico</i>	(+26° F, -3.3° C) (now Piedras Negras, Coahuila)
Leon de Aldamas, <i>Mexico</i>	(+27° F, -2.8° C) (now León, Guanajuato)
Puebla, <i>Mexico</i>	(+26° F, -3.3° C)
Topolobampo, <i>Mexico</i>	(+50° F, +10.0° C)

The winter of 1897-98 in Bradford County, Pennsylvania in the *United States* was moderate. The first snowfall on 22 November was not sufficient for sleighing. On December 31, there was a heavy snowfall, which permitted excellent sleighing for most of January and February. The beginning of March was warm. There was a thundershower on the 19<sup>th</sup>, which was followed by a snowstorm. April came in cold but moderated towards the middle of the month when farmers, generally, sowed oats. May was wet with 17 rainy days.<sup>178</sup>

Severe cold weather prevailed in Florida in the *United States* on 2-4 January 1898. Following were the minimum temperatures which were reported from Jacksonville, Tampa, and Jupiter, respectively, viz January 2<sup>nd</sup>, 24° F, 28° F, 30° F; January 3<sup>rd</sup>, 26° F, 26° F, 30° F; January 4<sup>th</sup>, 38° F, 38° F, 34° F. These conditions were very destructive to early vegetables throughout this region, killing nearly all those of the more tender kinds. Considerable injury was done to citrus trees, many of the young trees and later shoots being destroyed. The pineapple interests also suffered some damage, although few, if any, plants were entirely killed. Severe cold weather again prevailed in Florida exactly one month later on 2-3 February 1898. Following were the minimum temperatures, which were reported from Jacksonville, and Tampa respectively, viz February 2<sup>nd</sup>, 26° F, 31° F; and February 3<sup>rd</sup>, 32° F, 38° F. Heavy frosts occurred on the morning of the 6<sup>th</sup> to 9<sup>th</sup> of April inclusive, in the South Atlantic and Gulf States, with light frost on the 8<sup>th</sup> as far south as Jacksonville, Florida. The district subjected to the greatest injury from frost was the trucking region of North Carolina.<sup>138</sup>

Injury from frost occurred in various portions of the citrus region of southern California in the *United States* during the winter of 1897/98. The following minimum temperatures were recorded:

<b>California City</b>	<b>December 1897</b>	<b>January 1898</b>
Anaheim	35° F	26° F
Colton	27° F	26° F
Crafton	24° F	28° F
Escondido	18° F	21° F
Fallbrook	30° F	29° F
Los Angeles	30° F	31° F
Ontario	28° F	29° F
Pomona	25° F	26° F
Redlands	27° F	27° F
Riverside	27° F	30° F
San Bernardino	27° F	24° F
San Diego	36° F	36° F
Santa Barbara	32° F	34° F
Santa Paula	20° F	24° F
Ventura	26° F	25° F

Generally newspapers indicated lower temperatures were recorded in January 1898, than in many years previous, and the amount of injury to citrus fruit during the January freeze was generally estimated at from 10 to 20 per cent. The value of the orange crop alone was estimated at from \$6,000,000 to \$7,000,000. Frosts, which in some instances were quite destructive, also occurred in the fruit regions of California on nearly every night from the March 12th to the 27th, inclusive. Almond and apricot crops were for the most part generally destroyed and considerable injury done to peaches and other fruits then in blossom. Many efforts at protection were made, but were not generally successful, owing to the extreme severity of the frosts. In some instances even grain was severely injured.<sup>138</sup>

Frosts and freezing weather occurred in the truck-growing regions near Galveston, Texas in the *United States* on January 2, 16, and 27 and on February 3, 6 and 21.<sup>138</sup>

On 12 January 1898, a tornado 300 feet wide passed directly through the business and residence portion of Fort Smith, the chief city of western Arkansas in the *United States*. Thirty-three persons were killed outright, 19 later died from injuries; 73 [total] were injured; property loss \$450,000. [In present currency, that would be equivalent to \$11.6 million in damages based on the Consumer Price Index (CPI) inflation rates.]<sup>138</sup>

As the clock was striking midnight and the Weather Office was about to be locked up, the barometer reading 28.846, actual, the wind south, not a drop of rain having fallen, the air feeling sultry and very damp, and while the book of mean pressures was being examined for comparative barometer readings, a gurgling noise was heard, like water rushing out of a bottle, followed immediately by a rumbling, such as that made by a number of heavy carriages rolling rapidly over a cobblestone pavement, and finally like a railroad train. These three noises appeared in this order of succession; each was distinctly different and clearly distinguishable from the other. This noise or roar was recognizable as the "tornado roar." About two seconds elapsed between the first roar and the rattling and quivering of the office window by the wind and the terrific driving rain which at once forced itself in between the frame and the sash, at the top, the bottom, and the sides, and flooded the office. The book of means was laid aside and the observer went to the landing in the large skylight on the roof of the observatory, whence he saw the tornado cloud 450 feet distant to the southward, a twisted black mass of two clouds, accompanied by lightning from the upper parts of the clouds. [The Weather Bureau Observer, standing within the skylight, on the roof of the Observatory, 54 feet above the ground and 450 feet north of the central portion of the track, could see on a level with his eye and higher up, objects flying out of the cloud toward the north and west.] The lightning was a continuous series of flashes of a pale yellow color; the noise of the thunder sounded like the muffled beating of a number of drums within the cloud. The clouds appeared like inverted siphons, each curved over downward from the right or left hand side of the cloud, respectively, to the center, where they came in contact with each other and twisted about one another downward to the ground, being narrowest about 40 feet from the ground and, probably, about 100 feet high.

The tornado cloud was seen emerging out of the National Cemetery and passing by the United States Post Office and the county courthouse. In its passage through the cemetery it uprooted forty trees, lifted the iron flagstaff, although embedded in solid granite, snapped to pieces the 1-inch wire cable guy of the staff, lifted bodily from its base 500 feet of 12-inch brick wall 4½ feet high, and demolished the keeper's residence. In its passage through vacant property to the principal business street it passed over the residence of Mrs. Mivelaz, the brick walls of which burst outward with a loud explosion, undoubtedly due to the low air-pressure at the center of the tornado; a similar fate befell a frame building. Farther on, and on the left-hand side of the tornado track, a two-story stone building was demolished and a three-story brick building was carried entire 25 feet away from its foundation. Some of the debris from the tornado was found the next day at Ozark, Arkansas, 30 or 35 miles distant.

In January 1898, the Kansas section director, wrote about an unusual weather phenomena that occurred in Saline County, Kansas in the *United States*. He described a fall of snowballs ranging "from the size of a baseball to a half-bushel measures". He reasoned that just as storms can produce a fall of hailstones, that they could likewise produce a fall of snowballs. He probably confused this phenomenon with "snow rollers". Freshly fallen snow is often rolled into balls and cylinders by a gentle wind, and this mysterious phenomenon is called "snow rollers". [Several years ago in Indiana, one morning I observed around 40 snow rollers in the flat farm fields. Many were cylinders 2-3 feet in diameter and 4-6 feet in length. These were rolled up like a jellyroll. First impressions were they must have been man-made. But on closer examination, there were no footprints in the snow. It's as if they were made by ghosts in the night. But a scientific explanation provided the answer. The wind was fairly strong the night before and that may account for their unusually large size].<sup>122</sup>



On 31 January 1898, there was a destructive blizzard in Boston, Massachusetts in the *United States*. The city was blocked. Two hundred horses were killed.<sup>97</sup>

A severe snow and windstorm passed over eastern New York and New England in the *United States* on 31 January and 1 February 1898. The storm was tremendously destructive near Boston, Massachusetts to property and to life. Not since March 12, 1888, some say January 17, 1867, has such a blizzard reached New England. The heavy snow blockaded the streetcars and greatly delayed steam railroad travel, and in a few instances trains were temporarily blockaded. There was a general wrecking of overhead wires, and hundreds of poles, iron and wood, were blown down or fell from greatly increased strain from the clinging snow and falling wires. Although the danger from crossed and live wires was very great, no person was killed, although about 30 horses were electrocuted in various parts of the city. The storm also served to close up the school system, close many of the large stores, and threaten a milk famine. On the New England Coast it brought death to more than a score of mariners, destruction to 10 vessels, and damage to as many more. The bodies of 7 sailors were recovered at Nahant, Massachusetts; 4 at Gloucester, Massachusetts; 3 at Rockport, Massachusetts; and 12 at Bakers Island, Massachusetts. Conservative estimates place the loss by the storm to electric and steam railroads, telegraph and telephone companies in the city of Boston and neighboring cities and towns, to corporations and individuals generally at about \$1,500,000. [In present currency, that would be equivalent to \$39 million in damages based on the Consumer Price Index (CPI) inflation rates.] The damage to shipping was estimated at from \$150,000 to \$200,000.<sup>138</sup>

Another article described this storm as follows: Heavy snow fell all night of January 31-February 1, and the wind attained the velocity of a gale of from 50 to 70 miles per hour from the northeast. On the morning of February 1, New England was completely snow-bound. The snow, which was damp and clinging, together with the wind, completely annihilated overhead wires of all sorts; transportation lines were almost completely blocked and traffic was not resumed with regularity for several days; thousands of suburban residents who earn their daily living in the city of Boston were unable to move from their homes. Other snowstorms continued to strike the New England area during February. The snow covering in Maine, New Hampshire and Vermont at the end of February was unusually heavy. Depths ranging from 40 to 70 inches were reported in Maine, 10 to 40 inches in New Hampshire and Vermont, and from 10 to 20 inches in Massachusetts. This great body of snow seriously interfered with lumbering operations throughout northeastern New England. The financial loss was placed at not less than \$1,000,000 [\$26 million in today's dollars].<sup>138</sup>

During 1898, a severe cold spell struck Northfield, Massachusetts in the *United States*. On 3 February, minimum temperature -28.5° F; February 3, at the toll bridge, lowest and coldest place in town, minimum temperature -35° F. On 31 January and 1 February, the total snowfall with gale was 2 feet. On 1 February, the depth of snow on ground was 3½ feet, being the greatest on record.<sup>138</sup>

In February [1898], a rare long prism diamond dust ice crystals storm occurred in Colorado in the *United States*. The American Indians refer to this phenomenon, a mist or fog of frozen vapor, as *pogonip*. The Indians were more afraid of it than they are of rattlesnakes, and called it the "white death".<sup>124</sup>

This phenomenon occurs most frequently in the northern part of Colorado, in Wyoming, and occasionally in Montana.

About two years ago a party of three women and two men were crossing North Park [basin] in a wagon in the month of February. The air was bitterly cold, but dry as a bone and motionless. The sun shone with almost startling brilliancy. As the five people drove along over the crisp snow they did not experience the least cold, but really felt most comfortable, and rather enjoyed the trip. Mountain peaks 50 miles away could be seen as distinctly as the pine trees by the roadside.

Suddenly one of the women put her hand up to her face and remarked that something had stung her. Then other members of the party did the same thing, although not a sign of an insect could be seen. All marveled greatly

at this. A moment later they noticed that the distant mountains were disappearing behind a cloud of mist. Mist in Colorado in January! Surely there must be some mistake. But there was no mistake, because within ten minutes a gentle wind began to blow, and the air became filled with fine particles of something that scintillated like diamond dust in the sunshine. Still the people drove on until they came to a cabin where a man signaled to them to stop. With his head tied up in a bundle of mufflers, he rushed out and handed the driver a piece of paper, on which was written: "Come into the house quick, or this storm will kill all of you. Don't talk outside here."

Of course no time was lost in getting under cover and putting the horses in the stables. But they were a little late, for in less than an hour the whole party was sick with violent coughs and fever. Before the next morning one of the women died with all the symptoms of pneumonia. The others were violently ill of it, but managed to pull through after long sickness.

"I saw you people driving along the road long before you got to my house, and I knew you did not know what you were driving through," said the man, as soon as the surviving members of the party were able to talk. "That stuff you saw in the air was small particles of ice, frozen so cold that it goes clear down into the lungs without melting. If one were to stay out a few hours without covering his head he would surely die. One winter about eight years earlier a whole Indian tribe across the Wyoming line died from its effects.

On 18-22 February 1898, a heavy snow and wind storm moved from Texas northeastward across the country to New England in the *United States*. This storm produced significant snowfalls in Iowa, Minnesota, Wisconsin, Michigan, northern Illinois, northern Indiana and Ohio. The total snowfall at Milwaukee exceeded 24 inches, and in many places accumulated to a depth of from 10 to 15 feet. All business was more or less interfered with, but the street railway lines suffered the greatest inconvenience. The mail trains were delayed from eight to twenty-four hours, especially from the south and west, and in one instance a train was literally buried by snow, which had drifted into a cut. Not since the memorable snowstorm of March 2-4, 1881, has there been a snowstorm of equal severity in this locality [Milwaukee, Wisconsin]. As this storm moved to the eastward, it produced rain, hail, and sleet. In several locations the storm deposited rain, which froze as it fell [freezing rain], forming a coating of ice several inches in thickness on all exposed objects. Much damage was done to trees and shrubbery of all kinds. In New England the storm was reported as being the most severe of its kind since 1837.<sup>138</sup>

On 21-22 February 1898, there was a destructive snowstorm in southwestern counties [of *England*].<sup>94</sup>

On 15 March 1898, a severe snowstorm struck Montana in the *United States*. The storm was exceptionally heavy in the northeastern part of the State; the snow was drifted to the depth of 6 to 8 feet in places in Lewistown. The cold wave and snowstorm which spread southward down the mountain valleys on the 20<sup>th</sup>-21<sup>st</sup> gave heavy snows in this section, which were badly drifted, and being followed on the 24<sup>th</sup> by another heavy snowfall with high winds, the cuts were blown full. The Great Northern Road could not get a train through over the Divide for several days, and stage lines were delayed everywhere.<sup>138</sup> Newspaper clippings indicate more snow in the mountains than ever before known at the end of March.

On 24-26 March 1898, there were severe gales with snow, over the *United Kingdom*, with loss of life.<sup>94</sup>

### 1898 A.D. – 1899 A.D. Russia. Famine

*Russia* suffered from a major famine in 1898-99.<sup>96</sup>

**1898 A.D.** On 4 February 1898, a cyclone struck Mackay, *Australia*, severely damaging the city.<sup>101</sup>

According to an extract from the *San Francisco Call*, the British bark *Fairfield*, of Glasgow, encountered on her trip between Shanghai and Tacoma a waterspout and hurricane that stripped her bare of canvas. The *Fairfield* passed within a quarter of a mile of this waterspout when about a week out from Shanghai, *China* viz, on February 10 [1898]. The sky became suddenly overcast and soon an electric storm was raging. The sky darkened and the wind came in puffs of hurricane violence. An attempt was made to turn the ship northward but it was too late to escape the storm. In a very few minutes an immense black

funnel cloud went swirling by, striking terror into every one aboard. There was an awful roar and the water seemed to be sucked from the ocean up to a height of 300 feet. Had the *Fairfield* been in the path of the waterspout she might have been destroyed in a twinkling. An hour after the waterspout passed the sun was shining and the ship was sailing through a peaceful sea as though nothing had happened. The vessel was in the most violent part of the storm for about forty minutes.<sup>138</sup>

On 16 February 1898, there were disastrous floods at Bungendore, in New South Wales, *Australia*. The whole town of Bungendore was submerged under water, with the water on some streets 5 feet (1.5 meters) deep. Two men were drowned and there was much property damage when Turalla Creek flooded.<sup>99</sup>

Numerous forest fires broke out in the South Atlantic States in the *United States* about the middle of February 1898. No rain had fallen for some time, and the forest and swamplands were very dry. The fires were fanned by the high southwest winds of the 15<sup>th</sup>, and spread with great rapidity, notwithstanding the efforts of the citizens to check them. Many buildings, fences, and bridges were burned and much lumber was destroyed, the losses aggregating upward of \$1,000,000. [In present currency, that would be equivalent to \$26 million in damages based on the Consumer Price Index (CPI) inflation rates.] The fires devastated portions of the counties of Moore, Richmond, Cumberland, Union, Bladen, Robeson, Pender, and Sampson in North Carolina; Marlboro, Sumter, Aiken, Berkeley, Darlington, Orangeburg, Colleton, Barnwell, Marion, Chesterfield, Richland, Lexington, Fairfield, Williamsburg, Georgetown, and Florence in South Carolina.<sup>138</sup>

Beginning 15 March 1898, a great flood rose in the Ohio River in the *United States*, coming largely from its northern tributaries. At Cincinnati, Ohio the rise was continuous to a maximum height of 61.4 feet, which was reached on the 29<sup>th</sup>. This was the highest stage in March since the record began in 1858. Great destruction was wrought by the flood on the streams of Indiana and Ohio, as well as along the Ohio River itself. The freshet from the upper Mississippi, joined to that from the Ohio, inaugurated a flood of considerable magnitude at Cairo, Illinois. The rise commenced on the March 13<sup>th</sup> and continued to rise until April 6<sup>th</sup>, when a stage of 49.8 feet had been attained. Corresponding steady rises followed at Memphis, Tennessee; Vicksburg, Mississippi; and New Orleans, Louisiana. On 3 April 1898, a levee broke at Shawneetown, Illinois, whereby the town was inundated, 30 persons were drowned, and considerable property destroyed.<sup>138</sup>

The Cincinnati Enquirer of 22 March 1898 reports that sulfur rain fell at Mount Vernon, Kentucky in the *United States*, early on the morning of March 21, and also at several other places in Rockcastle County; the stuff burned and gave out fumes of sulfur. According to the editor of the National Weather Service, "Those who are not seeking after mysteries may rest assured that such a rain of sulphur simply brings down to the ground some pollen from the pine woods, or some other light substance that has only a short time before been carried up by a strong gust of wind. It saddens one to think that any superstition should attach to such an ordinary phenomenon, one that occurs every day of the year at some place on the globe. Still more is it a pity that our daily press should repeat, and apparently indorse, any of the popular errors regarding these and other meteorological phenomena. It is quite as easy for a popular journal to present the best thoughts of the best people as it is to merely diffuse and strengthen the errors of the ignorant. The past century has witnessed the banishment from our text-books of innumerable erroneous ideas that were accepted by our ancestors. Why can not the daily press assist in the work of educating the public and resolutely refuse to print such nonsense as "the people generally consider this a sure harbinger of war," or such headings as "a red sun: bloody omen," or again, "great drought: belief that the world is drying up and that its end is drawing near"? If any one thing is more clearly taught than another by all our teachers, both religious and secular, it is that the future is not and can not be revealed by signs and omens."<sup>138</sup> [In my opinion, the same holds true today over a hundred years later when the press blindly generates unwarranted scare stories about man-made global warming. They continue to feed the flames.]

March 1898 was an unusually rainy month throughout the group of *Hawaiian Islands*. Kaumana (near Hilo), Hawaii, reports 55.58 inches; 10.18 inches fell at Luakaha, Oahu (5 miles from Honolulu); on the 24<sup>th</sup> unprecedented floods did much damage, especially in Oahu and Kauai; heaviest rain on north side of Oahu on the 27<sup>th</sup>. There was frequent thunder and lightning from the 12<sup>th</sup> to the 24<sup>th</sup>.<sup>138</sup>

On 29 March 1898, a cyclone struck Darwin in the Northern Territory of *Australia*. There were strong winds with heavy rain and severe flooding between Darwin and Daly River.<sup>99</sup>

During March 1898, a cyclone struck Cossack in Western Australia. This cyclone developed in the Bonaparte Gulf and moved down the west coast of *Australia*. It tore through Cossack, wreaking havoc both on shipping and causing over £30,000 damage to the town.<sup>99</sup> [In today's currency, that would be the equivalent of £2.5 million or \$4 million U.S. dollars using the retail price index.]

A very severe storm, known locally as a "willy-willy" visited the northwest coast of *Australia* at the end of March and beginning of April 1898. The first well-marked sign of its approach came from Port Darwin, in the Northern Territory of South Australia, on March 28th. The barometer at 9 a.m. read 29.40 inches, and fell to 29.34 inches during the course of the day, accompanied by heavy rain. This is the lowest reading recorded there since that town was devastated by a terrible cyclone about a year previously. The storm, keeping out to sea, travelled in a southwest direction at first, passing Wyndham on the 29th where the barometer fell to 29.33 inches, with heavy rain. It continued to move down the coast, passing Derby on the 30th (29.51 inches) and Broome a little later on the same day (29.60 inches). Its motion now appeared to lie retarded, due probably to the fact that it was recurving and preparing to travel in a more or less southeast direction. The winds now commenced to freshen, blowing from the East at Cossack and northeast farther up the coast, and this, combined with the shape of the isobars, indicated that the storm center was still lying out at sea. On the morning of the 2<sup>nd</sup> the wind was from the North at Condon, East at Cossack, and South at Onslow, blowing strong at each place, and the barometer at Cossack had fallen to 29.54 inches, with very high sea. The storm, apparently, was now moving from the sea straight on to Cossack, where the barometer fell rapidly, reaching a minimum of 28.718 inches at 5 p.m. Some idea of the hurricane that was then experienced by the inhabitants of this town may lie gathered from the following extracts from the newspaper *West Australian*.<sup>102</sup>

In Cossack, *Australia*, the town presents a very dilapidated spectacle. In no storm previously experienced has so much damage been wrought. Telegraph communication between Roebourne and Cossack, and eastwards, is entirely cut off. The line between the two former places is down for three or four miles. The tramway embankment across the marsh is washed away, and the rails have parted in places and been lodged 20 yards from the site of the embankment. All the approaches and bridges, both along the tramway line and on the road, have been completely washed away; the rails standing several feet from the ground. Communication is cut off by road.<sup>102</sup>

In Cossack, *Australia*, "Several daring persons walked up to Roebourne through mud and slush up to their knees to communicate the news of the most terrible disaster that has befallen Cossack, which appears to have been the very center of the hurricane. The experiences of some of the residents of Cossack are most heartrending. Mr. and Mrs. Wilson, observing their dwelling collapsing, left it with the intention of proceeding to Mr. C. W. Paterson's residence, a few hundreds yards off. They had a terrible time of it. They were for four hours hanging on to the spinifex [a type of grass], in the midst of the storm, before they reached their destination. Wilson lost sight of his wife for a whole hour, and then only found her by chance. S. Hemingway and B. Thompson, after their residences had collapsed, got into a 400-gallon tank to save their lives, and remained there, up to their middle in water, till daylight. The jetty has sunk down many feet, and the goods shed is frightfully torn about by the storm. The sea burst in the door facing the creek and swept a quantity of cargo out. Fearful damage has been done to shipping. The *S.S. Beagle* is

piled up on the rocks on the south side of the jetty, in front of the Weld Hotel, with her stern resting on the fallen walls of the jetty and her bows on the rocks. The schooner *Maggie Gollan* is a total wreck on the beach, towards Japtown. The dilapidated jetty was fully loaded with general merchandise for Condon. The cargo is now strewn along the strand from one end to the other. The schooner *Harriet* is high and dry on the beach close to the north side of the jetty. The *S.S. Croydon*, which was moored near the stock jetty, on the opposite side of the creek, was carried fair on to high land. The cutter *Rose* has been washed up between the residences of A. Rouse and A. S. Thompson. Smaller crafts, such as passenger boats, etc. were carried greater distances inland. The only boat that remained at her moorings was the police boat. Not a single boat other than this is safe.”<sup>102</sup>

Floods occurred in Arkansas in the *United States* during the first half of May 1898. During this flood the high water record at Fort Smith and Dardanelle, Arkansas, was broken. At Fort Smith, the highest of record, heretofore, was 30.9 feet, which occurred 19 May 1892, and at Dardanelle the highest of record was 27.9 feet, which occurred 18 May 1892. During the 1898 flood the water at Fort Smith and Dardanelle registered 35.4 and 29.3 feet, respectively.<sup>138</sup>

A series of tornadoes ripped across the *United States* on 18 May 1898. The storms killed 47 people and produced property losses of \$700,000, [approximately \$18 million in today's dollars] not including the loss of timber. [Fifteen were killed in Iowa with property damage estimated at \$150,000. Sixteen were killed in Illinois with property damage estimated at \$340,000. Sixteen were killed in Wisconsin with property damage estimated at \$210,000 and with over 100 injured.]<sup>138</sup>

About 18 May 1898, destructive tornadoes struck Iowa, Illinois and Minnesota in the *United States* with loss of life.<sup>94</sup>

On 6 June 1898, a very severe hailstorm struck between Rocky Ford and La Junta, Colorado in the *United States*. The storm path was 5 miles wide and 12 miles long. Trees were stripped of foliage, young hogs, turkeys, etc. were killed and much fruit was destroyed. The hailstones varied from about the size of peas to that of hen's eggs and were accompanied by severe wind. The hail was left in drifts 15 inches deep.<sup>138</sup>

On 24 June 1898, a very destructive hailstorm originated in Benson County, North Dakota in the *United States*. It moved eastward in a path from 1 to 8 miles in width, passing through the counties of Ramsey and Walsh, North Dakota, and Marshall, Minnesota. Crops in the pathway of the storm were very much damaged. According to newspaper reports, the area of grain destroyed was about 50,000 acres, and the loss from \$150,000 to \$200,000 [\$4 - \$5 million in today's dollars]. A few buildings were wrecked by the wind, and many head of livestock were killed by lightning. Two persons were killed by lightning 12 miles west of Minnewaukon [Minnewaukan, North Dakota].<sup>138</sup>

The year 1898 in Bradford County, Pennsylvania in the *United States* was notable for the numerous destructive electrical storms in July, August and September. Those of August 24 and September 4 were severe. On 6 September, a tornado swept over the central part of Springfield Township in Bradford County. The tornado killed two men, blew down buildings, killed livestock and destroyed crops.<sup>178</sup>

On 10-11 September 1898, a hurricane struck the *Caribbean island* of St. Vincent and Barbados in the *Lesser Antilles*. [Most accounts cite 383 fatalities but one account cites 283 deaths.]<sup>141</sup>

On 26 September 1898, a destructive tornado struck at St. Catharine's and Merriton, Niagara, in *Canada*. The tornado caused 5 deaths.<sup>94</sup>

On 2 October 1898, a hurricane struck Georgia, South Carolina and North Carolina in the *United States* causing between 150 and 180 deaths.<sup>141</sup>



On 15 October 1898, severe gale struck round *Great Britain*, many deaths.<sup>94</sup>

On 2-3 November, there was a gale in Great Britain, with loss of life.<sup>94</sup>

In early November 1898, there were destructive floods in Shan-Tung [Shandong in the northeast coast of *China*].<sup>97</sup>

In 1898 during the period between 15 October and 13 November, a drought engulfed Hopei (now Hebei province) in northern *China* at Ning-ching.<sup>153</sup>

On 27 November 1898, there was a violent gale off New England in the *United States*. Six vessels were wrecked causing 180 deaths.<sup>94</sup>

On 26-27, and 31 December 1898, there was a destructive southwest gale over the *United Kingdom*.<sup>94</sup>

*Also refer to the section 1895 A.D. – 1903 A.D. for information on the drought in Australia during that timeframe.*

*Also refer to the section 1896 A.D. – 1900 A.D. for information on the famine in India during that timeframe.*

*Also refer to the section 1898 A.D. – 1899 A.D. for information on the famine in Russia during that timeframe.*

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**Winter of 1898 / 1899 A.D.** On 23-25 November 1898, there were blizzards and floods in the Midland region of *England* and in the *English Channel*. Some deaths were reported.<sup>94</sup>

The winter of 1898-99 in Bradford County, Pennsylvania in the *United States* began with a beautiful fall. Many ripe red raspberries were picked during the beginning of October. The first killing frost occurred on 23 October. Snowfall during the first week of December permitted good sleighing on the highlands. January came in cold and blustery, the temperature being -3° F [-19° C] on January 1<sup>st</sup>, and -10° F [-23° C] on January 2<sup>nd</sup>. A storm of sleet struck on February 3<sup>rd</sup>, which covered the roads with a glare of ice and made travel dangerous. A snowstorm followed. The memorable cold wave reached this section on the night of 8 February and continued for five days. On 9 February, temperatures in the county ranged from -12° F to -20° F [-24° C to -29° C]; on the 10<sup>th</sup> from -20° F to -30° F [-29° C to -34° C]; on the 11<sup>th</sup> from -18° F to -34° F [-28° C to -37° C]. On the 12<sup>th</sup>, there was a heavy snowfall with the weather severe and biting. On the 13<sup>th</sup>, there was a strong wind that piled the roads full of snowdrifts, cutting off traffic and mail from every quarter. There was good sleighing until about the first of March when heavy rains set in. Bluebirds and robins appeared during the beginning of March, and by the middle of April farmers were busy plowing their fields and sowing oats. May was a month of delightful weather.<sup>178</sup>

A storm originated in the Rio Grande Valley in the *United States* and advanced from Texas to the St. Lawrence Valley from 5-7 January 1899. This storm caused heavy snowfalls in the upper Ohio Valley and the lower Lake region on the 6<sup>th</sup>, and heavy gales the night of the 6<sup>th</sup> over the lower Lakes and along the north Atlantic coast.<sup>123</sup>

In the *United States*, the Mississippi River froze its entire length down to the Gulf of Mexico. Some ice even flowed into the Gulf. In places like Cairo, Illinois the thickness of the ice was 13 inches (33 centimeters). The ice in New Orleans was two inches (5 centimeters) thick and one inch (2.5 centimeters) thick at the mouth of the Mississippi River. During four consecutive days the cold weather was so severe that the event was referred to as “The Great Cold Wave”. On February 10, a strong storm came down from *Canada*. Logan, Montana recorded a low temperatures of -61° F (-52° C). On February 11, at Quantico, Virginia recorded temperatures of -30° F (-34° C). Pittsburg, Pennsylvania saw a temperature of -20° F (-29° C). In Chicago, the ground froze to a depth of 5 feet (1.5 meters). The storm traveled up the East Coast depositing 2 feet (0.6 meters) of snow in Washington D.C. and 4 feet (1.2 meters) of snow



in Philadelphia, New York, and Boston and 10 feet (3 meters) of snow in the Chesapeake Bay area. On February 14, Tallahassee, Florida saw temperatures as cold as -2° F (-19° C). Other locations that saw rare low temperatures include Dallas, Texas at -10° F (-23° C), Kansas City, Missouri at -22° F (-30° C), and Scottsbluff, Nebraska at -45° F (-43° C).<sup>22, 23</sup>

In the *United States* in 1899, an area west of Galveston Harbor froze from the Barrier islands to the mainland. In the same cold snap, children were skating on the San Antonio River.<sup>33</sup>

On 9-13 February 1899, a blizzard struck New York and the *United States*. Forty deaths were reported.<sup>94</sup>

During the first half of February the most remarkable cold wave, or series of cold waves, in the history of the Weather Bureau traversed the *United States* from the north Pacific to the south Atlantic coasts, damaging crops and fruits in the Southern States to the extent of millions of dollars. During the first eight days of the month the lowest temperatures on record were reported at points in the north Pacific coast States; from the 9<sup>th</sup> to the 12<sup>th</sup> many places in the Central, Western, and Northwestern States reported the coldest weather on record. During the 13<sup>th</sup> and 14<sup>th</sup> the cold wave overspread the Southern and Eastern States, attended, on the 13<sup>th</sup>, by the lowest temperatures on record from the southern Rocky Mountain slope to the south Atlantic coast, by zero temperatures to the Gulf coast of Alabama, and by a snowstorm of unprecedented severity in the Middle Atlantic States.<sup>67, 123</sup>

The following are the lowest temperatures observed during February 1899 in the *United States*:<sup>123</sup>

Fort Logan, Montana	( -61° F, -51.7° C)
Leech Lake, Minnesota	( -59° F, -50.6° C)
Fort Keogh, Montana	( -55° F, -48.3° C)
Detroit City, Minnesota	( -53° F, -47.2° C)
Park Rapids, Minnesota	( -51° F, -46.1° C)
Lovell, Wyoming	( -51° F, -46.1° C)
St. Paul's Mission, Montana	( -51° F, -46.1° C)
Basin, Wyoming	( -51° F, -46.1° C)
Adel, Montana	( -50° F, -45.6° C)
Glasgow, Montana	( -50° F, -45.6° C)
Easton, Wisconsin	( -50° F, -45.6° C)
Pokegama Falls, Minnesota	( -50° F, -45.6° C)
Tower, Minnesota	( -49° F, -45.0° C)
Baldwin, Michigan	( -49° F, -45.0° C)
Humboldt, Michigan	( -49° F, -45.0° C)
Billings, Montana	( -49° F, -45.0° C)
Amherst, Wisconsin	( -48° F, -44.4° C)
Barron, Wisconsin	( -48° F, -44.4° C)
Knapp, Wisconsin	( -48° F, -44.4° C)
Steven's Point, Wisconsin	( -48° F, -44.4° C)
Fort Laramie, Wyoming	( -48° F, -44.4° C)
Bemidji, Minnesota	( -48° F, -44.4° C)
Sandy Lake Dam, Minnesota	( -48° F, -44.4° C)
McKinney, North Dakota	( -48° F, -44.4° C)
Ewen, Michigan	( -47° F, -43.9° C)
Fort Berthold, North Dakota	( -47° F, -43.9° C)
Roseau, Minnesota	( -47° F, -43.9° C)
Camp Clarke, Nebraska	( -47° F, -43.9° C)
Doland, South Dakota	( -47° F, -43.9° C)
Forestburg, South Dakota	( -46° F, -43.3° C)
Thomaston, Michigan	( -46° F, -43.3° C)
Cody, Wyoming	( -46° F, -43.3° C)
Hallock, Minnesota	( -46° F, -43.3° C)

Crow Agency, Montana	(-46° F, -43.3° C) (near Little Big Horn)
Kipp, Montana	(-46° F, -43.3° C)
Shelby, Montana	(-46° F, -43.3° C)
Minnewaukan, North Dakota	(-46° F, -43.3° C)
Woodbridge, North Dakota	(-46° F, -43.3° C)
Manhattan, Montana	(-45° F, -42.8° C)
Willow River, Minnesota	(-45° F, -42.8° C)
Gering, Nebraska	(-45° F, -42.8° C)
Milton, North Dakota	(-45° F, -42.8° C)
Portal, North Dakota	(-45° F, -42.8° C)
Newfolden, Minnesota	(-44° F, -42.2° C)
Harney, South Dakota	(-44° F, -42.2° C)
Big Timber, Montana	(-44° F, -42.2° C)
Mancelona, Michigan	(-43° F, -41.7° C)
Sidnaw, Michigan	(-43° F, -41.7° C)
Waverly, Michigan	(-43° F, -41.7° C)
Holdrege, Nebraska	(-43° F, -41.7° C)
Poplar, Montana	(-42° F, -41.1° C)
Lost River, Idaho	(-41° F, -40.6° C)
Grayling, Michigan	(-41° F, -40.6° C)
Lake City, Michigan	(-41° F, -40.6° C)
Hay Springs, Nebraska	(-41° F, -40.6° C)
Williston, North Dakota	(-41° F, -40.6° C)
Republican City, Nebraska	(-40° F, -40.0° C)
Lathrop, Michigan	(-40° F, -40.0° C)
Swan Valley, Idaho	(-40° F, -40.0° C)
Rock Rapids, Iowa	(-40° F, -40.0° C)
Sibley, Iowa	(-40° F, -40.0° C)
Spirit Lake, Iowa	(-39° F, -39.4° C)
Pierre, South Dakota	(-39° F, -39.4° C)
Lawrenceville, Pennsylvania	(-39° F, -39.4° C)
Scipio, Utah	(-39° F, -39.4° C)
Pagoda, Colorado	(-39° F, -39.4° C)
Walden, Colorado	(-39° F, -39.4° C)
Milligan, Ohio	(-39° F, -39.4° C)
Coalton, Ohio	(-38° F, -38.9° C)
McArthur, Ohio	(-38° F, -38.9° C)
Fort Collins, Colorado	(-38° F, -38.9° C)
Bismarck, North Dakota	(-37° F, -38.3° C)
Sault Sainte Marie, Michigan	(-37° F, -38.3° C)
Usk, Washington	(-36° F, -37.8° C)
Duluth, Wisconsin	(-36° F, -37.8° C)
Dayton, West Virginia	(-35° F, -37.2° C)
North Platte, Nebraska	(-35° F, -37.2° C)
Frankfort, Kansas	(-34° F, -36.7° C)
Saint Paul, Minnesota	(-33° F, -36.1° C)
La Crosse, Wisconsin	(-32° F, -35.6° C)
Birch Tree, Missouri	(-32° F, -35.6° C)
Zeitonia, Missouri	(-32° F, -35.6° C) (now called Gad's Hill)
Woodstock, Vermont	(-30° F, -34.4° C)
Erasmus, Tennessee	(-30° F, -34.4° C)
Yankton, South Dakota	(-30° F, -34.4° C)
Boca, California	(-30° F, -34.4° C)
Flagstaff, Maine	(-30° F, -34.4° C)
Greensboro, Pennsylvania	(-30° F, -34.4° C)
Helena, Montana	(-30° F, -34.4° C)

North Lake, New York	( -30° F, -34.4° C)
Idaho Falls, Idaho	( -29° F, -33.9° C)
Morrisonville, Illinois	( -29° F, -33.9° C)
Abilene, Kansas	( -29° F, -33.9° C)
Greensburg, Kentucky	( -29° F, -33.9° C)
Monterey, Virginia	( -29° F, -33.9° C)
Wells, Nevada	( -29° F, -33.9° C)
Berlin Mills, New Hampshire	( -29° F, -33.9° C)
Earlington, Kentucky	( -28° F, -33.3° C)
Cheyenne, Wyoming	( -28° F, -33.3° C)
Silver Lake, Oregon	( -27° F, -32.8° C)
Parkersburg, West Virginia	( -27° F, -32.8° C)
Columbus, Indiana	( -27° F, -32.8° C)
Salem, Indiana	( -27° F, -32.8° C)
Pueblo, Colorado	( -27° F, -32.8° C)
Dodge City, Kansas	( -26° F, -32.2° C)
Dubuque, Iowa	( -26° F, -32.2° C)
Sunnyside, Maryland	( -26° F, -32.2° C)
Omaha, Nebraska	( -26° F, -32.2° C)
Monero, New Mexico	( -26° F, -32.2° C)
Winnebago, Illinois	( -25° F, -31.7° C)
Northfield, Maine	( -25° F, -31.7° C)
Chase, Maryland	( -25° F, -31.7° C)
Topeka, Kansas	( -25° F, -31.7° C)
Morgantown, West Virginia	( -25° F, -31.7° C)
Corning, Arkansas	( -25° F, -31.7° C)
Winslow, Arkansas	( -25° F, -31.7° C)
Beaver, Oklahoma	( -25° F, -31.7° C)
Fort Defiance, Arizona	( -24° F, -31.1° C)
Marquette, Michigan	( -23° F, -30.6° C)
Lafayette, Indiana	( -22° F, -30.0° C)
Denver, Colorado	( -22° F, -30.0° C)
Milwaukee, Wisconsin	( -22° F, -30.0° C)
Chicago, Illinois	( -21° F, -29.4° C)
Keokuk, Iowa	( -21° F, -29.4° C)
Truckee, California	( -21° F, -29.4° C)
Lexington, Kentucky	( -20° F, -28.9° C)
North Bridgton, Maine	( -20° F, -28.9° C)
Columbus, Ohio	( -20° F, -28.9° C)
Indianapolis, Indiana	( -18° F, -27.8° C)
Deckertown, New Jersey	( -17° F, -27.2° C) (now Sussex)
Valleyhead, Alabama	( -17° F, -27.2° C)
Cincinnati, Ohio	( -17° F, -27.2° C)
Oklahoma City, Oklahoma	( -17° F, -27.2° C)
Norwalk, Connecticut	( -16° F, -26.7° C)
Minden, Louisiana	( -16° F, -26.7° C)
Mount Pleasant, North Carolina	( -16° F, -26.7° C)
Leeds, Massachusetts	( -16° F, -26.7° C)
Saint Louis, Missouri	( -16° F, -26.7° C)
Amarillo, Texas	( -16° F, -26.7° C)
Washington, D.C.	( -15° F, -26.1° C)
Evansville, Indiana	( -15° F, -26.1° C)
Fort Smith, Arkansas	( -15° F, -26.1° C)
Aberdeen, Mississippi	( -15° F, -26.1° C)
Binghamton, New York	( -15° F, -26.1° C)
Louisville, Kentucky	( -14° F, -25.6° C)

Cairo, Illinois	( -14° F, -25.6° C)
Fort Sill, Oklahoma	( -14° F, -25.6° C)
Nashville, Tennessee	( -13° F, -25.0° C)
Detroit, Michigan	( -13° F, -25.0° C)
Little Rock, Arkansas	( -12° F, -24.4° C)
Tallapoosa, Georgia	( -12° F, -24.4° C)
Winnemucca, Nevada	( -12° F, -24.4° C)
Spokane, Washington	( -12° F, -24.4° C)
Erie, Pennsylvania	( -12° F, -24.4° C)
Santuck, South Carolina	( -11° F, -23.9° C)
Knoxville, Tennessee	( -10° F, -23.3° C)
Millsboro, Delaware	( -10° F, -23.3° C)
Birmingham, Alabama	( -10° F, -23.3° C)
New London, Connecticut	( -10° F, -23.3° C)
New Brunswick, New Jersey	( -10° F, -23.3° C)
Salt Lake City, Utah	( -10° F, -23.3° C)
Burlington, Vermont	( -10° F, -23.3° C)
New Haven, Connecticut	( -9° F, -22.8° C)
Atlanta, Georgia	( -8° F, -22.2° C)
Lewiston, Idaho	( -8° F, -22.2° C)
Albany, New York	( -8° F, -22.2° C)
Fort Worth, Texas	( -8° F, -22.2° C)
Cape May, New Jersey	( -8° F, -22.2° C)
Baltimore, Maryland	( -7° F, -21.7° C)
Portland, Maine	( -6° F, -21.1° C)
New York City, New York	( -6° F, -21.1° C)
Philadelphia, Pennsylvania	( -6° F, -21.1° C)
Shreveport, Louisiana	( -5° F, -20.6° C)
Santa Fe, New Mexico	( -5° F, -20.6° C)
Montgomery, Alabama	( -5° F, -20.6° C)
Charlotte, North Carolina	( -5° F, -20.6° C)
Carson City, Nevada	( -4° F, -20.0° C)
Boston, Massachusetts	( -4° F, -20.0° C)
Lynchburg, Virginia	( -3° F, -19.4° C)
Columbia, South Carolina	( -2° F, -18.9° C)
Tallahassee, Florida	( -2° F, -18.9° C)
Vicksburg, Mississippi	( -1° F, -18.3° C)
Mobile, Alabama	( -1° F, -18.3° C)
Block Island, Rhode Island	( 0° F, -17.8° C)
Nantucket, Massachusetts	( 2° F, -16.7° C)
Augusta, Georgia	( 3° F, -16.1° C)
Norfolk, Virginia	( 3° F, -16.1° C)
San Antonio, Texas	( 4° F, -15.6° C)
Olympia, Washington	( 5° F, -15.0° C)
Kitty Hawk, North Carolina	( 6° F, -14.4° C)
Pensacola, Florida	( 7° F, -13.9° C)
Roseburg, Oregon	( 7° F, -13.9° C)
Charleston, South Carolina	( 7° F, -13.9° C)
New Orleans, Louisiana	( 7° F, -13.9° C)
Savannah, Georgia	( 8° F, -13.3° C)
Galveston, Texas	( 8° F, -13.3° C)
Portland, Oregon	( 9° F, -12.8° C)
Jacksonville, Florida	( 10° F, -12.2° C)
Tucson, Arizona	( 17° F, -8.3° C)
Yuma, Arizona	( 28° F, -2.2° C)
San Francisco, California	( 34° F, +1.1° C)

San Diego, California	( 34° F, +1.1° C)
Key West, Florida	( 44° F, +6.7° C)

During the winter of 1898-99 in the *United States*, the thickness in ice in rivers peaked during February 1899 at the following levels: <sup>123</sup>

Moorhead, Minnesota	42.0 inches
St. Paul, Minnesota	30.0 inches
La Crosse, Wisconsin	32.0 inches
Dubuque, Iowa	27.5 inches
Davenport, Iowa	21.5 inches
Keokuk, Iowa	26.0 inches
Hannibal, Missouri	16.0 inches
Williston, North Dakota	32.0 inches
Bismarck, North Dakota	34.0 inches
Pierre, South Dakota	25.0 inches
Yankton, South Dakota	26.0 inches
Sioux City, Iowa	24.0 inches
Omaha, Nebraska	22.0 inches
Topeka, Kansas	15.0 inches
Kansas City, Missouri	13.0 inches
Wichita, Kansas	12.0 inches
Pittsburg, Pennsylvania	1.4 inches
Parkersburg, West Virginia	5.0 inches
Columbus, Ohio	8.0 inches
Memphis, Tennessee	1.0 inch
Fort Smith, Arkansas	9.0 inches
Little Rock, Arkansas	5.0 inches
New Orleans, Louisiana	2.0 inches
Brattleboro, Vermont	18.5 inches
Concord, Massachusetts	22.0 inches
Albany, New York	11.0 inches
New Brunswick, New Jersey	13.0 inches
Harrisburg, Pennsylvania	12.0 inches
Lynchburg, Virginia	5.0 inches
Richmond, Virginia	6.0 inches
Columbia, South Carolina	2.0 inches

The following are accounts of the great storm that struck the United States during 9-14 February 1899: <sup>123</sup>

New Orleans, Louisiana, reported: “the early vegetable crop was entirely destroyed, the orange crop was a total loss, and trees were killed, the cane crop was considerably injured, and fruit, aside from oranges, was seriously injured. The freeze benefited the rice land. The evening of the 13<sup>th</sup> there was one inch of snow on the ground, and ice two inches in thickness had formed.”

Alabama reported: “The month was the coldest on record. Several persons were frozen to death; stock suffered very much; in some counties cows, hogs, and goats froze to death, and poultry froze on the roost; large numbers of game birds perished, and swift-running streams, never before known to freeze, were covered with ice; the ice on ponds in middle counties was thick enough for skating on the 13<sup>th</sup> and 14<sup>th</sup>, while at Montgomery sleighing was indulged in for three days.”

According to the Weather Bureau in Atlanta, Georgia, while the entire state suffered severely, the damage was greatest in the southern half, where peaches, as well as a number of young trees, were killed. A covering of snow generally protected the grains. Livestock suffered, and in some counties cows and goats were frozen to death.

Jacksonville, Florida, reported that “on the night of the 12<sup>th</sup>, heavy sleet and snow prostrated telegraph lines north and cut off communication with Washington D.C. The cold was so severe over the western and parts of the northern districts that cattle, horses, and sheep died from exposure. The lowest temperature reported was 4° F below zero over the western district. The temperature fell to 29° F in the southern part of Dade County. The vegetable crop over central, northern, and western portions of the State has been destroyed; oats, peaches, and pears damaged, and probably the greater portion of young citrus trees over the north-central counties has been seriously damaged.”

Little Rock, Arkansas reported: “The extreme cold which swept over the State, like a breath from the frozen pole, from the 8<sup>th</sup> to, and including, the 16<sup>th</sup>, broke all records both as to the minimum temperature and the protracted character of the cold spell. Only once "within the memory of the oldest inhabitant" was it equaled, and that was in "the winter of 1863, when the Union forces hauled their cannon across the *Arkansas River* on the ice," and only once since the establishment of the Weather Bureau in this city was the river frozen over for a greater length of time. The records show but two previous occasions when the river was frozen over. On February 3, 1886, it was frozen over from shore to shore; in February, 1895, it was again frozen from shore to shore from the 7<sup>th</sup> to the 17<sup>th</sup>, both dates included.”

New York City reported the following: “During Sunday night and Monday heavy snow fell without intermission. Up to midnight Sunday (12<sup>th</sup>), owing to light winds there had been but little confusion on account of snow, notwithstanding the ground was covered to an average depth of 14 inches. About 4 a.m. Monday (13<sup>th</sup>), a gale came on from the northeast, which continued with increasing force till 4:30 p.m., when it shifted to northwest and continued throughout the night with hurricane velocity. The snow was very dry, and drifted badly; street traffic, which before had not been interrupted, was maintained with great difficulty, and finally abandoned altogether, with the exception of two cable lines. At 8 p.m. (13<sup>th</sup>), the conditions were worse. The average depth of snow on the ground was 23 inches, and it drifted to a depth of 6 feet in many places. After 8 p.m. the snowfall became lighter, and ceased during the early morning of February 14, with a fall of 15.6 inches during the storm, and a total depth on the ground of 24 inches. Monday was very generally observed as a holiday, and all business was suspended. When Tuesday morning came, with clearing weather and a resumption of business, the scene in lower Broadway was one of indescribable confusion. All traffic was confined to the narrow space covered by car tracks, while snow was piled on either side to a depth of 8 feet.”

New Jersey reported: “The extreme cold was followed by one of the most severe snowstorms on record. Snow began to fall on the evening of the 11<sup>th</sup>, and continued until early in the morning of the 14<sup>th</sup>. During this period it fell to the depth of from 30 inches in the southern to 44 inches in the northern portions. All railroad travel was suspended by the 13<sup>th</sup>, and country roads were impassable for several days, the drifts being from 3 to 8 feet high in many places.

Chicago, Illinois reported: “On account of the absence of snow, the ground in the vicinity of Chicago was frozen in many places to the depth of five and one-half feet, causing great damage by the freezing up of the water and gas mains and service pipes. Plumbers have been unable to meet the demands for their services, and the exigency has brought forward the novel method of thawing out frozen pipes by the use of an electric current. Great suffering was caused by the severe cold among the poorer classes, and many people were frozen to death. Several steamboats which maintain winter service on Lake Michigan were blocked by the thick ice and unable to reach port for three or four days.”

Michigan reported: “The month was remarkable for excessive cold, it being the coldest on record. Lake Michigan was almost frozen over on the 15<sup>th</sup>. Much fruit was destroyed and considerable game, especially quail, partridge and ducks, perished on account of the extreme cold.”

Missouri reported: “As a result of the extremely low temperatures of the first half of the month peach buds were very nearly all killed and a large per cent of the trees badly frozen, many being



killed to the snow line. Pears, plums, and apricots also suffered severely, a large portion of the buds being killed and, in some instances, the wood badly damaged. The hardier varieties of cherries generally escaped, but sweet cherries were killed to a considerable extent. Apples were reported badly damaged in some localities but it is believed that, as a rule, they were not seriously injured. The hardy varieties of grapes are generally safe. In most of the east-central, southeastern and south-central counties winter wheat was well protected by snow during the severe cold weather and was not seriously injured, except in localities where some of the late sown was killed, but generally throughout the northern and western sections the ground was nearly or quite bare and much of the crop was greatly damaged. Clover was also badly killed in some sections, especially where closely pastured, but in many counties was reported in good condition at the close of the month.”

Pennsylvania reported: “On the 11<sup>th</sup> all previous records of low temperatures were broken in nearly all sections of the State, and during the latter part of the day a severe snowstorm, accompanied by high winds, set in, and by the morning of the 12<sup>th</sup> railroads and trolleys were so badly blocked that transportation of all kinds was almost suspended. The storm continued with unabated energy throughout the 12<sup>th</sup> and 13<sup>th</sup>, during which time traffic was at a standstill. The snow was piled up in high drifts and cities and towns were completely cut off from outside communication, except by wire, and the streets were almost impassable to pedestrians. There being no heavy lodgment of ice or snow on the telegraph lines, telegraph and telephone service was but little interrupted. Many employees were unable to reach their places of business in the cities, and in the coal regions, mines were shut down because the miners were snowbound in their homes.”

*Niagara Falls* experienced a major ice jam. According to the *Post Standard* of Syracuse, New York, the Niagara River was frozen over from Lewiston down to Youngstown for the first time in twenty-two years. An ice jam formed along the river on February 13 and the river was frozen solid on the 14<sup>th</sup> from the base of the *Niagara Falls* to *Lake Ontario*, except at the Rapids. Above *Niagara Falls* the ice was packed in high piles in the river. Much dynamite was exploded to drive the ice from the inlets leading to the different power plants. In the gorge at the foot of the *Niagara Falls* some of the ice hills were nearly fifty feet high and one was said to be over a hundred feet high. Such a large quantity of ice had not been seen in the Niagara River for many years.

This storm reached Cuba. Havana, Cuba reported much damage by storm along coast front. The water and waves were the highest known in twenty-five years, and a number of houses were washed away, and many others, including their furniture, damaged or ruined. No estimate of amount of damage can be made. Camps and corrals of United States troops along the oceanfront greatly damaged. No lives lost. The Havana newspaper *Times of Cuba* of 14 February 1899 reported: “Yesterday winds and waves created sad havoc in many a household on the beach. The huge waves toppled over three houses at the ends of Aguila and Laza streets as if they were eggshells. Several persons in the houses were badly injured. From 6 to 7 in the morning those who live on the beach noticed the increasing height and periods of the waves, and by 8:30 a. m. the water was dashing upon the houses skirting the edge of the shore. The waves mounted higher and higher as the wind became more savage, and for a few hours it seemed as if a small sized cyclone was at work. The day was unusually tempestuous at sea.”

The storm was felt even near the equator. Colon, Columbia (now Colón, Panama near the Atlantic entrance to the Panama Canal) reports “On the 13<sup>th</sup> a moderate storm of the northern type prevailed in the afternoon. The sea became high during the evening. The wind decreased somewhat during the night of the 13<sup>th</sup>, and gradually shifted to northeast during the morning of the 14<sup>th</sup>, backing to north in the evening. The sea continued high, and steamers left their wharves in the early morning and sought anchorage in the mouth of the harbor.”

Snow fell and ice formed in South Carolina in the *United States* in 5 April 1899. The snow was confined to the northern border counties.<sup>123</sup>

On 10 April 1899, a protracted cold spell prevailed over the South producing heavy killing frosts in Alabama, Mississippi, Georgia, and east Tennessee in the *United States*. Heavy frosts occurred as far south as Mobile, Alabama and light frosts were reported in Jacksonville, Florida. Many farmers took advantage of early warnings by covering their crops with protective blankets of hay or canvas to prevent serious injury.<sup>123</sup>

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**1899 A.D.** On 2-3 January 1899, there was a gale in the *English Channel* and *Irish Sea*, with loss of life.<sup>94</sup>

On 12-16 January 1899, violent gales struck over the *United Kingdom* and *European Continent*. Some deaths were reported.<sup>94</sup>

On 20-24 January 1899, there was a gale that caused floods in *Wales* and the Thames valley in *England*.<sup>94</sup>

On 11-13 February 1899, there was a destructive southwest gale and tidal wave in *Wales*.<sup>94</sup>

On 4-5 March 1899, a cyclone struck along the coast of Bathurst Bay, *Australia* in Queensland. The cyclone severely damaged the pearling fleet in Bathurst Bay. Fifty-five vessels were sunk and 300 people drowned. The storm surge caused the coastal waters to rise 49 feet (15 meters) above normal tidal levels in the bay.<sup>101</sup>

On 4 March 1899 a cyclone, *Mahina*, struck Bathurst Bay, near Princess Charlotte Bay (Cape York) in Queensland, *Australia*. The pearling fleet suffered great losses with 152 boats sunk or wrecked. Some of these boats were found kilometers inland. At least 307 crewmembers lost their lives. Over 100 aborigines also died in forest country or trying to help shipwrecked men when the back surge swept them far out into the sea where they drowned. Tons of fish and some dolphins were found 49 feet (15 meters) above sea level and up to several kilometers inland and rocks were embedded in trees. On Flinders Island, dolphins were found 50 feet (15.2 meters) up on the cliffs. On that night of 4 March, Constable J.M. Kenny reported that a 48-foot (14.6-meter) storm surge swept over their camp at Barrow Point (south of Cape Melville) atop a 40-foot (12-meter) high ridge and reached 3 miles (4.8 kilometers) inland, the largest storm surge ever recorded. After crossing Bathurst Bay, the cyclone *Mahina* - now generally known as the Bathurst Bay 'Hurricane' - continued on, with diminishing strength but caused considerable flooding, southwest across the peninsula to the southeastern corner of the Gulf of Carpentaria. There it doubled back on its tracks and died over the land on 10 March.<sup>99</sup>

On 11 March 1899, a hurricane struck Queensland, *Australia*, 411 persons drowned.<sup>94</sup>

On 7 April 1899, there was a southwest gale over the *United Kingdom*, with loss of life.<sup>94</sup>

On 27-28 April 1899, a cyclone [tornado] devastated Kirksville and Newtown, Missouri in the *United States*. It caused about 100 deaths.<sup>94</sup>

A series of tornadoes struck northern Missouri, western Iowa and central Nebraska in the *United States* in 1899 on April 19<sup>th</sup>, 26<sup>th</sup>, 27<sup>th</sup> and 30<sup>th</sup>. Fifty-one persons were killed outright or received injuries from which they have since died, and probably 200 received serious wounds. The property loss was about \$300,000. [In present currency, that would be equivalent to \$7.8 million in damages based on the Consumer Price Index (CPI) inflation rates.] A tornado struck Kirksville, Missouri on 27 April. The path of the tornado was about 800 feet wide and 1½ miles long. The tornado either totally or partially destroyed about 300 buildings and 34 lives were lost. On the same day, another tornado struck Newtown, Missouri, causing the loss of 12 lives.<sup>123</sup>

On 30 April 1899, a mudstorm struck South Dakota, Iowa and Nebraska in the *United States*. The mudstorm was caused by the collision of a dust storm and a rainstorm. An area of low pressure moved from Colorado northeastward into Iowa in the United States. During the prevalence of the southerly winds on the southeast side of the storm center, the dust was carried in great quantities northward, but when the clouds coming from the west began to drop a little rain, preliminary to the heavy northwest winds that were to follow, then the dust became mud and the rain became a very dirty rain. This succession of dust followed by muddy rain moved eastward over the greater part of Nebraska. During most of this time the sunlight was so obscured that lamps were lighted. This weather occurred in a weather pattern that also spawned several tornadoes.<sup>123</sup>

A tornado struck Colesburg, Iowa in the *United States* on 16 May 1899. Nine buildings were totally destroyed and 18 badly damaged. Five persons were killed and 12 injured. The property loss was very heavy, probably \$30,000 [\$775,000 in today's dollars]. The path of great destruction was, on an average, 30 rods [500 feet] wide and 12½ miles long.<sup>123</sup>

A very severe rain and hail storm struck Kansas in the *United States* on 21 & 22 May 1899. The storm was especially destructive in parts of Saline, Marion, Chase, Butler, Elk and Chautauqua Counties in Kansas. In those counties, torrents of rain fell soon swelling the streams to overflowing and drowning probably 1,000 head of livestock. Five hundred ten cattle were drowned in one bunch in Butler County. The cattle went into a draw and were overcome by the flood of water and icy hail. Some of the cattle when found were covered by drifts of hail, and chunks of ice to a depth of from 10 to 12 feet.<sup>123</sup>

A tornado struck in Brule County, South Dakota in the *United States* on 27 May 1899. Seven persons were killed. Several buildings in the path of the storm were totally demolished, involving a loss to buildings and livestock together at about \$8,000.<sup>123</sup>

During May 1899 in the *United States*, sixteen persons were killed by tornadoes and about 34 injured, while the property loss was about \$130,000. During the same month, 104 persons were killed by lightning strikes and 88 injured.<sup>123</sup>

On 12-13 June 1899, tornadoes struck the upper Mississippi [River], Wisconsin and Minnesota in the *United States*. New Richmond was almost destroyed, about 200 persons killed and many injured.<sup>94</sup>

A tornado destroyed the city of New Richmond, Wisconsin in the *United States* on 12 June 1899. A severe local storm occurred in western Wisconsin during the early evening of the 12<sup>th</sup>, which was most destructive at New Richmond, a town of about 1,500 inhabitants, of whom 114 were reported to have been killed by the fury of the storm, which also wrecked a large number of the most substantial buildings in the main portion of the town. In the aftermath several findings were observed:<sup>123</sup>

- \* A large iron safe weighing 3,000 pounds was caught up by the tornado and carried several hundred feet.
- \* An iron bar 4 feet long, 4 inches wide, and ½ inch thick, was driven into a lombardy poplar and solidly embedded at about 3 feet above the ground.
- \* A complete circle of boards driven deep into the earth, the circle was 90 feet in diameter. Furrows showed where other boards had struck the earth and were carried on.
- \* A sill beam 20 feet by 10 inches, from a destroyed planing mill, 2 rods to the southeast was thrust into the ground, so that only 5 feet protruded.
- \* The loss of life was very large in the cellars where people fled for shelter. The wind was so fierce that everything was swept clean, and then the debris from other buildings poured into the cellars with fatal results.

On 30 June 1899, a destructive frost struck in the morning in Hardin, Allen, Hancock and Marion Counties in Ohio in the *United States*. It was believed that a small mass of dense cold air, descended to the ground and then spread out horizontally, forming spots of low temperature.<sup>123</sup>

The following are the highest temperatures observed during July 1899 in the *United States*:<sup>123</sup>

Montgomery, Alabama	( 98° F, 36.7° C)
Mobile, Alabama	( 96° F, 35.6° C)
Tucson, Arizona	(107° F, 41.7° C)
Yuma, Arizona	(111° F, 43.9° C)
Little Rock, Arkansas	( 94° F, 34.4° C)
Fort Smith, Arkansas	( 95° F, 35.0° C)
San Francisco, California	( 73° F, 22.8° C)
San Diego, California	( 78° F, 25.6° C)
Fresno, California	(111° F, 43.9° C)
Denver, Colorado	( 95° F, 35.0° C)
Pueblo, Colorado	( 96° F, 35.6° C)
New Haven, Connecticut	( 90° F, 32.2° C)
New London, Connecticut	( 89° F, 31.7° C)
Millsboro, Delaware	( 93° F, 33.9° C)
Washington, D.C.	( 94° F, 34.4° C)
Pensacola, Florida	( 95° F, 35.0° C)
Key West, Florida	( 90° F, 32.2° C)
Augusta, Georgia	(100° F, 37.8° C)
Savannah, Georgia	( 98° F, 36.7° C)
Swan Valley, Idaho	( 94° F, 34.4° C)
Lewiston, Idaho	(104° F, 40.0° C)
Chicago, Illinois	( 90° F, 32.2° C)
Cairo, Illinois	( 92° F, 33.3° C)
Indianapolis, Indiana	( 94° F, 34.4° C)
Lafayette, Indiana	( 94° F, 34.4° C)
Dubuque, Iowa	( 92° F, 33.3° C)
Keokuk, Iowa	( 95° F, 35.0° C)
Topeka, Kansas	( 94° F, 34.4° C)
Dodge City, Kansas	( 96° F, 35.6° C)
Louisville, Kentucky	( 95° F, 35.0° C)
Lexington, Kentucky	( 95° F, 35.0° C)
New Orleans, Louisiana	( 93° F, 33.9° C)
Shreveport, Louisiana	(101° F, 38.3° C)
Eastport, Maine	( 80° F, 26.7° C)
Portland, Maine	( 87° F, 30.6° C)
Baltimore, Maryland	( 96° F, 35.6° C)
Boston, Massachusetts	( 94° F, 34.4° C)
Nantucket, Massachusetts	( 82° F, 27.8° C)
Marquette, Michigan	( 89° F, 31.7° C)
Detroit, Michigan	( 90° F, 32.2° C)
Saint Paul, Minnesota	( 91° F, 32.8° C)
Vicksburg, Mississippi	( 94° F, 34.4° C)
Saint Louis, Missouri	( 93° F, 33.9° C)
Billings, Montana	(102° F, 38.9° C)
Helena, Montana	( 98° F, 36.7° C)
North Platte, Nebraska	(101° F, 38.3° C)
Omaha, Nebraska	( 92° F, 33.3° C)
Winnemucca, Nevada	( 98° F, 36.7° C)
Carson City, Nevada	( 95° F, 35.0° C)
Claremont, New Hampshire	(101° F, 38.3° C)

New Brunswick, New Jersey	( 96° F, 35.6° C)
Cape May, New Jersey	( 84° F, 28.9° C)
Santa Fe, New Mexico	( 84° F, 28.9° C)
Albany, New York	( 94° F, 34.4° C)
New York City, New York	( 90° F, 32.2° C)
Charlotte, North Carolina	(100° F, 37.8° C)
Kitty Hawk, North Carolina	( 95° F, 35.0° C)
Bismarck, North Dakota	(100° F, 37.8° C)
Williston, North Dakota	( 92° F, 33.3° C)
Cincinnati, Ohio	( 94° F, 34.4° C)
Columbus, Ohio	( 94° F, 34.4° C)
Oklahoma City, Oklahoma	( 92° F, 33.3° C)
Fort Sill, Oklahoma	( 95° F, 35.0° C)
Roseburg, Oregon	( 92° F, 33.3° C)
Portland, Oregon	( 93° F, 33.9° C)
Erie, Pennsylvania	( 89° F, 31.7° C)
Philadelphia, Pennsylvania	( 96° F, 35.6° C)
Block Island, Rhode Island	( 80° F, 26.7° C)
Charleston, South Carolina	( 96° F, 35.6° C)
Columbia, South Carolina	(105° F, 40.6° C)
Yankton, South Dakota	( 97° F, 36.1° C)
Nashville, Tennessee	( 98° F, 36.7° C)
Knoxville, Tennessee	( 98° F, 36.7° C)
San Antonio, Texas	(100° F, 37.8° C)
Galveston, Texas	( 91° F, 32.8° C)
Salt Lake City, Utah	( 97° F, 36.1° C)
Burlington, Vermont	( 89° F, 31.7° C)
Lynchburg, Virginia	( 95° F, 35.0° C)
Norfolk, Virginia	( 95° F, 35.0° C)
Olympia, Washington	( 95° F, 35.0° C)
Spokane, Washington	( 98° F, 36.7° C)
Morgantown, West Virginia	( 96° F, 35.6° C)
Milwaukee, Wisconsin	( 90° F, 32.2° C)
La Crosse, Wisconsin	( 92° F, 33.3° C)
Cheyenne, Wyoming	( 91° F, 32.8° C)

The following are the highest temperatures observed during July 1899: <sup>123</sup>

Ciudad Porfirio Díaz, <i>Mexico</i>	( 98° F, 36.7° C)	(now Piedras Negras, Coahuila)
Leon de Aldamas, <i>Mexico</i>	( 87° F, 30.6° C)	(now León, Guanajuato)
Puebla, <i>Mexico</i>	( 79° F, 26.1° C)	
Basseterre, <i>Saint Kitts</i>	( 87° F, 30.6° C)	
Bridgetown, <i>Barbados</i>	( 88° F, 31.1° C)	
Cienfuegos, <i>Cuba</i>	( 93° F, 33.9° C)	
Havana, <i>Cuba</i>	( 91° F, 32.8° C)	
Puerto Principe, <i>Cuba</i>	( 97° F, 36.1° C)	
Kingston, <i>Jamaica</i>	( 94° F, 34.4° C)	
Port of Spain, <i>Trinidad &amp; Tobago</i>	( 90° F, 32.2° C)	
San Juan, <i>Puerto Rico</i>	( 87° F, 30.6° C)	
Santiago de Cuba, <i>Cuba</i>	( 94° F, 34.4° C)	
Willemstad, <i>Curaçao</i>	( 89° F, 31.7° C)	
Isle de Vieques, <i>Puerto Rico</i>	( 90° F, 32.2° C)	
Humacao, <i>Puerto Rico</i>	( 92° F, 33.3° C)	

On 30 June-5 July 1899, there was an overflow of the Brazos River in Texas in the *United States*, which caused great damage. This flood caused an estimated 100 to 300 deaths.<sup>97</sup>

In early July 1899, there was an overflow of the Brazos River, in Texas in the *United States*, which caused over 100 deaths.<sup>97</sup>

During the closing days of June and the early part of July, phenomenally heavy rains caused destructive floods in the valley of the Brazos River, Texas in the *United States*. The flood resulted from heavy rains, which set in near the mouth of the Brazos on the afternoon and night of June 26 and progressed slowly inland until June 28, when phenomenally heavy rains occurred over the central portion of the Brazos drainage basin. In some localities the rains were unprecedented in the history of Texas. These floods caused the loss of 40 to 60 lives and destroyed property and crops to the estimated value of nearly \$10,000,000.<sup>123</sup>

The Brazos River, with its tortuous channel of nearly one thousand miles in length, passes through a narrow valley, which ranges in width from a few miles to several miles in different localities. This valley is unsurpassed for productiveness. The banks of the Brazos for 200 miles from its mouth range in height from 20 to 40 feet, and in ordinary seasons are not overflowed to any serious extent. Heavy rains about its source cause the river to swell into a torrent, which flows with great impetuosity, but does not often overflow its banks. The banks of the river are formed of a tenacious red or blue clay, which yields very slowly to the force of the current. The width of the channel ranges from 150 to 200 feet. The gradient of the river from Waco to the Gulf of Mexico is little more than two feet to the mile.

The flood in the valley of the Brazos River, commenced on June 29 in central Texas and passed out into the Gulf of Mexico between the 12<sup>th</sup> and 15<sup>th</sup> of July 1899, has been, in all respects, the most destructive flood which ever struck this region, one of the most fertile and productive in Texas. The Brazos River, with its deep channel, has the capacity for carrying off a vast amount of water, and as a result destructive floods on this river are very rare. According to calculations published in a special bulletin of the Texas Section, Climate and Crop Service, the Brazos River discharges into the Gulf of Mexico, on an average, annually, during the months of April, May, and June, 6,447,403,576 cubic yards of water. In this flood, the river carried off more than this amount of water in fifteen days.

Phenomenally heavy rains fell on June 28 and 29 over the drainage basin of the Brazos River in the central portion of the State, and these were followed by heavy rains for four or five days in succession. During the last four days of June 1899, the heaviest rainfall in the records of Texas occurred near the headwaters of the Brazos River. Turnersville, about 240 miles from the Gulf, had over 33 inches of rain in ninety hours, and Hearne, some 80 miles toward the southeast, reported over 30 inches. Probably an area of nearly 2,000 square miles experienced a rain of about 30 inches in less than four days. On June 29, all the tributaries of the Brazos River from McLennan County south to Brazos County were higher than they had ever been before. This water, with that of succeeding rains, caused a flood in the Brazos, which inundated all low lands to a depth ranging from 2 to 12 feet. In places it is said that the river was more than 12 miles wide. The flood moved southward very slowly, and it was fourteen days from the time the crest of the flood was noted in central Texas until it passed out into the Gulf of Mexico.

The damage to crops was very great. All crops on the immediate river bottoms from McLennan County south were a total loss. The land bordering on the Brazos River is the most productive in the State. There was a large acreage in cotton, corn, sugar cane, and other crops. The following are the counties, which had suffered the greatest damage: McLennan, Falls, Robertson, Milam, Brazos, Burleson, Grimes, Washington, Waller, Austin, Fort Bend, and Brazoria. There was small acreage inundated in some other counties, but no great damage resulted outside of these. Cotton planters suffered most. The loss of corn was great, and besides the crop that was planted and growing, there was a large amount of last year's crop yet in the bins, which had spoiled. Sugar cane plantations in the Brazos bottoms suffered much. In some places half the crop was destroyed. Minor crops were also of considerable importance in some of these counties, and the loss of these represents a large sum. Farming implements, stock, and many of the small tenant



houses in the bottoms were washed away. Houses left standing were in many instances not in a fit condition for use. The total losses, judging from press reports and other available information, aggregates to nearly ten million dollars. The number of people who were left without means of sustenance was very large. The towns, which suffered most, were Calvert, Brookshire, Richmond, Sandy Point, Columbia, and Brazoria. While the water was well up in some of these towns no great damage resulted except to small settlements in low parts of the surrounding country. There was much suffering during the early part of the flood from hunger and exposure. Notwithstanding rescue parties were organized as rapidly as possible some of the sufferers were in tree tops and on houses for two or three days without food. Life saving crews were organized at Galveston and other points, and sent with boats to aid in the rescue.

Both the previous 1833 and 1843 Brazos River Floods, the creeks and lakes in this locality were dry; in fact there was no water in the county whatever, and all waters of the two floods were brought down by the rivers from up the country, while in the 1899 flood every creek and slough was filled to its utmost by the heavy rains prior to the overflow; such being the case there could not have been any more river water brought down the stream in 1899 than in 1833. The flood of 1899 is the only overflow that hurt the farmers of this section of Texas. All previous floods came before planting time, or sufficiently early to enable farmers to replant their crops. The aggregate loss to individuals, plantations, municipalities, and counties from this flood was, according to these estimates, \$7,690,856. The loss to railroads was conservatively estimated at \$1,000,000, which makes the total loss as a result of the overflow, \$8,690,856. [In present currency, that would be equivalent to \$225 million in damages based on the Consumer Price Index (CPI) inflation rates.]

On 11 July 1899, serious floods were reported in *Silesia, Galicia, and northwest Hungary*. Crops were destroyed and there was much damage.<sup>97</sup>

On the night of 12 July 1899, within a few hours of each other and a short distance apart, 2 barquentine vessels were driven to destruction during a gale in the Perth region of *Western Australia* with the loss of 33 lives. Wreckage washed up at Rockingham, Australia confirmed the loss of the *Carlisle Castle*, a 1,484-ton vessel. None of the crew of 22 survived, no bodies were ever found. It was believed that the vessel had struck the vicious Coventry Reef during the severe gale, which raged that night and was smashed to matchwood. The other ship, the *City of York*, a 1,218-ton vessel, with a cargo of timber, ran into the same gale as she approached Rottneest Island (west of Perth) lighthouse. The vessel sent out a signal requesting a pilot. None were available so the lighthouse replied with a flare intended to warn the ship but she misread the signal and continued her course towards the harbor. The vessel struck the reef, heavily ripping out most of her bottom. Some of the crew reached safety in a boat but a second boat containing the captain and 14 men was swamped by the huge seas and 11 drowned.<sup>99</sup>

On 1 & 2 August 1899, a violent local storm visited Carabelle, Florida in the *United States*, and vicinity. Great damage befell the town of Carabelle, where not more than a score of unimportant houses withstood the storm. The result to shipping was disastrous. The following vessels, most of them loaded, were wrecked: 14 barks, 40 small boats under twenty tons, and 3 pilot boats. The value of the vessels and cargoes lost was \$375,000. The city of Carabelle was damaged to the extent of \$100,000, other towns to the extent of \$50,000, and crops were destroyed to the value of \$50,000. [In present currency, the combined damage would be equivalent to \$15 million based on the Consumer Price Index (CPI) inflation rates.] The number of persons drowned and killed was 6.<sup>123</sup>

On 3 August 1899, destructive storm off Florida in the *United States*, many deaths.<sup>94</sup>

On 2 August 1899, violent thunderstorms struck New York, New Jersey, eastern Pennsylvania, Delaware, Maryland, and the District of Columbia [Washington D.C.] in the *United States*. In the storm stricken region of Maryland, 139 buildings, including barns and sheds, were destroyed by the wind; 3 were struck

by lightning and burned; 7 were damaged by lightning; and 43 by the wind. In the northern portion of the storm's path in Maryland, the main loss was occasioned by hail. Where the winds were the highest and the lightning most incessant there the hail was the heaviest. In some places hailstones lay unmelted for hours, and some of the elongated forms were 6 inches in length. In the areas of great destruction by hail the damage occurred largely in streaks or parallel bands, with intermediate strips that were left untouched.<sup>123</sup>

On 7 August 1899, a hurricane struck St. Kitts in the *West Indies*.<sup>144</sup>

On 7-12 August 1899, there was a fearful hurricane in the Lesser Antilles in the *West Indies*; 100 deaths, at Montserrat, 1,500 injured, 8,000 homeless, total deaths about 2,000.<sup>94</sup>

During 8-19 August 1899, a great Atlantic hurricane struck the island of *Puerto Rico* and the Carolinas [North and South Carolina] in the *United States* causing 3,433 deaths.<sup>107</sup>

On 8-19 August 1899, an Atlantic hurricane struck *Puerto Rico* and the Carolinas in the *United States*. One set of sources indicates this hurricane cause over 3,064 deaths; while another set of sources indicates this hurricane cause over 3,433 deaths. [Garriott (1900) and Alexander (1902) indicate thousands of additional deaths in *Puerto Rico* due to subsequent starvation. Stick (1952) and Chapman indicate at least 50 deaths in shipwrecks along coastal Carolina. Barnes (1995) has at least 30 along the coast of North Carolina and 14 inland in that state.]<sup>141</sup>

A great hurricane struck the *West Indies* beginning on 7 August 1899. It appeared east of Martinique on the morning of the 7<sup>th</sup>. During the afternoon and night of the 7<sup>th</sup> this storm devastated the more southern of the Leeward Islands of the Lesser Antilles, and on the 8<sup>th</sup> caused the loss of hundreds of human lives and destroyed millions of dollars' worth of property in Puerto Rico. Moving thence north of west the disturbance crossed the Bahamas Islands during the 11<sup>th</sup> and 12<sup>th</sup>, attended by a considerable loss of life and property, and from the 13<sup>th</sup> to the 17<sup>th</sup> skirted the south Atlantic coast of the *United States*, after which it disappeared in the direction of Newfoundland. At Puerto Rico and Hatteras, North Carolina, where its vortex passed near regular reporting stations of the Weather Bureau, the hurricane was of exceptional severity, and at Hatteras it will go on record as the severest storm within the recollection of the oldest inhabitants.<sup>123, 124</sup>

The hurricane crossed directly over the Island of Guadeloupe early in the afternoon, and passing 50 to 75 miles south of St. Kitts late in the afternoon of the 7<sup>th</sup>, and reached the southeast coast of Puerto Rico shortly after 8 a.m. on the morning of August 8. At St. Kitts the lowest barometer, 29.268 inches, was reached at 5 p.m., and the maximum wind velocity was 72 miles an hour from 4:22 to 4:27 p.m., with an extreme velocity for one minute of 120 miles at 4:40 p.m. Along this portion of the track the destruction of life and property was most marked on the islands of Guadeloupe, Montserrat, and St. Croix, which lay along the path covered by the storm's vortex.

Tuesday, August 8, 1899, will go on record as a day during which Puerto Rico experienced one of the most disastrous hurricanes noted in the history of the West Indies. In the morning the hurricane center struck the southeastern part of the island and moved west-northwest, passing very near and apparently to the northward of Ponce. The lowest barometer reading noted at the Weather Bureau station at San Juan was 29.23 inches at 8.30 a.m. Reports of readings of aneroid barometers in the possession of voluntary observers who were located nearer the path of the storm's center show a barometric gradient, which will account for the terrific violence of the hurricane. At Guayama, Puerto Rico, a reading of 27.75 corrected for elevation and instrumental error, was registered. [According to the barometric pressure, this hurricane would have been rated a Category 4 hurricane at this location.] At Juana Diaz a reading of 28.11 inches was recorded at 9:30 a.m.

During the 8<sup>th</sup> the storm center continued a west-northwest course and reached the northeast coast of Santo Domingo, Dominican Republic, the morning of the 9<sup>th</sup>. In Santo Domingo the storm was severe in the northeast and north parts of the island, while in the southern part but little damage was done.

From the morning of the 9<sup>th</sup> to the morning of the 12<sup>th</sup> the path of the hurricane was without the region of observation, and during this period it moved from the northeast coast of Santo Domingo to a position some 50 miles south of Nassau, Bahamas, a distance of about 700 miles at a velocity of less than 10 miles an hour. In its passage over the Bahamas the storm was quite severe, and at Nassau a minimum barometer reading of 29.10 inches was reported. By the morning of the 13<sup>th</sup> the storm center had reached a position off Jupiter, Florida, with a minimum barometer reading of 29.22 inches at 8 a.m.

The subsequent course of the storm lay off and nearly parallel with the south Atlantic coast of the United States, where, as shown by the detailed reports from Weather Bureau stations, herewith, it apparently acquired its greatest intensity in the region about Hatteras from August the 16<sup>th</sup> to the 18<sup>th</sup>, with a minimum barometer reading of 28.620 at 8 p.m. on August the 17<sup>th</sup>, an unprecedentedly low reading for the Hatteras station. The storm recurred and by 9 September was centered off the coast of Provence, *France* producing gales in that region until 12 September.

As of 16 August, reports from Ponce, Puerto Rico showed that already 500 bodies have been recovered, and it was thought that there were many yet to be found. In Humacao, Puerto Rico, 60 persons were killed, and from every side came reports of tremendous loss of life and destruction of property. The smaller fruits and vegetables were reported as utterly lost, and this includes bananas, which are the principal food of the inhabitants. As a result a possible famine stares the island in the face.

An observer at Juana Diaz, Puerto Rico reported that the rainfall from 6 a.m. of the 8<sup>th</sup> to the same hour on the 9<sup>th</sup> was 11.20 inches. This report agrees with those from Ponce, where the rainfall was said to have been torrential, many of the deaths at that place being the result of drowning.

Along the military road from Coamo, Puerto Rico, desolation reigned on every side. Only two houses were left standing at Aibonito, and 6 persons were reported dead at that place. Only two houses were left standing between Coamo and Aibonito, and the road was blocked in many places by huge boulders, which were blown and washed down from the cliffs, which border the road. The celebrated baths at Coamo were utterly destroyed. As San Juan is built of brick and the houses have thick walls and flat roofs comparatively little damage was done in this city.

At Mayaguez, Puerto Rico, this hurricane was one of the severest that ever chastened the island, nor had the oldest men heard of anything the likes before. In the city, the damage to property was large, and from the country the news was appalling. One-fourth of the coffee crop only will be saved, the loss of cane was considerable, and crops of minor fruits, which are the sustenance of the poor, have disappeared. The loss of life was greater than ever before, houses with all the inmates were washed away by the floods.

As regards the damage and destruction it was so enormous that it was difficult to make an estimate. A very conservative estimate of the actual losses of the districts of Guayama, Arroya, Patillas, and Maunabo can be safely placed at \$1,000,000. [In present currency, that would be equivalent to \$26 million in damages based on the Consumer Price Index (CPI) inflation rates.]

At Arecibo, Puerto Rico, the flood of the three rivers, which by a common mouth, empty into the sea near this town, was such an enormous one that old people here had no recollection of anything to equal it. The loss of life and property was beyond an approximate estimate at that time. Some gave the number of the drowned and killed at 500 more or less, while others place the figure as nearly 1,000. Almost all the peasantry houses and huts in the plains, and higher up on the river sides, have been carried to sea or destroyed, while in the lower part of this town, which was

several meters underwater, the loss of property was immense, and most of the poor people were deprived of shelter. Crops sustained damage amounting to many hundred thousand dollars. The dam of the aqueduct, situated on the hills, broke, carrying away everything in its path. Thousands of cattle from the pasturelands, in which the district abounded, as well as stock from the estates, disappeared into the sea. Railroads and bridges were destroyed and ruin and desolation reign supreme.

At Humacao, Puerto Rico, the estimated loss of property was \$1,000,000; loss of life nearly eighty, though the count was not accurately kept, as many of the dead were buried in the place where the loss of life occurred. A tidal wave came in and destroyed almost all houses in this port. A large vessel, *the Monroe*, of New York, was driven ashore.

In the Islands of the *Bahamas*, the hurricane struck six or eight islands, doing at all of them great damage in the way of blowing down or unroofing houses, destroying crops, uprooting fruit orchards, and wrecking or injuring vessels. The loss of life was considerable. At Nassau, the loss was quite severe. There were about fifty vessels in port, mostly small fishing and sponging craft, at least one-half of which were torn from their moorings and dashed against the rocky shores of the islands or were sunken at their anchorages. The steam tug *Nassau*, formerly tender for Ward's New York and Cuba Line of steamers, broke her moorings, drifted down the harbor, and was wrecked on the reefs west of the city. Two steam yachts drifted over the bar out to sea and have not been heard of since. On shore the damage was considerable. A large fruit-preserving factory, a big sponge warehouse, a music hall, a dancing pavilion, and about one hundred smaller buildings being blown down. Some damage was done to the roofs of the public buildings, and the contents of the Government House were damaged by water. A general look of desolation and destruction pervaded the entire city. It was already known that at least one hundred lives were lost, mostly fishermen and spongers, and it was expected that the number would be increased when news came from the outlying islands. The scattered position of our islands, slow means of communication, and a tendency to exaggerate make it difficult to obtain accurate information. The following data, though not strictly accurate, may be as close as we can ever get to it. Number of small craft lost, 50. Conservative estimates place the total loss of life at 125, probably 100 occurring at Red Bays. A few sponge vessels were missing which may swell the totals given.

At Hatteras, North Carolina, in the United States during the early morning of the 17<sup>th</sup> the wind increased to a hurricane and at 4 a.m. was blowing at the rate of 70 miles an hour; 10 a.m. it had increased to 84 miles; and at 1 p.m. it was blowing 93 miles an hour, with occasional extreme velocity of 120 to 140 miles an hour. The record of wind after about 1 p.m. was lost, but it was estimated that it blew with even greater force from about 3 p.m. to 7 p.m., and it was believed that between these hours the wind reached a regular velocity of at least 100 miles an hour. The barometer began to fall rapidly about 8 a.m. of the 17<sup>th</sup>, and 8 p.m. of that date it had reached the unprecedentedly low reading of 28.620 inches, where it remained about an hour, when it began to rise rapidly. This hurricane was the most severe in the history of Hatteras. The scene on the 17<sup>th</sup> was wild and terrific. By 8 a.m. the entire island was covered by water from the Sound, and by 11 a.m. all the land was covered to a depth of from 4 to 10 feet. This tide swept over the island at a fearful rate carrying everything movable before it. There were not more than four houses on the island in which the tide did not rise to a depth of 1 to 4 feet, at least half the people had to abandon their homes and seek safety with those who were fortunate enough to live on the higher grounds. The frightened people were crowded 40 or 50 in a house. All this day the gale, the tide, and the sea continued with unabated fury. During the lull in the evening the tide ran off with great swiftness, causing a fall in the water of several feet in less than half an hour. Domestic livestock were drowned, and it was believed that the property loss to Hatteras alone would amount to \$15,000 or \$20,000. The fishing industry was, for a time, swept out of existence, and of the 13 fish-packing houses, which were situated on the waterfront, 10 with all their equipments and contents were lost. A great proportion of the houses on the island were badly damaged and many families lost their homes. All bridges were swept away and roadways were piled high with wreckage. All telegraph and telephone lines were down.

The following vessels were known to be lost between Hatteras and Big Kinnakeet, North Carolina: A large steamship foundered about one mile off Hatteras beach the night of the 17<sup>th</sup>, and it was thought all on board were drowned. From the marks on some of the wreckage, which drifted ashore, it was supposed her name was the *Agnat* and that she was German or Norwegian. She was loaded with cotton and staves, a portion of which cargo drifted on the beach. The Diamond Shoals Light Ship which was stationed off Hatteras broke loose from her moorings the morning of the 17<sup>th</sup> and was carried southward by the gale; when the wind shifted to the southeast she was carried ashore near Creeds Hill Life-Saving Station, where she now lies high on the beach. The crew was saved by the Creeds Hill life-saving crew. The three-masted schooner *Florence Randall* went ashore 1 mile north of Big Kinnakeet Life-Saving Station the night of the 16<sup>th</sup>. The crew was saved by the Kinnakeet life-saving crew. The schooner was a total loss.

On 8-15 August 1899, there were destructive storms in South America in *Chile*.<sup>94</sup>

On 10 August 1899, there were destructive floods in Chubat region in southern *Argentina*.<sup>97</sup>

On 10 August 1899, about two million bushels of wheat in North Dakota in the *United States* were destroyed by hail.<sup>123</sup>

On 3 September 1899, there was a hurricane in the *Azores* [an archipelago in the middle of the North Atlantic Ocean], which caused [ship] wrecks and loss of life.<sup>94</sup>

On 8 September 1899, there was a gale off Nova Scotia, *Canada*. Many deaths were reported. Then on 15-16 September 1899, there was a gale off Newfoundland, 400 fishing vessels reported lost.<sup>94</sup>

On 8-13 September 1899, a hurricane struck the islands of the *West Indies*.<sup>123</sup>

At St. Kitts the wind reached a velocity of 62 miles an hour at 8:18 p.m. of the September 8<sup>th</sup>, and an extreme velocity for one minute of 120 miles an hour was recorded at 5:51 p.m. This hurricane, as compared with that of August 7, was slightly less intense, and far less disastrous, owing, no doubt, to the fact that only the strong trees and buildings were left, and these were able to successfully resist the attacks of the weaker storm. Otherwise there would have been very much the same story to tell. A few small huts were destroyed, rendering about 200 people homeless; two schooners, with cargoes, total value \$25,000, wrecked; one small boat, valued at \$240, wrecked, and cane crop badly damaged. The neighboring islands to the east suffered about the same as St. Kitts, except the little island of Anguilla, where as many as 200 houses were demolished and 800 people were rendered homeless. The steamship *Caracas*, of the Red D Line, met the storm 400 miles north of Puerto Rico, and experienced its fury from midnight on Saturday until Monday morning. In about the same region the schooner *Isaac Newton* was dismasted and waterlogged on Sunday, the 10<sup>th</sup>. The crew of this schooner, when rescued on the 13<sup>th</sup> by the steamship *Fontabelle*, were standing in water waist deep, and had been without food and fresh water for three days. They report the occurrence, during the hurricane, of a severe hailstorm, lasting about half an hour, and producing intense cold. The hailstones were very large, and fell with great force.

A hurricane swept over the Island of Bermuda during the night of September 12. Many houses were blown down and others were unroofed. The storm raged during all of last night. No lives were lost, but heavy damage was done to public and private property, fruit and cedar trees. The causeway was wrecked and the government house was damaged. Giant cedars were uprooted, ornamental and fruit trees were destroyed, and wharfs were washed into the sea. All communication with St. Georges was cut off and news from the western end of the island and the dockyard was not obtainable at that time. The telephone and telegraph poles and wires were down, causing a total interruption of business. There was considerable damage at the military camp. The city hall, public gardens and hotels, and several public and private dwellings were also damaged, and numerous small craft in the harbors were sunk or driven ashore. The storm was the



worst known here since the hurricane of 1880; in fact, many of the inhabitants say it exceeded that of 1880 in violence. It was rumored that damage amounting to £100,000 was done at the dockyard alone. On Ireland and Boaz Islands everything was more or less injured. The damage there was roughly estimated at £100,000. At Somerset, all the boats and small craft were destroyed, trees demolished, and houses unslated and otherwise damaged. At Prospect Camp the damage was estimated at £3,000. More than half a mile of the causeway connecting the mainland with St. Georges was totally destroyed. The cost to repair was estimated at £13,000. News from St. Georges, received by a whaleboat, says serious damage had been done there to trees, houses, etc. All the boats had been destroyed or badly injured. At that time, reports from outlying parishes were slowly coming in. They all show that there was great destruction of trees and serious injury to houses and other property. From what was learned preliminary reports found no loss of life.

During the night of September 14<sup>th</sup>, violent gales off the Newfoundland coast caused considerable damage to fishing craft and the loss of four lives.

On 15 September 1899, there were floods in *Austria*. Nineteen lives lost by the collapse of a bridge over the Traun River [in northern *Austria*].<sup>97</sup>

On 29-30 September and 2 October 1899, there was a gale in the *English Channel*, wrecks and loss of life.<sup>94</sup>

On 7 October 1899, there was a typhoon in central and eastern *Japan*. Train was blown off a bridge, 50 deaths.<sup>94</sup>

On 7- 8 October 1899 and in April 1900, there were destructive floods in Salem [*England*]. Villages were swept away. There were 40 deaths.<sup>97</sup>

On 8 October 1899, there was a destructive storm and floods in Salerno in southwestern *Italy*, which caused about 40 deaths. Then on 20 October 1899, there was another storm in southern *Italy*, much damage and 3 deaths.<sup>94</sup>

On 27-30 October 1899, there was a destructive storm in *Jamaica*; several deaths.<sup>94</sup>

On 28-29 October 1899, a hurricane struck *Jamaica* and *Cuba*. Many people died in *Jamaica*. In *Cuba*, there was some loss of human lives.<sup>141</sup>

On 28-31 October 1899, a storm traveled from the *Caribbean Sea* and then along the Atlantic coast of the *United States*. In *Cuba* and *Jamaica* the feature of the storm was the exceptionally heavy rainfall. During the evening of 28<sup>th</sup>, 13 houses blown down and tobacco seed plants and banana plants destroyed; night of 28<sup>th</sup> considerable damage done by inundation of a portion of Camajuani, Cuba and the blowing down of several houses at Sancti Spiritus, Cuba; damage and loss of one life at Santiago de Cuba, and damage by the overflowing of the Cauti [Cauto] River. In Florida, Georgia, and South Carolina no special damage was caused, although dangerous gales prevailed off the coasts. At Charleston, South Carolina, the wind reached a velocity of 58 miles an hour from the northwest at 10:05 p.m. on the 30<sup>th</sup>. The night of the 30<sup>th</sup> the storm was one of the severest on record along the North Carolina coast near Wilmington, and an enormous amount of damage was caused by exceptionally heavy seas and high tides. The total loss of property in that section was placed at a quarter of a million dollars. [In present currency, that would be equivalent to \$6.5 million in damages based on the Consumer Price Index (CPI) inflation rates.] A number of coasting vessels were lost, and the steamer *Catherine Whiting* was wrecked on Goss Beach, Brunswick County. The value of sailing vessels and their cargoes, which were lost along the North Carolina coast, was placed at \$144,000. The ravages of the storm along the Virginia coast the night of the



30<sup>th</sup>, and during the 31<sup>st</sup> represented losses of thousands of dollars. The tide was the highest noted in years, and the high wind caused the water to overflow lowlands.<sup>123</sup>

*Also refer to the section 1890 A.D. – 1900 A.D. for information on the drought in South Africa during that timeframe.*

*Also refer to the section 1895 A.D. – 1903 A.D. for information on the drought in Australia during that timeframe.*

*Also refer to the section 1896 A.D. – 1900 A.D. for information on the famine in India during that timeframe.*

*Also refer to the section 1898 A.D. – 1899 A.D. for information on the famine in Russia during that timeframe.*

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**Winter of 1899 / 1900 A.D.** In October 1899, a very severe snowstorm occurred in western Montana in the *United States*, directly along the eastern foothills, and extending from Augusta to the international boundary line. The storm was unexpectedly severe, and a number of sheepherders, probably as many as twelve, lost their lives before a place of shelter could be reached. The storm-swept area was about 20 miles wide and upward of 100 miles long. The depth of snowfall over this strip was from 30 to 40 inches, but on either side the amount was very much less.<sup>123</sup>

During the night of 15 December 1899 in the *United States*, heavy snow fell in Idaho, northern Utah, and elsewhere in the middle and northern Rocky Mountain districts; in Colorado a heavy snow and windstorm caused a blockade of railroads along the Arkansas-Platte Divide, and very low temperature continued several days in the Western and Northwestern States. The storm produced the following low temperatures: 10° F occurred at Spokane, Washington; 8° F at Walla Walla, Washington; 6° F at Baker City, Oregon; and 0° F at Kalispell, Montana.<sup>123</sup>

A cold wave of considerable severity moved southeastward from the northeastern Rocky Mountains slope in the *United States* on 15 February 1900, reaching the Florida Peninsula on the morning of the 18<sup>th</sup> and *Cuba* and *Puerto Rico* on the 19<sup>th</sup> and 20<sup>th</sup>.<sup>124</sup>

The winter of 1899-1900 in Bradford County, Pennsylvania in the *United States* was an open and mild, with heavy rains and little snow. October alternated between hot and cold waves and the month ended with heavy rain. On 14 November, 3 inches [8 cm] of snow fell, but it quickly melted. On 11 & 12 December, there was a heavy rain. In the middle of January, snow fell sufficiently to support a short run of sleighing on the highlands. On 22 February, a thunderstorm was followed by a cold wave. During the last week of February, there were such heavy rains that it caused high water in the larger creeks and considerable damage was done by washouts. On 16 March, snowfall enabled people in the valleys to enjoy their first and only sleigh-ride of the season. The last snow fell at Barclay on May 4<sup>th</sup>. Oats were sowed about the middle of April. The beginning of May was dry and forest fires raged in the townships of Overton and Barclay, damaging thousands of acres of timber.<sup>178</sup>

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**1900 A.D.** In 1900 in the *United States*, the great floods occurred in February in the Atlantic States, particularly in New England and eastern New York; those of April in the east Gulf States; and the extremely disastrous ones of April and May in Texas. The reported losses from these floods were estimated at \$12 million.<sup>124</sup> [In present currency, that would be equivalent to \$310 million in damages based on the Consumer Price Index (CPI) inflation rates.]

On 7 April 1900, there was a great cloudburst and floods in Texas in the *United States*, about 40 deaths and vast loss of property.<sup>97</sup>

On 29 April 1900, there was a cyclone in Huelva in southwestern *Spain*; much damage done.<sup>94</sup>

Several editorials in the Journal *Nature*, discussed a linkage between the height of the annual Nile Flood in *Egypt* and the yearly monsoon floods in *India*. Even as early as 1881, this linkage was being discussed

when Mr. Morgan Brierly wrote “the famine years in India are generally years of low flood in Egypt.” In 1899, the rainfall in India was 11.14 inches less than normal and this also corresponded to a very low flood in the Nile River, the lowest in a century. In comparison in the year 1893, the rainfall in India was 9.07 inches more than normal and this corresponded to a high flood on the Nile.<sup>124</sup>

The following were the highest temperatures observed during the summer of 1900 in the *United States*:<sup>124</sup>

Montgomery, Alabama	( 99° F, 37.2° C)
Mobile, Alabama	( 96° F, 35.6° C)
Phoenix, Arizona	(112° F, 44.4° C)
Yuma, Arizona	(112° F, 44.4° C)
Little Rock, Arkansas	( 96° F, 35.6° C)
Fort Smith, Arkansas	(100° F, 37.8° C)
San Francisco, California	( 92° F, 33.3° C)
San Diego, California	( 89° F, 31.7° C)
Fresno, California	(109° F, 42.8° C)
Denver, Colorado	( 97° F, 36.1° C)
Pueblo, Colorado	(100° F, 37.8° C)
New Haven, Connecticut	( 98° F, 36.7° C)
Washington, D.C.	(101° F, 38.3° C)
Pensacola, Florida	( 97° F, 36.1° C)
Key West, Florida	( 89° F, 31.7° C)
Augusta, Georgia	(102° F, 38.9° C)
Savannah, Georgia	(102° F, 38.9° C)
Boise, Idaho	(104° F, 40.0° C)
Chicago, Illinois	( 94° F, 34.4° C)
Cairo, Illinois	( 97° F, 36.1° C)
Indianapolis, Indiana	( 94° F, 34.4° C)
Evansville, Indiana	(100° F, 37.8° C)
Dubuque, Iowa	( 95° F, 35.0° C)
Keokuk, Iowa	( 98° F, 36.7° C)
Topeka, Kansas	(101° F, 38.3° C)
Dodge City, Kansas	(104° F, 40.0° C)
Louisville, Kentucky	(101° F, 38.3° C)
Lexington, Kentucky	( 97° F, 36.1° C)
New Orleans, Louisiana	( 96° F, 35.6° C)
Shreveport, Louisiana	( 98° F, 36.7° C)
Eastport, Maine	( 89° F, 31.7° C)
Portland, Maine	( 94° F, 34.4° C)
Baltimore, Maryland	(100° F, 37.8° C)
Boston, Massachusetts	( 97° F, 36.1° C)
Nantucket, Massachusetts	( 87° F, 30.6° C)
Marquette, Michigan	( 94° F, 34.4° C)
Detroit, Michigan	( 94° F, 34.4° C)
Saint Paul, Minnesota	( 96° F, 35.6° C)
Vicksburg, Mississippi	( 96° F, 35.6° C)
Saint Louis, Missouri	( 99° F, 37.2° C)
Miles City, Montana	(110° F, 43.3° C)
Helena, Montana	(102° F, 38.9° C)
North Platte, Nebraska	(100° F, 37.8° C)
Omaha, Nebraska	( 97° F, 36.1° C)
Winnemucca, Nevada	( 98° F, 36.7° C)
Carson City, Nevada	( 95° F, 35.0° C)
Atlantic City, New Jersey	( 98° F, 36.7° C)
Santa Fe, New Mexico	( 89° F, 31.7° C)
Albany, New York	( 99° F, 37.2° C)

New York City, New York	( 95° F, 35.0° C)
Charlotte, North Carolina	( 99° F, 37.2° C)
Raleigh, North Carolina	(100° F, 37.8° C)
Bismarck, North Dakota	(105° F, 40.6° C)
Williston, North Dakota	(104° F, 40.0° C)
Cincinnati, Ohio	( 97° F, 36.1° C)
Columbus, Ohio	( 97° F, 36.1° C)
Oklahoma City, Oklahoma	( 98° F, 36.7° C)
Roseburg, Oregon	( 95° F, 35.0° C)
Portland, Oregon	( 90° F, 32.2° C)
Erie, Pennsylvania	( 92° F, 33.3° C)
Philadelphia, Pennsylvania	(101° F, 38.3° C)
Block Island, Rhode Island	( 89° F, 31.7° C)
Charleston, South Carolina	( 99° F, 37.2° C)
Columbia, South Carolina	(106° F, 41.1° C)
Pierre, South Dakota	(110° F, 43.3° C)
Yankton, South Dakota	(100° F, 37.8° C)
Nashville, Tennessee	( 98° F, 36.7° C)
Knoxville, Tennessee	( 98° F, 36.7° C)
Abilene, Texas	(105° F, 40.6° C)
San Antonio, Texas	(100° F, 37.8° C)
Galveston, Texas	( 94° F, 34.4° C)
Salt Lake City, Utah	(101° F, 38.3° C)
Northfield, Vermont	( 92° F, 33.3° C)
Lynchburg, Virginia	(100° F, 37.8° C)
Norfolk, Virginia	(100° F, 37.8° C)
Walla Walla, Washington	(102° F, 38.9° C)
Spokane, Washington	(100° F, 37.8° C)
Parkersburg, West Virginia	( 98° F, 36.7° C)
Milwaukee, Wisconsin	( 96° F, 35.6° C)
La Crosse, Wisconsin	( 96° F, 35.6° C)
Cheyenne, Wyoming	( 92° F, 33.3° C)

The following were the highest temperatures observed during the summer of 1900: <sup>124</sup>

Basseterre, St. Kitts	( 89° F, 31.7° C)
Bridgetown, Barbados	( 90° F, 32.2° C)
Havana, Cuba	( 91° F, 32.8° C)
Port of Spain, Trinidad	( 92° F, 33.3° C)
Puerto Principe, Cuba	( 96° F, 35.6° C)
Roseau, Dominican Republic	( 91° F, 32.8° C)
San Juan, Puerto Rico	( 93° F, 33.9° C)
Santiago de Cuba, Cuba	( 95° F, 35.0° C)
Santo Domingo, Dominican Republic	( 93° F, 33.9° C)
Willemstad, Curaçao	( 93° F, 33.9° C)

In July 1900, there was a major flood at Hawkesbury/Nepean Valley in New South Wales, *Australia*. The water level was recorded at 46 feet (14.08 meters) above the sea level height at Windsor Bridge.<sup>99, 109</sup>

During 3-7 July 1900, a phenomenal snowstorm struck New South Wales, *Australia*.<sup>176</sup>

\* The snow area extended from Congewai in the Hunter district to Condobolin and Warrumbungle in the west. Railway traffic became paralyzed, passengers being shut up in their carriages, unable to reach hotels. In places the snow was 8 feet deep on the rails. Telegraph wires were down everywhere. Boats were sent to flooded districts. Bathurst had a unique experience, all business being suspended; roofs, verandahs, and lightly constructed buildings collapsed under the weight of the snow. The phenomenal fall of snow at Bathurst was surpassed on the mountains, and at places between Locksley

and Rydal, it fell to a depth of 4 feet. The passenger train, which left Bathurst, was unable to proceed beyond Locksley.

\* At Blayney snow began to fall at 5 a.m. on the 5<sup>th</sup>, light at first, but the storm increased as the morning advanced; at 8 a.m. there was over 9 inches of snow on the ground, and by noon it had increased to 17 inches in depth in the main street; at 2 p.m., on the flats of the town, the snow was, in places, 3 feet deep, the minimum depth being 22 inches, the storm continued till 5 p.m., when the standard measurement in the main street was 27 inches. Such a fall was never experienced before in Blayney; many sheds, balconies, and verandahs collapsed, whilst the damage done to the guttering of houses was immense. Railway traffic was completely blocked from the afternoon of 5<sup>th</sup> till afternoon of 6<sup>th</sup>.

\* Snow fell in many regions. The town of Capertee received 15 inches. O'Connell [20 km southeast of Bathurst] received an average of 24 inches. Milthorpe [now Millthorpe, 20 km south-southeast of Orange] received 22 inches that produced 3-4 foot drifts. Parkes received 4 inches. Maluna received 1 inch. Ilford [55 km northeast of Bathurst] received 24 inches. Yass received 4 inches. Rylston [now Rylstone, 30 km south of Bathurst] received 18 inches. Katoomba received 12 inches. Rockley [30 km south of Bathurst] received 32 inches. Molong received 15 inches. Cowra received 5 inches. Mudgee received 22 inches. Taralga received 18-24 inches. Wellington received 4 inches. Forbes received 9 inches. Murrumburrah [45 km northwest of Yass] received 6 inches. Marsdens [now Marsden, 60 km west-northwest of Grenfell] received 2 inches. Carcoar [15 km southwest of Blayney] received 3 feet. Wallerawang [10 km northwest of Lithgow] received 2 feet. Crookwell received 24-30 inches. Canowindra received 1 foot. Hill End received 16 inches. Orange received 18 inches. Waroo [now Warroo, 40 km west of Forbes] received 3 inches. Kiandra received 30 inches.

\* The snowstorm also produced heavy rainfall in many areas. Mittagong received 12.56 inches. Richmond received 12.41 inches. Moss Vale received 12.30 inches. Katoomba received 10.59 inches. Araluen received 9.27 inches. Lithgow received 8.41 inches. Campbelltown received 8.40 inches. Kiama received 8.30 inches. Penrith received 8.05 inches.

\* Floods resulted from this storm in the coastal rivers and eastern tributaries of the Darling; also in the Macquarie, Lachlan, and Murrumbidgee Rivers. The Nepean River was many feet over the floor of the Camden Bridge. The Hawkesbury River was 34 feet 6 inches at Penrith and 35 feet over the bridge at Richmond. The Namoi River was 22 feet at Walgett. The Barwon River was 28 feet at Walgett. The Murrumbidgee River was 32 feet 9 inches at Wagga Wagga and 33 feet 6 inches at Gundagai. The Goulburn River was 22 feet. The Macquarie River was 33 feet at Dubbo.

On 13 July 1900, there was an extraordinary fall of rain at Galveston, Texas in the *United States*, a depth of 14 inches recorded in twenty-four hours, of which 3 inches fell in sixty minutes.<sup>124</sup>

On 16 July 1900, the temperature in the shade at Camden-Square in London, *England* reached a peak of 95.2° F (35.1° C).<sup>97</sup>

On 15 August 1900, there were floods in various parts of *Japan*, 200 deaths reported.<sup>97</sup>

On 29 August 1900, there was a destructive cyclone [tornado?] at Mafeking [Mahikeng which is inland in northwest *South Africa*].<sup>94</sup>

On 8-9 September 1900, there was a destructive hurricane and tidal wave that struck Galveston, Texas in the *United States*. The city was wrecked, nearly 8,000 perished; enormous loss. After the devastation there was much looting. The troops were called in and about 25 persons were shot.<sup>94</sup>

On 8 September 1900, a hurricane struck Galveston, Texas in the *United States*. The hurricane caused between 8,000 and 12,000 deaths. This is the second deadliest known Atlantic hurricane.<sup>107, 141</sup>

Measured by losses of life and property and the depression of the barometer at Galveston, Texas, the hurricane of September 8, 1900, was the severest storm that ever occurred in the *United States*. On Galveston Island upward of 6,000 human beings were drowned, or killed by falling buildings or flying

debris, and property to the estimated value of \$30,000,000 was destroyed. [In present currency, that would be equivalent to \$775 million in damages based on the Consumer Price Index (CPI) inflation rates.] Enormous losses of life and property were also reported in the inland coast country. The barometer, which reached a verified minimum of 28.48 inches at Galveston, was lower by 0.10 inch than any reading previously made at a station of the Weather Bureau. The devastation at Galveston was caused principally by a storm wave, which swept in from the Gulf in advance of the hurricane's vortex. This wave, 4 feet in depth, struck the already submerged island with almost irresistible force, and entirely destroyed the south, east, and west portions of the city for a distance of two to five blocks inland. In other parts of the city many houses were destroyed and none escaped injury.<sup>124</sup>

The following special report was made by Dr. Isaac M. Cline, the Section Weather Station Director. The oldest residents of Galveston Island were not thrown into a panic even when the water had flooded the whole city. They remembered the height reached by the tide in the storm of 1875, and as most of them, having built their houses after that event so that the first floor was above the level of danger then, were dwelling in such residences or had friends who occupied them, they repaired to these refuges. But the water climbed above its old mark and the wind, reaching a maximum at times of 100 miles an hour, assisted it in destroying nearly all of the stoutest houses. Dr. Cline occupied such a building, and was confident that the water would not reach his first floor, but his home was utterly demolished. He spent all the late afternoon in carefully watching the advancing height of the water and he did not give up his hope that his place would withstand the storm until the 1875 water mark was passed. In that last hour he waved warnings from his porch to his neighbors, telling them to fly to higher ground. Some could heed his warnings, but by far the most of the people were caught in the same way that he was.<sup>124</sup>

#### SPECIAL REPORT ON THE GALVESTON HURRICANE OF SEPTEMBER 8, 1900.

The hurricane, which visited Galveston Island on Saturday, September 8, 1900, was no doubt one of the most important meteorological events in the world's history. The ruin, which it wrought beggars description, and conservative estimates place the loss of life at the appalling figure, 6,000.

A brief description of Galveston Island will not be out of place as introductory to the details of this disaster. It is a sand island about thirty miles in length and one and one half to three miles in width. The course of the island is southwest to northeast, parallel with the southeast coast of the State. The City of Galveston is located on the east end of the island. To the northeast of Galveston is Bolivar Peninsula; a sand spit about twenty miles in length and varying in width from one-fourth of a mile to about three miles. Inside of Galveston Island and Bolivar Peninsula is Galveston Bay, a shallow body of water with an area of nearly five hundred square miles. The length of the bay along shore is about fifty miles and its greatest distance from the Gulf coast is about twenty-five miles. The greater portion of the bay lies due north of Galveston. That portion of the bay, which separates the island west of Galveston from the mainland, is very narrow, being only about two miles in width in places, and discharges into the Gulf of Mexico through San Louis Pass. The main bay discharges into the Gulf between the jetties; the south one being built out from the northeast end of Galveston Island and the north one from the most southerly point of Bolivar Peninsula. The channel between the jetties is twenty-seven to thirty feet in depth at different stages of the tide. There are channels in the harbor with a depth of thirty to thirty-five feet, and there is an area of nearly two thousand acres with an anchorage depth of eighteen feet or more. The mainland for several miles back from the bay is very low, in fact much of it is lower than Galveston Island, and it is so frequently overflowed by high tide that large areas present a marshy appearance. These are in brief the physical conditions of the territory devastated by the hurricane.

The usual signs, which herald the approach of hurricanes, were not present in this case. The brick-dust sky was not in evidence in the smallest degree. This feature, which has been distinctly observed in other storms that have occurred in this section, was carefully watched for, both on the evening of the 7<sup>th</sup> and the morning of the 8<sup>th</sup>. There was cirrus clouds moving from the southeast during the forenoon of the 7<sup>th</sup>, but by noon only altostratus from the northeast were observed. About the middle of the afternoon the clouds were divided between cirrus, altostratus, and cumulus, moving from the northeast. During the remainder of the 7<sup>th</sup>, stratocumulus clouds prevailed, with a steady movement from the northeast. A heavy swell from the



southeast made its appearance in the Gulf of Mexico during the afternoon of the 7<sup>th</sup>. The swell continued during the night without diminishing, and the tide rose to an unusual height when it is considered that the wind was from the north and northwest. About 5 a.m. of the 8<sup>th</sup>, Mr. J. L. Cline, Observer, called me and stated that the tide was well up in the low parts of the city, and that we might be able to telegraph important information to Washington. He, having been on duty until nearly midnight, was told to retire and I would look into the conditions. I drove to the Gulf, where I timed the swells, and then proceeded to the office and found that the barometer was only one-tenth of an inch lower than it was at the 8 p.m. observation of the 7<sup>th</sup>. I then returned to the Gulf, made more detailed observations of the tide and swells, and filed the following telegram addressed to the Central Office at Washington:

“Unusually heavy swells from the southeast, intervals one to five minutes, overflowing low places south portion of city three to four blocks from beach. Such high water with opposing winds never observed previously.”

A storm velocity was not attained until about 1 p.m. on the 8<sup>th</sup>, after which the wind increased steadily and reached a hurricane velocity about 5 p.m. The greatest velocity for five minutes was 84 miles per hour at 6:15 p.m., with two miles at the rate of 100 miles per hour. The anemometer blew away at this time, and it is estimated that prior to 8 p.m. the wind attained a velocity of at least 120 miles per hour. For a short time, about 8 p.m., just before the wind shifted to the east, there was a distinct lull, but when it came out from the east and southeast it appeared to come with greater fury than before. After shifting to the south at about 11 p.m. the wind steadily diminished in velocity, and at 8 a.m. on the morning of the 9<sup>th</sup> was blowing at the rate of 26 miles per hour from the south.

The barometer commenced falling during the afternoon of the 6<sup>th</sup> and continued falling steadily but slowly up to noon of the 8<sup>th</sup>, when it read 29.42 inches. The barometer fell rapidly from noon until 8:30 p.m. of the 8<sup>th</sup>, when it registered 28.48 inches, a fall of pressure of about one inch in eight and one-half hours. After 8:30 p.m. the barometer rose at the same rapid rate that had characterized the fall. On account of the rapid fall in pressure, Mr. John D. Blagden, Observer, took readings of the mercurial barometer as a check on the barograph. His readings confirm the low pressure shown by barograph and indicate the great intensity of the hurricane.

Mr. Blagden looked after the instruments during the hurricane in a heroic and commendable manner. He kept the wires of the self-registering apparatus intact as long as it was possible for him to reach the roof. The rain gage blew away about 6 p.m., and the thermometer shelter soon followed. All the instruments in the thermometer shelter were broken, except the thermograph, which was found damaged, but has been put in working order.

Storm warnings were timely and received a wide distribution not only in Galveston but throughout the coast region. Hundreds of people who could not reach us by telephone came to the Weather Bureau office seeking advice. I went down on Strand Street and advised some wholesale commission merchants who had perishable goods on their floors to place them 3 feet above the floor. One gentleman has informed me that he carried out my instructions, but the wind blew his goods down. The public was warned, over the telephone and verbally, that the wind would go by the east to the south and that the worst was yet to come. People were advised to seek secure places for the night. As a result thousands of people who lived near the beach or in small houses moved their families into the center of the city and were thus saved. Those who lived in large strong buildings, a few blocks from the beach, one of whom was the writer of this report, thought that they could weather the wind and tide. Soon after 3 p.m. of the 8<sup>th</sup> conditions became so threatening that it was deemed essential that a special report be sent at once to Washington. Mr. J. L. Cline, Observer, took the instrumental readings while I drove first to the bay and then to the Gulf, and finding that half the streets of the city were under water added the following to the special observation at 3:30 p.m.: "Gulf rising, water covers streets of about half city." Having been on duty since 5 a.m., after giving this message to the observer, I went home to lunch. Mr. J. L. Cline went to the telegraph offices through water from two to four feet deep, and found that the telegraph wires had all gone down; he then returned to the office, and by inquiry learned that the long distance telephone had one wire still working to Houston, over which he gave the message to the Western Union telegraph office at Houston to be forwarded to the Central Office at Washington.



I reached home and found the water around my residence waist deep. I at once went to work assisting people, who were not securely located, into my residence, until forty or fifty persons were housed therein. About 6:30 p.m. Mr. J. L. Cline, who had left Mr. Blagden at the office to look after the instruments, reached my residence, where he found the water neck deep. He informed me that the barometer had fallen below 29.00 inches; that no further messages could be gotten off on account of all wires being down, and that he had advised everyone he could see to go to the center of the city; also, that he thought we had better make an attempt in that direction. At this time, however, the roofs of houses and timbers were flying through the streets as though they were paper, and it appeared suicidal to attempt a journey through the flying timbers. Many people were killed by flying timbers about this time while endeavoring to escape to town.

The water rose at a steady rate from 3 p.m. until about 7:30 p.m., when there was a sudden rise of about four feet in as many seconds. I was standing at my front door, which was partly open, watching the water, which was flowing with great rapidity from east to west. The water at this time was about eight inches deep in my residence, and the sudden rise of 4 feet brought it above my waist before I could change my position. The water had now reached a stage 10 feet above the ground at Rosenberg Avenue (Twenty-Fifth Street) and Q Street, where my residence stood. The ground was 5.2 feet elevation, which made the tide 15.2 feet. The tide rose the next hour, between 7:30 and 8:30 p.m., nearly five feet additional, making a total tide in that locality of about twenty feet. These observations were carefully taken and represent to within a few tenths of a foot the true conditions. Other personal observations in my vicinity confirm these estimates. The tide, however, on the bay or north side of the city did not obtain a height of more than 15 feet. It is possible that there was 5 feet of backwater on the Gulf side as a result of debris accumulating four to six blocks inland. The debris is piled eight to fifteen feet in height. By 8 p.m. a number of houses had drifted up and lodged to the east and southeast of my residence, and these with the force of the waves acted as a battering ram against which it was impossible for any building to stand for any length of time, and at 8:30 p.m. my residence went down with about fifty persons who had sought it for safety, and all but eighteen were hurled into eternity. Among the lost was my wife, who never rose above the water after the wreck of the building. I was nearly drowned and became unconscious, but recovered through being crushed by timbers and found myself clinging to my youngest child, who had gone down with myself and wife. Mr. J. L. Cline joined me five minutes later with my other two children, and with them and a woman and child we picked up from the raging waters, we drifted for three hours, landing 300 yards from where we started. There were two hours that we did not see a house nor any person, and from the swell we inferred that we were drifting to sea, which, in view of the northeast wind then blowing, was more than probable. During the last hour that we were drifting, which was with southeast and south winds, the wreckage on which we were floating knocked several residences to pieces. When we landed about 11:30 p.m., by climbing over floating debris to a residence on Twenty-Eighth Street and Avenue P, the water had fallen 4 feet. It continued falling, and on the following morning the Gulf was nearly normal. While we were drifting we had to protect ourselves from the flying timbers by holding planks between us and the wind, and with this protection we were frequently knocked great distances. Many persons were killed on top of the drifting debris by flying timbers after they had escaped from their wrecked homes. In order to keep on the top of the floating masses of wrecked buildings one had to be constantly on the lookout and continually climbing from drift to drift. Hundreds of people had similar experiences.

Sunday, September 9, 1900, revealed one of the most horrible sights that ever a civilized people looked upon. About three thousand homes, nearly half the residence portion of Galveston, had been completely swept out of existence, and probably more than six thousand persons had passed from life to death during that dreadful night. The correct number of those who perished will probably never be known, for many entire families are missing. Where 20,000 people lived on the 8<sup>th</sup> not a house remained on the 9<sup>th</sup>, and who occupied the houses may, in many instances, never be known. On account of the pleasant Gulf breezes many strangers were residing temporarily near the beach, and the number of these that were lost cannot yet be estimated. That portion of the city west of Forty-Fifth Street was sparsely settled, but there were several splendid residences in the southern part of it. Many truck farmers and dairy men resided on the west end of the island, and it is estimated that half of these were lost, as but very few residences remain standing down the island. For two blocks, inside the shaded area, the damage amounts to at least fifty per cent of the property. There is not a house in Galveston that escaped injury, and there are houses totally wrecked in all

parts of the city. All goods and supplies not over eight feet above floor were badly injured, and much was totally lost. The damage to buildings, personal, and other property in Galveston County is estimated at about thirty million dollars. The insurance inspector for Galveston states that there were 2,636 residences located prior to the hurricane in the area of total destruction, and he estimates 1,000 houses totally destroyed in other portions of the city, making a total of 3,636 houses totally destroyed. The value of these buildings alone is estimated at \$5,500,000.

The grain elevators, which were full of grain, suffered the smallest damage. Ships have resumed loading and work is being rushed day and night. The railroad bridges across the bay were washed away, but one of these has been repaired and direct rail communication was established with the outside world within eleven days after the disaster. Repairs and extensions of wharfs are now being pushed forward with great rapidity. Notwithstanding the fact that the streets are not yet clean and dead bodies are being discovered daily among the drifted debris, the people appear to have confidence in the place and are determined to rebuild and reestablish themselves here. Galveston being one of the richest cities of its size in the United States, there is no question but that business will soon regain its normal condition and the city will grow and prosper as she did before the disaster. Cotton is now coming in by rail from different parts of the State and by barge from Houston. The wheels of commerce are already moving in a manner, which gives assurance for the future. Improvements will be made stronger and more judiciously; for the past twenty-five years they have been made with the hurricane of 1875 in mind, but no one ever dreamed that the water would reach the height observed in the present case. The railroad bridges are to be built ten feet higher than they were before. The engineer of the Southern Pacific Company has informed me that they will construct their wharfs so that they will withstand even such a hurricane as the one we have just experienced.

I believe that a sea wall, which would have broken the swells, would have saved much loss of both life and property. I base this view upon observations which I have made in the extreme northeastern portion of the city, which is practically protected by the south jetty; this part of the city did not suffer more than half the damage that other similarly located districts, without protection, sustained.

From the officers of the U. S. Engineer tug *Anna*, I learn that the wind at the mouth of the Brazos River went from north to southwest by the way of west. This shows that the center of the hurricane was near Galveston, probably not more than 30 miles to the westward. The following towns have suffered great damage, both in the loss of life and property: Texas City, Dickinson, La Marque, Hitchcock, Arcadia, Alvin, Manvel, Brazoria, Columbia, and Wharton. Other towns further inland have suffered, but not so seriously. The exact damage at these places cannot be ascertained.

On 12 September 1900, a hurricane struck off Newfoundland and Prince Edward Island, *Canada*. The French fishing fleet was lost. There was a great loss of life.<sup>94</sup>

On 22 September 1900, floods were reported in Calcutta and Delhi, *India*, with loss of life.<sup>97</sup>

In October 1900, there was a flood in the *United States* of considerable proportions over the Wisconsin tributaries of the Mississippi River, due to excessive rains over that district. At La Crosse, Wisconsin, 7.23 inches of rain fell during the twenty-four hours ending at 8 a.m. of the 28<sup>th</sup>. Heavy rains had also occurred during the early days of the month. Great damage was wrought by the high waters in the Chippewa, Black, and Wisconsin rivers, and the total losses reported exceeded \$100,000 [\$2.6 million in today's dollars]. Streets in towns were flooded, families driven from their homes, stock drowned, crops ruined, and railroads washed out, but very fortunately, no lives were lost. At Portage, Wisconsin, on the 9<sup>th</sup>, the Wisconsin River reached 12.5 feet on the gage (the highest known stage), and the lowlands for five or six miles around were from four to six feet underwater. The Government levee at Portage gave way and the lower portions of the city were flooded in a very few minutes.<sup>124</sup>

On 26-27 October 1900, there was a heavy rainstorm and destructive floods in the Newcastle district of *England* resulting in 5 deaths.<sup>94</sup>

In early November 1900, there was a typhoon at Hong Kong, *China*, which caused over 70 deaths.<sup>94</sup>

On 10 November 1900, Hong Kong, *China* was visited by the most disastrous typhoon that it had experienced since 1874. It caused the loss of over 200 lives, some 270 junks and fishing boats in the harbor, and the loss of the government's new dredger, costing £40,000 and the foundering of H.M.S. gunboat *Sandpiper*. The American barque *Benjamin Sewall* broke her cable and drifted on to the Chinese gunboat *Fupo*, carrying away her masts, spars, and boats. The damage to the *Sewall* running ashore was about \$10,000 [\$250,000 in today's dollars]. The American barque *State of Maine*, Captain Colcord, was fortunate in being able to save 8 Chinese from a sinking junk alongside. The greatest loss was caused by the sudden veering of the wind at 8 o'clock. The damage to the city was not as great as to the shipping in the harbor, although iron lampposts and telegraph posts were twisted and bent, and all buildings of a temporary character were blown down and those in process of construction badly damaged. The consular buildings sustained the loss of all the blinds on one side of it and of a large portion of the windows on the other side. The trees and foliage about the grounds were badly wrecked, as they were all over the city.<sup>124</sup>

On 13 November 1900, a destructive typhoon struck *Guam* [in the western Pacific Ocean]. The U.S.S. *Yosemite* was lost.<sup>124</sup>

On 11-13 November 1900, a destructive typhoon struck off *Guam* and the *Philippines*. Hundreds were killed.<sup>94</sup>

On 20 November 1900, the severest "kona" ever known swept through the *Hawaiian Islands*. Prior to this, exceptionally hot weather was succeeded by 6 weeks of heavy rains. The "kona" is the Hawaiian native name for a storm from the southwest, a direction from which few storms come in this region. In reality, it is a cyclonic disturbance crossing the Pacific, and when its track lies far enough south, it appears there as a southwest wind. The Hawaiian Islands are exempt from anything like a hurricane or typhoon, just as they are wholly exempt from the extreme heats of the tropics. Although there were no actual losses of vessels, the shipping suffered severely. The Oahu Railroad suffered two washouts and a landslide, which disarranged traffic for three days. This was something that never occurred before. On Kanau [Kanu], the flood came in such torrents as to break down a protecting cement wall. On Molokai the torrent came down in such floods that at one time it scooped out a course for itself many feet deep, carrying millions of cubic feet of earth, rock, and boulders in its onrush. On Maui, the rain fell at the rate of 4 inches a day for 3 days in succession. The telephone system of the island was in chaos. The whole island of Haleakala [Haleakalā or East Maui Volcano] seemed a rushing torrent and streams flowed in great volume where there were never known to be any before. Kahului, Maui was under water for several days. During the storm on Maui, the Iao River overflowed its banks, carrying a raging torrent to the sea.<sup>124</sup>

During the afternoon and evening of 20 November 1900, a series of tornadoes struck southeastern Arkansas, northern Mississippi, and western Tennessee in the *United States*. The actual deaths resulting from these storms number at least seventy-three, while a large number of persons were seriously injured and a much greater number rendered homeless by the destruction of their dwellings. Through the farming districts the loss was mainly confined to fences, farm buildings, and cabins. Unpicked cotton was stripped from the stalk and scattered broadcast over the country, and instances were noted where large quantities of cotton were carried by the tornado to distant forests and deposited upon trees making them appear to be covered with snow. The estimated damage exceeded a half million dollars [\$13 million in today's dollars].<sup>124</sup>

\* At Ulm, Arkansas, several dwellings were destroyed and 2 persons killed.

\* The town of Moro, Arkansas was almost entirely swept away, only 4 buildings left standing; 3 persons were killed.

- \* At Dundee, Mississippi 6 persons were killed, many buildings destroyed, great damage done to fences and unpicked cotton. An additional 9 people were killed from Dundee to Arkabutla, Mississippi.
- \* At Arkadelphia, Mississippi, a town of about 1,000 inhabitants, scarcely anyone escaped without injury. Hundreds of homes were swept away without warning, and 11 persons were killed and a very large number severely injured.
- \* At Strayhorn, Mississippi, 11 people were killed
- \* At Coldwater, Mississippi, 1 person was killed and much valuable property destroyed.
- \* At Guys Switch, Mississippi, the tornado demolished 10 or 12 buildings, among which was the big sawmill plant of J. Guy & Co. Mr. Guy described the storm as follows: "We were running a sawmill at the time and did not notice the approach of the storm until within a few yards of us. The destructive part of the storm lasted about five or ten minutes. There were 23 men in the mill at the time, and though it was completely demolished no one was hurt. The storm was moving northeast with a path, I think, about 500 yards wide. It passed my place and swept everything before it. There was no hail, very little thunder and lightning, and no rain until the storm had passed. The trees outside of the storm's path lay mostly with their tops toward the center of the track of greatest destruction. The cloud was funnel shaped, and when it came in contact with the ground flattened out, and as it rose became narrower. One man was killed and several badly hurt by flying and falling lumber."
- \* At Lagrange, Tennessee, the tornado destroyed about 20 buildings and caused the death of 2 persons. The property loss at this place aggregates \$50,000. Within a path 175 yards wide practically every building was leveled to the ground. A strange relic left by the storm at Lagrange was a tin sign bearing the inscription "Johnson Bros., Lula, Miss." evidently brought by the tornado from that place more than 80 miles distant.
- \* At Ripley, Tennessee at least 25 dwellings were destroyed and a large number of people injured, but none were reported killed.
- \* The tornado passed through the suburbs of Columbia, Tennessee in a northeasterly direction, sweeping a path from 100 to 300 yards wide and destroying everything within its reach; 27 persons were killed and between 60 and 70 more or less injured. About 50 dwellings were destroyed, and the loss in buildings alone was estimated at \$30,000. A settlement near Columbia, known as Macedonia, about 2 miles from the original striking point of the tornado, containing about 25 houses, was completely demolished, and 13 people were buried under the debris.
- \* At Nolandsville [Nolensville], Tennessee, 3 persons were killed and about 13 buildings destroyed.
- \* At Laverne, Tennessee, 2 persons were killed and 25 buildings demolished.
- \* In the vicinity of Huntington, Mississippi, 10 buildings were destroyed and about 20 persons injured.
- \* At Vance, Mississippi, a tornado destroyed a general store and 10 cabins and killed 3 children.

On 20 November 1900, a destructive cyclone [tornado] struck Columbia, Tennessee in the *United States* causing many deaths.<sup>94</sup>

During 7-10 December 1900, the most disastrous hurricane within the past twenty-five years struck the island of New Britain [an island off the northwest coast of Papua, *New Guinea*]. The storm came after an unusually trying season of drought. The rain and squalls began on the 2<sup>nd</sup> or 3<sup>rd</sup> and increased in force daily until the hurricane and tremendous sea of the afternoon of the 7<sup>th</sup>.<sup>124</sup>

Exceptionally severe weather prevailed along the steamer routes of the Atlantic and Pacific Oceans during December 1900; and from the 20<sup>th</sup> until the close of the month disastrous storms visited the *British Isles* and the middle-western and northwestern coasts of continental *Europe*.<sup>124</sup>

On 20-21 December 1900, there was a gale over *United Kingdom* with loss of life. Twenty-two Shetland fishermen drowned.<sup>94</sup>

On 27, 29 December 1900, there was a destructive gale over the *United Kingdom*.<sup>94</sup>

On 30-31 December 1900, there were heavy floods in the Midlands and western *England*.<sup>97</sup>

In 1900 during the period between 27 June and 25 July, a drought engulfed Kansu (now Gansu province) in northwest *China* at Ching-sh'uan, Lanchow, P'ing-liang, Chuang-lang, Ku-yüan and Lin-t'an. During the period between 24 September and 22 October, a drought engulfed Hopei (now Hebei province) in

northern *China* at Nan-yüeh and Hsing-t'ai.<sup>153</sup>

*Also refer to the section 1890 A.D. – 1900 A.D. for information on the drought in South Africa during that timeframe.*

*Also refer to the section 1895 A.D. – 1903 A.D. for information on the drought in Australia during that timeframe.*

*Also refer to the section 1896 A.D. – 1900 A.D. for information on the famine in India during that timeframe.*

**Winter of 1900 / 1901 A.D.** On 22-24 November 1900, a storm of heavy sleet and snow struck the highlands of western New York in the *United States*. At Hammondsport, New York:<sup>124</sup>

The falling moisture clung to and froze fast upon everything. Nearly every fruit orchard was more or less damaged, and some were totally ruined. Thousands of trees were either uprooted or thoroughly stripped of branches. Whole tracts of forest were similarly affected, in many instances being crushed to the ground. Fruit trees of almost every description were more or less damaged. Young orchards escaped with slight injury, from the fact that the weight bent the trees to the ground, thus saving them. It was said that 1½ inches of ice formed on every twig and branch of the trees. This will give a faint idea of the immense weight. One man says that in a tract of second growth hickory and white oak from thirty to fifty feet tall, the trees were bent entirely over, the tops resting on the ground. When the sun loosened the ice many sprung back, but portions of them were splintered and ruined. The drippings from pine boughs formed in many instances complete thatched roofs. Pine timber was, therefore, less injured than others, from the fact that all of the pine boughs were so closely bound together that the weight was more equally distributed.

One of the strange sights of the effects of the storm was that upon wire fences. In many cases they were one solid sheet of ice, with scarcely a crevice large enough for a field bird to penetrate. The amount of damage can hardly be estimated but it will be immense at the best. In the memory of the oldest inhabitant nothing like it had ever been known in this region. The result will be a great scarcity of apples and other fruit for years to come in the region thus affected.

The winter of 1900-01 in Bradford County, Pennsylvania in the *United States* was open with little snow but was remarkable for rain and windstorms. Heavy rains broke a severe drought during the last week in November. A destructive windstorm swept over sections of the county on November 21 and another hit North Towanda on December 23. Several inches of snow fell January 25, affording the first sleighing of winter, and continued for most of February. February 23 was the coldest day when the temperature fell to -8° F [-22° C]. On March 3, a destructive windstorm hit the valley of Towanda Creek. On March 10, a heavy rainfall caused a sudden rise in the streams, which with the breaking up of ice at various points created floods and overflows, doing much damage to bridges and other property. The heaviest snowfall was on April 2, which was 18 inches [46 cm] deep in some parts of the county. It was too wet for farming, until the end of April. May was remarkable for heavy rains, with wind, thunder and hailstorms, the most notable of these occurred on May 23.<sup>178</sup>

A terrible storm passed over northern *England* and southern *Scotland*. In *England*, when the storm centers passes by far to the north, southern *England* experiences the mildest winter weather. Thus, on 26 December 1900, the weather in London, *England* was one of the greenest Christmases on record, for the weather had been so mild that primroses and corn flowers were abloom as far north as Liverpool and Yorkshire, while Devonshire reveled in a subtropical climate and the Isle of Wight was a garden of roses in midwinter. Never had flowers been more abundant in the London market at Christmas time, nor had mistletoe been cheaper. The London sky had been heavily clouded and the air filled with mist, while the weather had been unseasonably warm.<sup>124</sup>

On January 6, severe cold weather somewhat suddenly spread over *Europe*. A blizzard prevailed throughout southern *Russia* and southern *Austria*; a bitter easterly wind and gale prevailed on the east coast of *Great Britain*, frozen harbors and enormous snow drifts impeded traffic on the northern shore of the *Black Sea*, and violent gales in the *Adriatic Sea*. Snow fell as far south as Naples and Rome, *Italy* and



Marseilles, *France*. The temperature at St. Petersburg and Moscow, *Russia* was unusually low even for those locations.<sup>124</sup>

During the week of 9-16 January 1901, Dawson, *Canada* experienced an average weekly temperature of -58° F (-50° C). The lowest temperatures occurred on the 16<sup>th</sup> when Dawson experienced a low of -68° F (-55.6° C) and Forty Mile Creek experienced -78° F (-61.1° C). These were the lowest temperatures on record in that region. From Skagway to Dawson and below, the Yukon was covered with deep snow. From Skagway to White Horse for 100 miles the railroad was blocked and all trains tied up.<sup>124</sup>

On 20 January 1901, Santiago de Cuba, *Cuba* reports the severest cold known for many years, viz, a temperature of 60° F and dry northerly winds, that brought great discomfort.<sup>124</sup>

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Rev. Original: 7 December 2010

Rev. 1: 24 January 2011 [correction to Winter 1809/10; added very early Russian chronology (Ref. 76); added American chronologies (Ref. 77 & 78)].

Rev. 2: 7 March 2011 [addition of French chronology (Ref. 79) and Italian accounts (Ref. 80-82); implemented several corrections].

Rev. 3: 3 June 2011 [added information on the most severe famines, Australian chronologies, U.S. Weather Data and began to fill in the gap between 1850-1900 A.D., references 83-128].

Rev. 4: 14 December 2011 [added substantial weather data from the U.S. Monthly Weather Reports, added hurricane data, added early Japanese weather data, the Finland & Estonian famine of 1695-97, added a small portion of the Chinese flood and drought data and incorporated numerous corrections. Added references 129-153].

Rev. 5 [6<sup>th</sup> Edition]: 14 June 2012 [completed the addition of China flood and drought data. Also added some early French and German events. Added references 154-172.]

Rev. 6 [7<sup>th</sup> Edition]: 3 March 2014 [made corrections to old German translations of reference 172, added 1783 Fractured Comet Impact Hypothesis, added Taiwan Mega-Tsunami, added references 173-306.]