

A Chronological Listing of Early Weather Events

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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*.¹ 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. I have combined and organized these accounts in chronological order.

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. Examples are the freezing of the Black Sea in 762 A.D., the heavy rainstorms in Great Britain in (553 A.D., 918 A.D., 1222 A.D., 1233 A.D., 1330 A.D., 1338 A.D., and 1348 A.D.), and the winters in which the River Thames froze in London.

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 the 1938 Yellow River flood that caused 500,000 Japanese/Chinese fatalities) and events caused by other non-weather related catastrophes (such as tsunami waves caused by earthquakes/volcanoes). The chronology does include major volcano induced global cooling events.

This chronology begins at 0 A.D. A few of the source chronologies actual 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 the temperature was at freezing 32° F (0° C) or below.

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.

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).

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.

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.

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.⁸³ [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.⁸⁴

Discussion

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.

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.

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 and tell me about the mistake.

I suspect there are a variety of chronologies in other languages yet to be uncovered.

6 A.D. A famine struck Rome, *Italy*.^{57, 91}

7 A.D. There was a great flood in the valley of Thames in *England*; many persons were drowned and cattle destroyed.^{47, 92}

[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.^{40, 41, 43}

9 A.D. There was a great overflow of River Humber in *England*, flooding the country all round.^{47, 92}

In the 43rd 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.⁷²

10 A.D. – 15 A.D. Ireland.

In *Ireland*, general fruitlessness [poor harvest], gave rise to famine and great mortality.^{57, 91}

14 A.D. There was a great overflow of River Severn in *England*, causing great damage.^{47, 92}

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

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.^{47, 92}

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

29 A.D. There was a great overflow of River Trent in *England*.^{47, 92}

33 A.D. There was a great overflow of River Dee in *England*, caused great damage at Chester.^{47, 92}

37 A.D. There was an overflow of River Medway in *England*, and many cattle drowned.^{47, 92}

42 A.D. In Judea [*Israel*], the area was desolated by a famine.^{57, 91}

Awful famine in *Egypt* in 42 A.D.⁹⁰

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.]⁷⁹

46 A.D. In *Syria*, there was a very great famine.⁷²

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

The River Thames in *England* overflowed. The water extended through four counties. 10,000 people drowned and there was much damage to property.^{47, 92}

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

51 A.D. A great famine in *Greece*.^{57, 72, 91}

52 A.D. A great famine struck Rome, *Italy*.⁷²

54 A.D. A grievous famine struck *England*.^{57, 91}

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.⁹²]

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

76 A.D. A famine caused great scarcity in *Ireland*.^{57, 91}

79 A.D. – 88 A.D. Italy.

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.⁸⁴

80 A.D. There was a great overflow of River Severn in *England*; many people and cattle were drowned.^{40, 41, 43, 47, 92}

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

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

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

95 A.D. The Humber River in *England* overflowed and laid the adjacent country for 50 miles (80 kilometers) under water.^{40, 41, 43, 47, 92}

104 A.D. A famine struck *England* and *Scotland*.^{57, 91}

107 A.D. A famine struck *Britain* after long rains.^{57, 91}

115 A.D. There was an overflow of River Severn in *England*; a great loss of life and cattle.^{47, 92}

The River Severn in *England* overflowed and drowned 5,000 head of cattle and people in their beds.^{40, 41, 43}

119 A.D. A famine struck *Britain* “after a pillar of fire was seen for several nights in the air”.^{57, 91}

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

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

In *England*, there were a hailstorm with hailstones 12 inches “about”, fatal to people and cattle.^{57, 93}

131 A.D. In Dorsetshire *England*, there was an inundation of the sea, which came 20-miles inland. Great loss of life and property.^{47, 92}

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

The River Thames in *England* frozen for two months.^{47, 93}

151 A.D. A grievous famine struck *Wales*.^{57, 91}

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

The River Thames and all rivers in *England* frozen nearly three months.^{47, 93}

154 A.D. In Rome, *Italy* in 154, during the 16th 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.⁹²

155 A.D. In Edinburgh, *Scotland*, there was considerable damage from a flood.^{47, 92}

160 A.D. A great famine struck *England*; multitudes starved.^{57, 91}

167 A.D. A great inundation of the Tiber River in *Italy*.⁷²

173 A.D. In *England*, three month’s frost followed by dearth.^{47, 93}

A famine struck *England* after severe frost and snow.^{57, 91}

175 A.D. A famine struck Rome, *Italy*.^{57, 72, 91}

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.]⁸⁴

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.⁹²

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.”^{57, 91}

A famine afflicted the city of Rome, *Italy*.⁷²

207 A.D. In *England*, hail, “bigger than ducks’ eggs.”^{57, 93}

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

In *England*, the Trent valley overflowed. Great destruction, extending 20 miles from normal course of stream.⁴⁷

218 A.D. In Northumberland, *England*, there was a great flood of the River Tweed; much damage.^{47, 92}

In *England*, the River Tweed had a sudden inundation, and destroyed a considerable number of the inhabitants on its banks.^{40, 41, 43}

220 A.D. The winter was very severe in *England* in 220 A.D. with a frost lasting five months.^{28, 40, 41, 42, 43}

In *Britain*, frost lasted five months continuously.^{47, 92}

[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.¹

228 A.D. A famine struck *Scotland*; thousands were starved.^{57, 91}

234 A.D. In Canterbury, *England*, a storm threw down 200 houses, and killed several families.^{40, 41, 43, 56}

238 A.D. A most grievous famine struck *Scotland*.^{57, 91}

245 A.D. In Lincolnshire, *England*, an eruption of the sea laid underwater many thousands of acres, which have not been recovered to this time.^{40, 41, 43, 47, 90}

250 A.D. In *England*, the River Ouse in Bedfordshire overflowed and drowned many people and cattle.^{40, 41, 43, 47}

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.¹

The River Thames in *England* frozen nine weeks.^{2, 40, 41, 43, 47, 93}

Severe winter struck *England*. The River Thames was frozen for 9 weeks.²⁸

259 A.D. A famine struck *Wales*. Thousands were “pined to death”.^{57, 91}

262 A.D. A famine at Rome, *Italy* attended by a plague.⁹⁰

264 A.D. In *Britain*, hail; each stone one pound or above in weight.^{57, 93}

268 A.D. In *England*, the River Humber overflowed and did great damage.^{47, 92} [Other sources place this flood in the year 269.^{40, 43}]

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.⁸⁰

272 A.D. A famine struck *Britain*. People ate the bark of trees and roots.^{57, 90, 91}

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.¹²⁸

277 A.D. In London, *England*, a storm killed several people.^{40, 41, 43, 56}

288 A.D. A famine struck all through *Britain*.^{57, 91}

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.¹

Most of the rivers in *Britain* frozen six weeks.^{2, 40, 41, 43, 47, 93}

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

298 A.D. In *Wales*, there was a great drought.⁴⁷

A famine struck *Wales*.^{57, 91}

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].⁶²

300 A.D. - 336 A.D. Cyprus

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

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

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

In Winchester, *England*, there was a major storm.^{40, 41, 56}

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

306 A.D. A famine prevailed in *Scotland* beginning in 306 and lasting four years. Thousands died; “most grievous and fatal.”^{57, 91}

A famine in *Scotland* in 306. Thousands died.⁹⁰

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

307 A.D. In 307, a famine prevailed in Cappadocia, *Turkey*.^{57, 91}

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

310 A.D. In 310, a famine prevailed in *England*; 40,000 people perished.^{57, 90, 91} [Other sources place this event in the year 338.]

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

317 A.D. In *England*, on the Isle of Thanet (Kent), there was a flood with loss of life and property.^{47, 92}

In *England*, on the Isle of Thanet, there was an inundation.⁴³

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

323 A.D. In *England*, the inhabitants of Ferne Island off the coast of Northumberland were destroyed by an inundation of the sea.⁴⁷

In *England* in 323, there was a flood that destroyed all the inhabitants in Ferne Island, 7 miles southwest of Holy Island.^{40, 43}

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

325 A.D. A severe famine struck *Britain*.⁵⁷

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

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

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

330 A.D. In *England*, there was an irruption of the sea in Lancashire.^{40, 41, 43, 47}

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

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.⁵⁷

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

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

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

334 A.D. In *England*, hail, “stones like goose eggs; fatal to people and cattle.”^{57, 93}

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

336 A.D. In *England*, there was a great flood and overflowing of the River Tweed.^{40, 41, 47}

In *England*, there was an inundation of the River Tweed.⁴³

A famine struck *Syria* along with a plague.^{57, 91}

Famine and plague depopulated *Syria* and *Cilicia* [Southeastern Anatolia].⁷²

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

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

344 A.D. In *England*, hailstorm, “stones much bigger than hens’ eggs.”^{41, 43, 56, 57, 93}

349 A.D. In *England*, 420 houses in Carlisle, blown down by a storm and many people killed.^{40, 41, 43, 56}

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

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

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

355 A.D. The harsh winter of 355 in northern *Gaul* caused a large number of people to freeze to death.⁷⁹

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.⁷⁹

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

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

In 358, the winter in Paris, *France* was extraordinarily cold.⁷⁹

359 A.D. The winter in *Scotland* produced a severe frost lasting 14 weeks.^{28, 40, 41, 43}

The winter in *Scotland* produced fourteen weeks of frost. The frost was also very severe in *England*.^{47, 93}

360 A.D. The winter of 360 in northern *Gaul* was much harsher than usual.⁷⁹

362 A.D. In *England*, “a prodigious drought.”⁴⁷

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.⁷² [Another source indicated there was a great drought that was universal over all the world in the year 360.]

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

366 A.D. The winter was extremely harsh in January 366 in northern *Gaul*.⁷⁹

367 A.D. A shower of hail fell at Constantinople [Istanbul, *Turkey*] on July 2nd. 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.⁷²

368 A.D. In Sicily *Italy*, there was an irruption of the sea; great destruction.^{47, 92}

370 A.D. An awful famine struck Phrygia [*Turkey*].^{57, 90, 91}

374 A.D. In *England*, there was a drought that was followed by a famine.⁴⁷

In Caesarea [*Palestine*], there was a great drought followed by a famine.⁷²

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

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

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].⁵⁷

There was a terrible famine among the Goths.⁹¹

387 A.D. In Cheshire, *England*, there was an overflowing of the River Dee, and great destruction.^{47, 92}

There was an inundation of the River Dee in *England*.^{40, 41, 43}

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

In 393 in *Egypt*, there was an unusual overflow of the Nile River; great damage.⁹² [Another source places this event in the year 398.⁴⁷]

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

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*.^{2, 41, 42, 43}

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

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*).^{47, 93}

In the year 400, the *Black Sea* froze completely. The Rhône River in *France* was frozen firm across its entire width.^{60, 62}

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

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

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.⁷²

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.⁶¹

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

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

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

410 A.D. In Rome, *Italy*, there was a famine followed by a plague.^{57, 72, 91}

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.⁷²

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.⁷²

415 A.D. In *England*, an inundation of the River Dee drowned 40 families.^{40, 41, 43}

416 A.D. In *England*, a great part of Colchester destroyed, and several people killed by a storm.^{40, 41, 43, 56}

419 A.D. In Hampshire, *England*, there was an inundation of the sea and great destruction, near Southampton.^{40, 41, 47, 92}

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

421 A.D. – 422 A.D. Turkey.

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.⁸⁶

434 A.D. In *Italy*, there was a famine.^{57, 72, 91}

439 A.D. In *England*, there was a drought.⁴⁷

In *England*, there was a famine.^{57, 91}

441 A.D. In *Wales*, the sea made great inroads, both north and south, many people and much cattle drowned.^{47, 92}

In north and south *Wales*, an irruption of the sea.^{40, 41, 43}

443 A.D. There was an extraordinary severe winter. There was so much snow that covered the ground for such a long time that it cause great destruction of people and cattle.⁷²

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

449 A.D. In 449, there was a great famine in *Italy*.¹²⁸

450 A.D. 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.¹

A great hailstorm struck *Britain* in 459 A.D. [misprint?] with hailstones 3 inches (8 centimeters) in diameter. Killed many people and cattle.²⁸

In *Gaul* in the year 450, the weather seasons were extraordinary.⁷⁹

In *Italy*, there was a severe famine – so severe that parents ate their children.^{57, 90, 91}

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.⁸⁶

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

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.⁴⁷

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.⁷²

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

458 A.D. In York, *England*, a storm blew down several houses, and killed many people.^{40, 41, 43, 56}

459 A.D. In *Britain*, hail in many parts of the country; stones 3 inches in diameter. “Killed many men and much cattle.”^{40, 41, 43, 56, 57, 93}

460 A.D. The Ardèche and the Durance rivers in *France* were entirely frozen. The winter was very severe.⁶¹

462 A.D. Danube River was frozen.¹

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 *France* was frozen.^{60, 62}

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

In 462, the Var River in southeast *France* also froze completely.⁷⁹

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

466 A.D. In *Britain*, there was a famine “and bad fatal air”.^{57, 91}

A grievous famine prevailed in *Britain*; and a pestiferous smell in the air killed both man and beast.⁷²

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.⁷⁹

469 A.D. In Constantinople (Istanbul, *Turkey*), there was much flooding, consequence of four days of incessant rain.^{47, 92}

Terrible rains fell in Constantinople and Bythina, which ceased not for four days. Floods turned mountains to a plain. Towns were drowned.⁷²

474 A.D. The winter in *Britain* was very cold. There was 4 months of frost and great snow.²⁸

Frost with great snow for four months in *England*.^{47, 93}

475 A.D. Famine oppressed the Gallicans, Rhaetians, Noricans, and other Northern Nations [most of *Europe*].⁷²

In 475, there was a famine in the Northern Nations [of *Europe*], partly caused by locusts.⁹¹

479 A.D. In London *England*, the River Thames for many miles above and below much flooded; great damage.^{47, 92}

480 A.D. The Tiber River in Rome, *Italy* froze over.³³

In *Scotland*, there was a drought.⁴⁷

In *Scotland*, there was a famine after the appearance of a comet.^{57, 91}

484 A.D. In *Africa*, there was a terrible drought.⁴⁷

In *Africa*, there was a famine caused by drought.^{57, 91}

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* [Germanic people]. 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.⁷²

487 A.D. In *England*, the Severn valley overflowed; great damage.^{40, 41, 47, 92}

In 487, there was an inundation of the Severn.⁴³

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

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

So severe a frost all over *Britain* that the rivers were frozen up for about two months.^{2, 40, 41, 42, 43, 47, 93}

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

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.⁷²

515 A.D. *England* was most afflicted by a famine.^{57, 91}

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

520 A.D. In Venice, *Italy*, there was a famine. The city received relief from Theodoric the Great.^{57, 91}

523 A.D. In *Scotland*, a terrible famine struck.^{57, 91}

525 A.D. In *England*, the River Thames hard frozen for six weeks.^{47, 93}

In *England*, the River Trent overflowed. Great number of cattle drowned.^{47, 92}

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

527 A.D. A famine struck in *North Wales*.^{57, 91}

529 A.D. In *England*, the River Humber overflowed.^{40, 41, 43} Many people and cattle drowned.^{47, 92}

531 A.D. A famine struck in *South Wales* and a small plague.^{57, 91}

534 A.D. A sore famine struck in *Italy*.⁷²

535 A.D. A famine struck *Ireland*. It was caused by the destruction of food and scarcity. The famine last four years.^{57, 91}

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.⁷³

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.⁷² [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.]

536 A.D. In Northumberland *England*, the River Tweed overflowed. People and cattle drowned.^{47, 92}

537 A.D. A dearth struck *Scotland* and *Wales*.^{57, 91}

538 A.D. The land of *Italy* lay uncultivated last year, hence a great famine. Such as dwelt in the region of Emilia, *Italy* left their seats and goods, and went into the region of Picenum, *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, *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 were also starved, but bread made of earthnuts was a help to them. Far greater still were the numbers of starved beyond the Ionian [*Greek*] 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, *Italy* that many mothers eat their own dearest children. The region of Campania, *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.⁷²

In 538 in *Italy* there was a great famine.^{57, 91}

540 A.D. In *France* and *Italy*, there were great floods from rain.^{47, 92}

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

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.⁶²

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.⁷²

547 A.D. In 547, there was a famine in *Italy*.^{57, 91}

Winter of 547 / 548 A.D. 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.^{62, 79}

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.⁶²

In the year 548, the winter in *France* was very cold and produced deep snow.²⁸

549 A.D. A terrific storm struck London, *England* blowing down many houses and killing two hundred and fifty persons.^{1, 40, 41, 43, 56}

550 A.D. In *Scotland*, hail, “like pullets’ eggs.”^{57, 93}

552 A.D. In *Greece*, there was an inundation from the sea; part submerged.^{47, 92}

553 A.D. It rained most of the year in *Scotland*.¹

The rainstorms were violent in *Scotland* for five months.^{2, 40, 41, 47, 92}

554 A.D. The winter is recorded in *Holland* as very severe.⁶²

[In *Western Europe*] the winter was so severe that wild fowl and great wild beast might be caught [by hand].⁷²

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.¹

In 558, in *Eastern Europe*, the frost was so great that the Danube River was quite frozen over.^{2, 39, 40, 41, 42, 43, 47, 93}

In 559, the Danube River was frozen this winter.⁶²

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.⁶²

In 558, the River Thames in *England* was frozen for six weeks.²⁹

559 A.D. 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.⁷⁹

564 A.D. In *England*, great rain floods.^{47, 92}

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.⁷²

566 A.D. On the coast of Kent, Sussex and Hampshire, *England*, there was a great storm.^{40, 41, 43}

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.⁶²

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.⁷⁹

570 A.D. In *Italy*, great rain and floods.^{47, 92}

575 A.D. In *England*, parts of Essex, Suffolk, and Norfolk inundated from the sea.^{40, 41, 43, 47, 92}

576 A.D. A fatal famine struck *Scotland*.^{57, 91}

579 A.D. In *France* and *Italy*, there were great rain and floods.^{47, 92}

580 A.D. In Anglesea, *Wales*, there was much damage by the sea.^{47, 92}

In the year 580, a great flood occurred in *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.⁶¹

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.⁷² [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, *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.⁷⁹

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, Arles and Bourges.⁷⁹

In 580 in *Western Europe*, there was the earthquake, large hail, fierce storms and rains.⁷⁹

582 A.D. In 582 in *Western Europe*, the heat of during the winter caused the trees to bloom in the month January. This month also was filled with violent rain, lightning and thunder.⁷⁹

January 582 produced heavy rains accompanied by lightning and thunder in *Western Europe*.⁷⁹

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.⁶²

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.⁷⁹

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.⁷⁹

In Gaul [*Western Europe*], the trees bore fruit in July and then again in September. The drought was very great.⁶²

In 584 in *Western Europe*, an immense drought finally ruined the vineyards and the harvest, which was already compromised by earlier hailstorms and frosts.⁷⁹

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.⁷⁹

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.⁷⁹

There was extensive flooding in 586 in the north of *Western Europe*.⁷⁹

587 A.D. In 587 the great rainfalls caused the rivers to swell prodigiously. This flood was especially severe in Burgundy, *France*.⁷⁹

[In *France*] in October, after the harvest, new vines covered with grapes appeared and on the trees, new leaves and new fruit.⁶²

In October 587 after the harvest in *Western Europe*, the vines grew new shoots and new grapes formed.⁷⁹

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.⁶²

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.⁷⁹

The trees bloomed again in the autumn of 589 in *Western Europe*, and then they produced other fruit. The fruit was pink in November.⁷⁹

590 A.D. In *Italy*, there were great floods from tempest; followed by a plague.^{47, 92}

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 and the Venetian territories, both by floods, famine and plague.⁷² [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 590.⁷⁹

In *England*, a tempest raised a great flood and afterwards a famine appeared.^{57, 91}

591 A.D. Following the heavy rains, and disastrous floods of 590, the year 591 produced a drought in *Western Europe*.⁷⁹

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.⁷⁹

The excessive dryness of 591 in *Western Europe* consumed all the fields.⁷⁹

592 A.D. In *England*, there was a drought that lasted from 10 January to September, along with a plague of locust. This produced a famine.^{57, 91}

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 Capiteano, then shifted to another province.⁷²

593 A.D. It was in southern Gaul [*Western Europe*] such a severe winter that no one living ever remembered a similar winter.⁶²

600 A.D. – 604 A.D. France.
In *France*, there was a famine.^{57, 91}

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*.^{47, 93}

[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.⁷²

The unusual cold of the year 603 in *Western Europe* killed much of the vineyards.⁷⁹

605 A.D. In *England*, there was a drought with scorching heat.⁴⁷

In *England*, there was heat and drought that caused a famine.^{57, 91}

In *Italy* there was extraordinary heat and drought.⁶²

There was excessive heat and drought, hence a famine and plague on man and beast in *Italy*.⁷²

Due to a harsh winter in *France*, a very large portion of the (grape) vines were lost.⁶²

607 A.D. There was extensive flooding in 607 in the north of *Western Europe*.⁷⁹

625 A.D. In *Britain*, there was a grievous famine.^{57, 91}

634 A.D. There were great snows in the Country of Berg (*Germany*) that killed many people.

In *Ireland*, there were floods in Munster.^{47, 92}

642 A.D. The winter in *Europe* was severe. The *Black Sea* was frozen. There were snowdrifts 90 feet (27 meters) deep.²⁸

649 A.D. In Cheshire and Lancashire, *England*, there was great damage from an inundation of the sea.^{40, 41, 43, 47, 92}

664 A.D. In *Ireland*, a great famine preceding second appearance of *Buidhe Chonail* [yellow pestilence].^{57, 91}

667 A.D. A grievous famine struck *Scotland*.^{57, 91}

669 A.D. In Kent, *England*, the River Medway overflowed; great damage.^{40, 41, 47, 92}

In 669, there was an inundation of the Medway.⁴³

A great famine struck *France*.^{57, 91}

There was a great famine in *France*. The king sold his jewels to relieve the poor.⁶²

In *Ireland* there was a great scarcity in 669 and in the following year.^{57, 91}

670 A.D. A fatal frost in *England*.^{47, 93}

The winter on the Coast of Constantinople was very severe and long and a large number of people and animals perished.⁶²

The winter was most severe and long. It killed many people and cattle.⁷²

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.⁷⁹

680 A.D. In *England*, there was famine from a drought that lasted for three years.^{47, 57, 91}

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.⁷²

683 A.D. There was a famine in *Syria* and *Libya*.^{57, 91}

[Another source cites this as the year 689] In 689 a famine afflicted *Syria* that many removed out of it into *Romania*.⁷²

684 A.D. The winter in *Scotland* was very cold. Many lakes, rivers and the sea froze.²⁸

685 A.D. In *Ireland*, there was a great inundation of the sea.^{47, 92}

690 A.D. At Venice and Liguria *Italy*, there were great floods from violent rainstorms.^{47, 92}

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.⁷²

693 A.D. In *Ireland*, there were floods caused by rainstorms in Leinster.^{47, 92}

695 A.D. The River Thames in *England* was frozen so hard that many booths were built thereon.¹

The River Thames in *England* was frozen for six weeks, when booths were built on it.^{2, 40, 41, 42, 43}

The Thames in *England* was frozen for six weeks, when booths were built, and a market held upon the ice.²⁹

In *England*, the River Thames was frozen over for six weeks. Trade were carried on in booths.^{47, 93}

A severe winter struck *England*. The River Thames was frozen for 6 weeks and it was cold in *Europe*.²⁸

700 A.D. In *England* and *Ireland*, there was a famine and pestilence during three years, “so that men ate each other”.^{57, 91}

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.⁷²

In 700, a great drought prevailed in the *Auvergne, France*.⁷⁹

701 A.D. In *Lincoln, England*, a storm threw down above 100 houses.^{40, 41, 43, 56}

703 A.D. In *Italy*, there were three years of famine.^{57, 91} [Another source gives the year as 708]⁷²

707 A.D. In *Asia*, there was a terrible frost.^{47, 93}

There was a most severe winter, so that in *Asia*, the earth was covered with snow for 30 days and most animals died.⁷²

712 A.D. A famine struck *Wales*.^{57, 91}

There was extensive flooding in 712 in the north of *Western Europe*.⁷⁹

717 A.D. In *Rome Italy*, the Tiber River greatly overflowed from rain.^{47, 92}

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].⁷²

The *Calvisio* says in 717 in the region of *Trace* and on the side of *Constantinople*, the winter was so violent that the horses and camels of the Saracen army perished in great numbers.^{58, 80}

In *Constantinople*, the winter was so severe that the horses and camels of the Saracen army that was besieging the city perished in large numbers.⁶²

718 A.D. A famine struck *Syria*.^{57, 91}

719 A.D. In *Ireland*, there was a rainy summer and a great inundation of the sea.^{47, 92}

730 A.D. In *Edinburgh, Scotland*, there was great damage by rain or inundation.^{40, 41, 43, 47, 92}

In 730 in *England, Wales* and *Scotland*, there was a great famine.^{57, 91}

[Another account places this event in the year 739.] In 739, there was a famine in *England, Wales*, and *Scotland*.⁹⁰

737 A.D. In *Britain*, there was a great drought that produced scarcity.⁴⁷

738 A.D. In *Glasgow Scotland*, there was great floods; more than 400 families drowned.^{40, 41, 43, 47, 92}
[Some authorities give the date 758 A.D.]

741 A.D. In *Britain*, there was a great drought that produced scarcity.⁴⁷

743 A.D. In *Britain*, there was a great drought with an earthquake.⁴⁷

746 A.D. In *Wales*, there was a dearth [famine].^{57, 91}

748 A.D. In *Scotland*, there was a famine.^{57, 91}

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.]⁷⁹

757 A.D. A great famine followed the continuous rains in the year 757 in the north of *Western Europe*.⁷⁹

758 A.D. In 758, there was an inundation at Glasgow, *Scotland*, which drowned more than 400 families.⁹⁰

759 A.D. In *Ireland*, there was a great famine throughout the kingdom, which lasted for several years.^{57, 91}

Winter of 759 / 760 A.D. The frost in *Britain* continued from 1 October 759 to 26 February 760.^{40, 41, 42, 43, 47, 93}

762 A.D. In *Britain*, there was a long and terrible drought, with heat.⁴⁷

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, *Bulgaria*, and the lands of other adjacent people. By divine command, during February of the same (764 A.D.) second indication the ice divided into a great number of mountainous chunks. The force of the wind brought them down to Daphnousia 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).³

Around Constantinople (now Istanbul, *Turkey*), the two seas frozen.^{47, 93}

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).¹ [misprint for 763 A.D.]

In the year 763, the *Black Sea* and the Straits of the *Dardanelles* were frozen.^{60, 62}

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 *Bosphorus* to the *Black Sea* near Daphnusia, which was a powerful castle. Most of them entered into the *Bosphorus*. 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 *Bosphorus* 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 Constantinopolis 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 Constantinopolis Fortress.⁴

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 764.²⁸

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 Marmora was passable for cavalry.⁶³

From October 763 to February 764, a frost at Constantinople, when the two seas there were frozen a hundred miles from the shore.⁹⁰

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.⁶²

During the winter of 763-764 in *Western Europe*, the cold started October 1st and ran until February 764.⁷⁹

On October the 1st, 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.⁷²

In 763 in *England*, there was a violent frost, which continues about 150 days.¹²⁸

764 A.D. In *Britain*, there was a drought after a long and severe frost.⁴⁷

767 A.D. In *Asia*, there was a great drought.⁴⁷

So great a drought in Thracia [*Southeast Europe*] without either rain or dew, that all springs, fountains and rivers at Constantinople were dried up.⁷²

768 A.D. In *Ireland*, there was famine and an earthquake.^{57, 91}

772 A.D. In *Ireland*, there was a great drought.⁴⁷

In *Ireland*, there was a famine from a drought.^{57, 91}

A storm struck Wells, *England*.^{40, 41}

774 A.D. In *Scotland*, there was a famine with a plague.^{57, 91}

775 A.D. In *England*, there was a drought with excessive heat, after a great frost.⁴⁷

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.⁷²

[In *Byzantium*], the summer was hot and all the wells dried up.⁶²

776 A.D. In *Ireland*, there were great fall of rain, and consequent flood.^{47, 92}

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.⁸⁶

779 A.D. A famine and plague grievously afflicted *France*.⁷²

781 A.D. A storm struck Coventry, *England*.^{40, 41}

783 A.D. [In *Germany*], the summer was so burning that many people perished from the heat.⁶²

The heat during the summer of 783 in southern *France* was so extreme that many people died from it.⁷⁹

785 A.D. In *Ireland*, there was a flood in Darinis [now Molana Island].^{47, 92}

788 A.D. In *Italy*, the Tiber River much flooded by rain.^{47, 92}

In *England* there was a famine. In *Italy* the Tiber River also overflowed and did inestimable damage.⁷²

791 A.D. This winter the vines in Provence, *France* suffered very much and the flocks came into the stables.⁶²

In *Wales*, there was a grievous famine.^{57, 91}

792 A.D. In *Scotland*, there was a dearth [famine].^{57, 91}

793 A.D. Frightful thunder and lightning storms, especially at Northumberland in *England* soon after followed by a severe famine.⁷²

In *England*, there was a famine “after many meteors;” and this famine was spread through other parts of the world.⁹¹

800 A.D. [In *England*] on the 9th 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.⁷²

801 A.D. The Pontus Euxine [*Black Sea*] was totally blocked by the ice.⁶²

In the year 801, the winter was very severe on the coast of the *Black Sea*.⁶²

803 A.D. In *Scotland* there was a terrible famine.^{57, 91}

805 A.D. In the South of *Wales*, hail; each stone like hen’s egg.^{57, 93}

806 A.D. The Rhône River [in *France*] was frozen over.³⁸

Winter of 808 / 809 A.D. [In *Europe*], during the winter of 808, the weather was warm but also very destructive because of the terrible floods.⁶²

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 28.⁷⁹

811 A.D. The winter of 811 was rough and lasted until the end of March.⁶²

The winter of 811 seemed very harsh in *Western Europe* in the north. It lasted until the end of March.⁷⁹

813 A.D. In *England*, there was a great overflow of the River Severn; 2,000 people and 7,000 cattle drowned.^{47, 92}

820 A.D. In *France*, there were great rains and floods.^{47, 92}

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.⁷⁹

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.⁷²

[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.⁶²

821 A.D. The abundant rainfall of 821 in the north of *Western Europe* prevented the sowing of autumn [fall crops].⁷⁹

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 822.²⁸

In 822, the Rhône River in *France* froze.^{58, 80}

In 822, the Po River in *Italy* froze.^{58, 80}

In *England*, the frost was great following two or three weeks of rain.^{47, 93}

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.^{60, 61, 62}

During the winter of 821-822 in *Western Europe*, the [frozen] rivers bore the weight of carriages for more than thirty days.⁷⁹

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*.⁶²

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.⁷²

822 A.D. – 823 A.D. England, Wales and Scotland.

In 822-823 in *England* and *Scotland*, thousands starved.^{57, 91}

In 823, there was a famine in *England*, *Wales*, and *Scotland*. Thousands starved.⁹⁰

822 A.D. In the year 822 in *Western Europe*, there were severe frosts on 2 July and 22 July.⁷⁹

Also refer to the section 822 A.D. – 823 A.D. for information on the famine in England, Wales and Scotland during that timeframe.

823 A.D. In 823 thunder and lightning this summer did great damage by killing people and cattle. Hail destroyed the corn.⁷²

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 *France*.)⁷⁹

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 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.⁶²

The winter of 824 in *Western Europe* in the north was as long as it was rigorous.⁷⁹

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.⁷²

824 A.D. – 825 A.D. In 824-825, *Ireland* was afflicted with a great dearth [famine].^{57, 91}

825 A.D. In *France* great hail killed several people and much cattle.⁷²

827 A.D. In *England*, the River Thames was frozen for 9 weeks.^{28, 29, 47, 93}

The frost in *England* lasted nine weeks.^{40, 41, 42, 43}

828 A.D. "In *Italy*, raised scorching winds, accompanied by fiery meteors. But this year was very fruitful."⁶²

829 A.D. The year 829 in *Western Europe* produced famines, plagues, and all kinds of evils.⁷⁹

Winter of 829 / 830 A.D. *Europe* experienced a very severe winter in 829. Ice was present on the Nile River.²⁸

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.^{60, 62}

In the year 829, the winter in *Egypt* was very severe.⁶²

The year 830 produced a very harsh winter in *Western Europe* in the north.⁷⁹

836 A.D. In *Wales*, [due to a famine], "the ground covered with dead bodies of men and beast."^{57, 91}

In 836, the River Tweed in *Great Britain* overflowed its banks, and laid waste the country for 30 miles round.⁹⁰

In 836, there was an inundation of the Tweed, which did immense damage.⁴³

[Another source places this flood in the year 834.] In Northumberland, *England*, the River Tweed overflowed and extended 30 miles round. Loss of life and cattle.^{47, 92}

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.⁶²

The year 838 produced diluvial rains [heavy rainfalls that produced floods] in *Western Europe*.⁷⁹

There were massive rainfalls in 838 in the north of *Western Europe*, which ruined the entire crops.⁷⁹

[In *Germany*] this year was marked by unusual atmospheric changes. A terrible burning sun scorched the earth.⁶²

840 A.D. In *Germany*, the Rhine River flooded from rains.^{47, 92}

From excessive rains, the Rhine River overflowed.⁷²

841 A.D. In Herbipolis [now Würzburg, *Germany*], people cattle and the lands were greatly harassed by hail, whirlwinds and unusual temperatures.⁷²

In 841, there was a terrible storm accompanied by lightning, thunder and heavy rains on the territory of Glandfeuil [Le Thoureil, Maine-et-Loire, *France*].⁷⁹

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 14.⁷⁹

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.⁶²

844 A. D. The winter was exceptionally mild [in *Europe*] and rainy up to early February, with some intervals of bright sky.⁶²

845 A.D. The winter was very severe in Normandy.⁶²

In *Bulgaria*, there was a great famine.^{57, 72, 91}

846 A.D. In May 846, Auxerre, *France* experienced such a flood. The Yonne River 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.⁷⁹

Winter in 848 / 849 A.D. The Seine River in *France* was frozen; so people used the river as a bridge.⁶²

We crossed the Seine River in *France* on the ice in 6 January 849.⁷⁹

In the year 849, the winter in Gaul [*Western Europe*] was very harsh.⁶²

849 A.D. The fall of 849 produced excessive rainfall in the north of *Western Europe*.⁷⁹

850 A.D. - 855 A.D. France, Italy and Germany.

During 850-851 in *Italy* and *Germany* there was a drought with famine.⁴⁷

In 850, a famine prevailed in Paris, *France*.^{57, 91}

In 851 there was a famine in *Italy* and *Germany*.^{57, 91}

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."⁶²

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.⁷²

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.⁷²

In *Poland*, there was a great frost.^{47, 93}

In *England*, there were great rains and floods, followed by an epidemic of quinsy.^{47, 92}

In *Scotland*, a four year famine began.^{57, 91}

The winter in 856 was very harsh and very dry, a violent epidemic pulled out many people.⁶²

Winter of 859 / 860 A.D. During the winter most of the rivers in *Europe* were frozen for two months.¹

In the year 860, the Rhône River in *France* froze.^{58, 80}

In the year 860, the *Adriatic Sea* and the Rhône River froze.⁶⁰

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.^{2, 39, 40, 41, 42, 43, 47, 93}

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].⁷⁹

The winter was very severe over nearly all of *Europe*. The *Ionian and Adriatic Seas* were frozen during 860 A.D.²⁸

So severe a winter that the *Adriatic Sea* was frozen over and people walked on foot to Venice, *Italy* [on the ice].⁷²

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.⁶²

In 860 in *Italy*, the Port of Venice was frozen.^{58, 80}

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.⁶²

861 A.D. In Kent, *England*, there were floods in the River Medway.^{40, 41, 43} Great loss of cattle.^{47, 92}

862 A.D. At the headquarters of Haslou on the Meuse River in *Western Europe* 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.⁷⁹

863 A.D. In *Scotland*, there was a famine with a plague.^{57, 91}

864 A.D. In *England*, the River Humber greatly flooded.^{40, 41, 43, 47, 92}

In 864 in *England*, there was a sharp and long frosty winter.⁷²

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.⁶²

867 A.D. Excessive rains fell in 867 in the north of *Western Europe*.⁷⁹

868 A.D. Paris, *France* suffered again from famine.^{57, 91}

A great famine afflicted not only *Germany*, but also all other countries of *Europe*.⁷²

The heavy rainfalls in 868 caused floods fatal to the grains in *Western Europe*.⁷⁹

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.⁶²

870 A.D. In the region around Worms, *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.⁶²

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.⁶²

In *England*, there was a famine "from ugly locusts."⁹¹

Worms, *Germany* was burnt to the ground by lightning.⁷² [The source list this event in the year 873]

There was a great drought and unusual scorching heat.⁷²

Due to the extreme dryness during the summer of 872 in the north of *Western Europe*, almost all the fruit was destroyed.⁷⁹

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.⁷⁹

873 A.D. In Paris, *France*, there was much suffering from a famine.⁹¹

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.⁷⁹

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.⁶²

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.⁷²

The long summer of 874 in *Western Europe* produced a long drought that was so great that it destroyed the hay and grains.⁷⁹

The summer of 874 in the north of *Western Europe* was long and dry. This cruel drought consumed the hay and corn [grains].⁷⁹

Paris, *France* suffered again from famine.⁵⁷ [The source list this event in the year 873]

Winter of 874 / 875 A.D. Cold weather brought great frost to *Scotland* from November to April. The winter thaw produced floods.²⁸

In the year 874, the Rhine and the Meuse rivers remained frozen for a long time and were accessible to pedestrians.⁶²

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.⁶²

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].⁷²

[Another account places this winter in 873.] In 873 in *Western Europe*, frost and snow continued without interruption from November 1st until the spring equinox.⁷⁹

876 A.D. In *Saxony*, there were great rains in June that produced extensive damage.^{47, 92}

A sudden tempest and inundation of rain in *Saxony*, to the ruin of many men, beast, buildings and trees.⁷²

879 A.D. In 879, a universal famine prevailed.^{57, 91}

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.⁶¹

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.⁷⁹

In the year 880, the Rhine and the Meuse rivers froze for a long time.⁶²

The winter of 880-881 was very cold and persistent in *France, Flanders* 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.⁶²

883 A.D. There was a terrible famine in *Italy*.^{57, 72, 91}

885 A.D. In Cheshire, *England*, the River Dee greatly overflowed; many villages injured.^{40, 41, 47, 92}

In 885, there was an inundation of the River Dee.⁴³

886 A.D. In 886, it rained day and night almost without interruption during the months of March, June and July in the vicinity of Mainz, *Germany*, which led to flooding of a frightening part of the Rhine River and other rivers.⁷⁹

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.⁶²

In 887 in *England*, there was a grievous two-year famine.^{57, 91}

889 A.D. In 889, the extraordinary floods desolated northern *Italy*. The mass of rains in Thuringia, *Germany* destroyed in a short time three villages, and three hundred people drowned there.⁷⁹

890 A.D. In *Scotland*, there was a great dearth [famine].^{57, 91}

891 A.D. In *Western Europe*, the Meuse River was frozen.⁶²

In the year 891 in *Flanders* and *Holland*, the winter was severe.⁶²

892 A.D. The months of April and May 892 in *Western Europe* produced an extreme drought.⁷⁹

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.⁷⁹

893 A. D. In the year 893, the vine and fruit trees in *France* were killed [by the extreme cold].^{58, 80}

The Rhône River in *France* froze.⁶²

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.⁷⁹

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.⁶²

895 A.D. - 897 A.D. Ireland.

In *Ireland*, there was a famine from an invasion of locusts.⁹¹

895 A.D. In York, *England*, hail; stones like ducks' eggs.^{57, 93}

In 895 in the north of *Western Europe*, the trees bloom a second time in December.⁷⁹

Also refer to the section 895 A.D. – 897 A.D. for information on the famine in Ireland during that timeframe.

896 A.D. - 899 A.D. France.

In 896-899, Paris, *France* suffered from a famine.⁹¹

In 898, the famine was so great in *France* that people out of necessity ate one another.⁷²

From 896 to 899, Paris, *France*, once again suffered from a famine.⁵⁷

In 898 in *France* a sore famine.^{57, 91}

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.⁸¹

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.

897 A.D. In 897, there was a great famine in *Germany*.¹²⁸

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.

900 A.D. *England* was visited by a sore famine.^{57, 72, 91}

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.¹²⁸

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.]⁸³

908 A.D. Most of the rivers in *England* were frozen for two months.^{2, 28, 40, 41, 42, 43, 47, 93}

The River Thames in *England* was frozen for two months.²⁹

912 A.D. *Saxony* was flooded by rain.^{47, 92}

There was a great inundation in *Saxony*.⁷²

In 912 there was a scarcity [famine] in *Egypt*.⁸³

913 A.D. In *Germany* and *Northern Europe*, the winter was very severe.⁶²

A most severe winter.⁷²

914 A.D. A great famine in *Germany*.⁷²

918 A.D. It rained most of the year in *Scotland*.¹

A continual rain in *Scotland* for five months.^{2, 40, 41, 56}

In *Scotland*, rains extended over five months producing floods. In *Ireland*, a great flood occurred.^{47, 92}

919 A.D. In Cambridge, *England*, a storm destroyed more than 40 houses.^{41, 56}

921 A.D. A storm struck Manchester, *England*.^{40, 41}

[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.⁶²

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.⁷⁹

In *Western Europe*, terrible storms filled the summer of 921.⁷⁹

Winter of 922 / 923 A.D. In the winter of the year 923, the River Thames in *England* was frozen for nine weeks.¹

In the year 923, the River Thames in London, *England* was frozen for 13 weeks.^{2, 28, 40, 41, 42, 43, 47, 93}

The winter of the year 922 [in *Western Europe*] is recorded as very severe.⁶²

927 A.D. Cold weather struck *Byzantium*. The frost lasted 120 days.²⁸

Winter of 927 / 928 A.D. The winter was very severe in northern *France* and *Flanders*.^{62, 79}

928 A.D. In Reims, *France*, the harvest was almost finished before August.⁶²

931 A.D. A famine in *Wales*.^{57, 91}

932 A.D. A great famine in *France*.^{57, 72, 91}

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.¹²⁸

934 A.D. A terrible whirlwind [tornado] blew down Saint Maximinus's Church at Triers, *Germany*.⁷²

935 A.D. In Southampton, *England*, there were great floods; many people drowned.^{40, 41, 43, 47, 92}

936 A.D. In *Scotland*, after the appearance of a comet, there were four years of famine “till people began to devour one another.”^{57, 91}

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.⁶²

942 A.D. In *England* in December, there were great rains and floods.^{47, 92}

In *Ireland*, there was a great flood of the River Shannon.^{47, 92}

944 A.D. In *England*, a great storm raged in and near London, which destroyed 1,500 houses.^{40, 41, 43, 56, 57}

[In *Western Europe*] in the year 944, the frost froze the grapevines in the beginning of May. It rained constantly during the whole summer.⁶²

In the north of *Western Europe*, the frost burnt the vines around May 1, 944. Then the weather turned rainy which lasted all summer.⁷⁹

The entire summer of 944 was rainy in the north of *Western Europe*.⁷⁹

945 A.D. – 946 A.D. France and Italy.

In 945-946, a famine struck *France*.^{57, 91}

In 945, a famine over all *Italy*, which with war reached *France* in 946.⁷²

In 946, a shocking famine in *Italy*.^{57, 91}

947 A.D. A cold frosty snowy winter in *Poland* from 1 November to the middle of March.⁷²

951 A.D. Southampton, *England*, was nearly destroyed in a storm by lightning.^{40, 41, 43, 56}

952 A.D. In Bagdad, *Iraq*, half of the city was inundated from a great overflow of the Euphrates River.^{47, 92}

954 A.D. In *England*, *Wales* and *Scotland*, a great famine which lasted four years.^{57, 90, 91}

956 A.D. A very severe winter followed by a grievous famine, especially in *France* and *Burgundy*.⁷²

959 A.D. In Bagdad, *Iraq*, nearly three-fourths of the city was inundated from a great overflow of the Euphrates River.^{47, 92}

962 A.D. In *England*, the frost was so great as to cause a famine.^{47, 57, 91, 93}

A most severe winter, a great famine and horrible fire.⁷²

963 A.D. – 964 A.D. Ireland.

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.⁸⁴

In *Ireland* in 963-964, an intolerable famine, “so that parents sold their children for food.”^{57, 91}

964 A.D. Up to the beginning of February, the winter [in *Western Europe*] was very hard and rough.⁶²

The excessive harshness of the cold in 964 in *Western Europe* in the north persisted until 1 February.⁷⁹

Also refer to the section 963 A.D. – 964 A.D. for information on the famine in Ireland during that timeframe.

966 A.D. – 967 A.D. Egypt.

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.⁸³ [The famine the following year swept away 600,000 people in the vicinity of the city of Al-Fustat, *Egypt*.⁸⁴ Al-Fustat was the first capital of *Egypt* under Arab rule.]

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.⁸⁴

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.⁸⁴

968 A.D. A famine in *Europe*, chiefly *Germany* and *Scotland*.^{57, 91}

[In 968 in the *Persian Gulf*, there were severe irruption following an earthquake [tsunami]. Several cities destroyed, and new islands formed.⁹²]

969 A.D. In May 969, the corn [grains] burnt by the winds, died; hence a sore famine.⁷²

In 969 in *England*, “All grain burnt by the winds.” As a result, there was a famine.⁹¹

[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.⁷²

971 A.D. A great famine in *England*.⁷²

973 A.D. In *England*, the River Thames greatly overflowed; many people drowned.^{40, 41, 47, 92}

In 973, there was an inundation of the Thames.⁴³

Winter of 974 / 975 A.D. *Europe* experienced a cold winter which began on 1 November 974 lasting to 11 March 975.²⁸

A most rigorous strong frost took place from 1 November to 11 March. Famine affected those that lived in the mountains.⁷²

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.⁶²

The winter of 975 in the north of *Western Europe* was dry, despite its great snow.⁷⁹

The winter of 975 in *Western Europe* in the north was tough, long, dry, and accompanied by deep snow.⁷⁹

In *England*, the frost was severe in 975 A.D.^{47, 93}

975 A.D. In Paris, *France*, a great number of inhabitants carried off by famine.^{57, 91}

In *England*, famine scoured the hills.⁹¹

976 A.D. A grievous famine over all *England*.⁷²

In *England*, this was the *micla hungor* (great famine).^{57, 91}

983 A.D. A grievous famine everywhere.⁷²

987 A.D. [In *England*], the extreme heat of summer killed many people; and they harvested almost nothing in fruits [of the earth].⁶²

There was a dearth [famine] in *Albania*.^{57, 91}

A great dearth in *Albania*; but the unseasonableness of the weather brought barrenness of lands, and a grievous famine on many countries.⁷²

The extreme summer heat of 987 in *Western Europe* caused a great reduction in crop yield.⁷⁹

The summer of 987 in *Western Europe* produced frightening storms with extraordinary lightning and thunder.⁷⁹

Winter of 987 / 988 A.D. In the winter, the River Thames in *England* was frozen for 120 days.¹

The River Thames in *England* was frozen for 120 days, which began on 22 December 987.²

In *England*, the frost began on 22 December 987 which lasted for 120 days.^{28, 40, 41, 42, 43, 47, 93}

Byzantium experienced a very cold winter.²⁸

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.⁶²

988 A.D. In *England*, there was a great drought with heat, both years (988-989).⁴⁷

[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.⁶²

Repeated flooding preceded the great summer of 988 in the north of *Western Europe*.⁷⁹

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*.⁷⁹

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.⁷⁹

In 988 in *England*, there was a famine from rains and barren land.^{57, 91}

In 988, there was an excessive drought and a most scorching heat.⁷²

989 A.D. In *England*, there were floods all the winter.^{47, 92}

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*.⁷²

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.^{57, 91}

In *England*, there was a great drought with heat, both years (988-989).⁴⁷

In the year 989 in the north of *Western Europe*, an excessive drought during the spring prevented the first seeds from being planted.⁷⁹

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.⁷⁹

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].⁷⁹

991 A.D. In 991, the vine and fruit trees in *France* were killed [by the extreme cold].^{58, 80}

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.⁶²

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.⁶²

994 A.D. A destructive storm struck London, *England*, blowing down fifteen hundred buildings and killing several hundred persons.^{1, 90}

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.⁶²

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.⁷⁹

Winter of 994 A.D. / 995 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).²⁰ 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 993 or 994, 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.⁶²

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.⁷⁹

From November 1st 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.⁷²

995 A.D. The summer was very cold throughout *Europe*. Severe frost and ice in July 995 A.D.²⁸

996 A.D. A storm struck Colchester, *England*.^{40, 41}

998 A.D. The River Thames in *England* was frozen five weeks.^{2, 28, 40, 41, 42, 43, 47, 93}

999 A.D. The cold weather in Baghdad, *Iraq* around the year 999 killed palm trees.²⁸

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.⁸⁴ Since the fields were left unplowed and unplanted and since the world did not come to an end, starvation set in.]

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.⁷⁹

The winter in *France* was harder than usual, and disastrous flooding occurred in the aftermath.⁶²

In 1003, the winter in southern *France* was longer than usual.⁷⁹

1004 A.D. – 1016 A.D. England.

In 1004 in *England* “such a famine prevailed as no man could remember.”^{57, 91}

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.⁸⁴

In 1005 in *England*, “This year was the great famine in England.” Sweyn the Dane quits in consequence.⁹¹

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.⁷²

1008 A.D. In *Wales*, there was a famine followed by a plague.^{57, 91}

Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.

1009 A.D. In one part of *Italy*, the rivers were frozen.⁶²

In the year 1009 in *Italy*, the troops marched over the frozen rivers.⁶²

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*.⁷⁹

The year 1010, northern *France* suffered from alternating periods of droughts and harmful overabundant rains.⁷⁹

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.²⁸

Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.

1012 A.D. In *England* and *Germany*, there was a great inundation from the sea.^{47, 92}

In *England* and *Germany*, endless multitudes died of famine.^{57, 91}

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.⁷²

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.⁷⁹

Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.

1013 A.D. In *England*, there was an earthquake, floods, thunder, lightning and a hurricane.^{47, 92}

[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.⁷²

Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.

1014 A.D. Many *English seaports* destroyed by the sea.⁴⁶

In 1014, there were great inundations of the *English coasts* and a number of seaport towns were demolished.^{47, 92}

In 1014, there was an inundation on the *English coasts*, which demolished a number of seaport towns.⁹⁰

In 1014, on the 3rd of October, the sea overflowed, drowned many villages and an innumerable multitude of people.⁷²

Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.

1016 A.D. In *Ireland*, there were excessive rains and floods – producing cattle mortality.^{47, 92}

There was an awful famine throughout *Europe* – “Hail, thunder and lightning.”^{57, 91}

There was an awful famine throughout *Europe*.⁹⁰

In July, hail and thunder killed many people. Trees and corn suffered much. A grievous famine followed.⁷²

Also refer to the section 1004 A.D. – 1016 A.D. for information on the famine in England during that timeframe.

1020 A.D. In *England*, the frost was very severe.^{47, 93}

In *England*, there were great floods followed by plague.^{47, 92}

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*].⁶²

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].⁷²

1022 A.D. In 1021 or 1022 in *England*, there was excessive heat, “yet marbles sweat profusely.”⁴⁷

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.⁹³

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.⁷²

In the year 1022, during the synod and royal assembly at *Aachen, 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.⁶²

In *Hindustan (India)* in 1022, during the reign of *Masaood I*, the area experienced a great drought followed by a famine. The whole country was entirely depopulated.⁵⁷

There are records of whole provinces in *India* begin depopulated by famine in 1022 A.D.⁸⁴

This year was remarkable for drought and famines in many parts of the world.⁵⁷

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.⁹⁶

1025 A.D. – 1027 A.D. Egypt.

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.⁸⁴

1025 A.D. In *England*, there was a famine from rains and a plague.^{57, 91}

In *Flanders*, 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.⁷²

Also refer to the section 1025 A.D. – 1027 A.D. for information on the drought and famine in Egypt during that timeframe.

1026 A.D. In 1026 in *Italy*, there was such a strong heat wave that many animals and people suffered greatly.⁶²

Also refer to the section 1025 A.D. – 1027 A.D. for information on the drought and famine in Egypt during that timeframe.

1030 A.D. – 1032 A.D. France.

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 1,000th 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.⁸⁴

One of the harrowing incidents of the time, which will give some idea of the insanity which suffering induced, occurred in the wood of Chatâny, 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.⁸⁴

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.⁸⁴

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.⁸⁴

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.⁶¹

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.⁷⁹

1031 A.D. In *England*, there were extended general floods from rains.^{47, 92}

In *England*, there was a famine from great rains and locust.^{57, 91}

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.⁷²

Also refer to the section 1030 A.D. – 1032 A.D. for information on the famine in France during that timeframe.

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.⁶²

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.⁶²

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.⁷⁹

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.⁶²

1035 A.D. A frost on Midsummer Day, so vehement, that the grain and fruits were destroyed.^{2, 40, 41, 42, 43}

A frost on Midsummer Day (21 June) struck *England* killing crops.²⁸ - destroyed the fruits of the earth.⁹⁰

A frost in *England* on Midsummer Day; all grass, grain and fruit destroyed; a dearth.^{47, 93}

1038 A.D. In 1038, a terrible famine in Constantinople (now Istanbul, *Turkey*).⁷²

[Another source places this event in 1035.] The *Byzantine Empire* was visited by a famine.^{57, 91}

1040 A.D. In *Germany*, there were great floods.^{47, 92}

There were great inundations in *Germany*.⁷²

1041 A.D. 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*, the sea broke down its banks, and carried off all, far and near, with it into the ocean.⁷²

[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.^{57, 91}

1042 A.D. The summer of 1042 in northern *France* was very wet.⁷⁹

1043 A.D. In 1043, tempest and profound summer rains, harvest snow, scarcity of wine and corn [grain] prevailed in *France* and *Germany*.⁷²

The year 1043 in northern *France* produced great rains. The summer was rainy and wintery.⁷⁹

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.⁷⁹

In 1043, there was a grievous famine over all *England*. Corn (grain) was the dearest ever known by anyone living.⁷²

Winter of 1043 / 1044 A.D. In 1044, the vine and fruit trees in *France* were killed [by the extreme cold].^{58, 80}

In 1043 in northern *France*, heavy frosts lasted from early December until early March.⁷⁹

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.⁶²

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.⁶²

1045 A.D. In *Flanders*, there was an inundation from the sea.^{47,92}

1046 A.D. In *England*, there was a great rain flood causing a loss of cattle.⁴⁷

In 1046, there was a flood of the Severn Valley in *England* from great rain floods; loss of cattle.⁹²

In *England*, an inundation of the River Severn, drowned an abundance of cattle.^{40,41,43}

1047 A.D. There was such a large amount of snow in the West [*Western Europe*], that the forests were inaccessible.⁶²

In 1047 in *Ireland*, there was a great famine and snow. In *England*, there was a famine from snow and frost.^{57,91}

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.⁷²

In 1047-48, famine in *Scotland* extended over two years.⁵⁷

1051 A.D. There was a great barrenness of the land in *England*, and dearth, famine, want of bread and great mortality.⁷²

[Another source places this event in 1050] In 1050 in *England*, there was a great famine and mortality; from barrenness of the land.^{57,91}

The entire year of 1051 in northern *France* was very wet.⁷⁹

In 1051 there was a famine in *Mexico* that caused the Toltecs to migrate.^{57,91}

1052 A.D. – 1060 A.D. India and Afghanistan.

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.⁵⁷

There are records of whole provinces in *India* begin 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 necessaries [food] for his household.⁸⁴

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.⁷²

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.

1053 A.D. A year of heat and drought, which extended to the north of *France*.⁶²

In 1053, a persistent drought burned lands in the country of Caux [*Switzerland*].⁷⁹

There was a famine in *England* after a comet. The famine lasted two years.^{57,91}

Also refer to the section **1052 A.D. – 1060 A.D.** for information on the drought and famine in India and Afganistan during that timeframe.

1055 A.D. In London, *England*, nearly 400 houses were blown down by a storm.^{40, 41, 43, 56}

Also refer to the section **1052 A.D. – 1060 A.D.** for information on the drought and famine in India and Afganistan during that timeframe.

1057 A.D. In 1057 in northern *France*, there was a large amount of snow and rain.⁷⁹

Also refer to the section **1052 A.D. – 1060 A.D.** for information on the drought and famine in India and Afganistan during that timeframe.

1059 A.D. In 1059, there was a great comet seen in *Poland*, followed by a severe famine.⁷² [Another source places this event in the year 1053.⁷²]

[Still another account places the event in the year 1058] In 1058 in *Poland* there was a grievous famine.^{57, 91}

Also refer to the section **1052 A.D. – 1060 A.D.** for information on the drought and famine in India and Afganistan during that timeframe.

Winter of 1059 / 1060 A.D. In 1059 in *England*, a great frost, and severe plague and famine after.^{47, 93}

The winter in *England* in 1059 was cold and long, very injurious to corn [grain], hence followed a famine and plague in 1060.⁷²

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.⁶²

1061 A.D. In *England*, the River Thames frozen seven weeks.^{47, 93}

1063 A.D. The winter in *Europe* was long and intensely cold and many people perished by cold and hunger.¹

The River Thames in *England* was frozen 14 weeks.^{2, 40, 41, 42, 43, 47, 90, 93}

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 *Italy* and many other streams were blocked by ice.⁶³

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.⁷²

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.⁷⁹

1064 A.D. – 1071 A.D. Egypt.

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 were cut off from supplies, and to add to these tribulations, the Nile failed to come to a flood in 1065.⁸⁴

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.⁸⁴

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.⁸⁴

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.⁴⁷

In 1064 in *Egypt*, there was a terrible famine, which lasted 7 years. The people driven to terrible expedients.⁹¹

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.⁵⁷

1064 A.D. A storm struck Edinburgh, *Scotland*.^{40, 41, 43}

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.^{47, 93}

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 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.¹

In 1067, the vine and fruit trees in *France* were killed [by the extreme cold].^{58, 80}

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.⁶²

In *France*, a terrible winter began on 13 November 1067 and lasted until 12 March 1068.⁷⁹

1068 A.D. Flood reigned in 1068 in northern *France*.⁷⁹

In *England* in 1068, there was famine and plague after a severe winter.^{57, 91}

Also refer to the section 1064 A.D. – 1071 A.D. for information on the drought and famine in Egypt during that timeframe.

1069 A.D. The rivers froze in the north of *Germany*.⁶²

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.⁶²

[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.⁷²]

[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 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.]⁸⁴

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.”⁹¹

Also refer to the section 1064 A.D. – 1071 A.D. for information on the drought and famine in Egypt during that timeframe.

1070 A.D. In *England*, the frost was severe.^{47, 93}

In *England* the winter was a most rigorous frost, all rivers were frozen up.⁷²

Also refer to the section 1064 A.D. – 1071 A.D. for information on the drought and famine in Egypt during that timeframe.

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.⁹¹

1074 A.D. The cold was very lively in *France* and most of the rivers froze.⁶¹

The winter was so severe, that all the rivers in *Flanders* and *Germany* were completely frozen.⁶²

In *France* in 1074, there were great frosts from 1st November to mid-April.⁷⁹

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.⁶²

1076 A.D. In *Iraq*, the Tigris River overflowed and inundated Bagdad.^{47, 92}

Winter of 1076 / 1077 A.D. The winter in *Europe* was long and intensely cold and many people perished by cold and hunger.¹

Europe experienced cold weather from November to April. The Rhine River was frozen. *France* experienced 4 ½ months of frost.²⁸

The year 1076 was another very cold winter in *France*, which destroyed many trees and vines.⁶¹

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.⁶²

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.⁶²

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 1077.⁷⁹

In *France*, abundant snow fell at the end of October 1076 and continued with extreme cold until March 27, 1077.⁷⁹

In *England*, there was frost from 1st November to 15th 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."^{47, 93}

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).^{2, 40, 41, 42, 43}

In *England* from 1 November 1076 to 15 April 1077 was one continuous hard frost.⁷²

In 1076, there was dreadful frost in *England* from November to April.⁹⁰

The River Thames in *England* was again frozen over.²⁹

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.⁷⁹

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.⁶²

The summer of 1078 in *France* was very hot and very dry. The farmers harvested in August. The wine was plentiful and very good.⁷⁹

[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.⁷² In 1078 in Constantinople, there was a famine “from the multitudes of strangers.”⁹¹]

1079 A.D. In *Italy*, the Calore Beneventano River (also called the Calore Irpino River) was so frozen that you could cross it safely on foot.⁶²

During the winter of 1079, the cold was very sharp in *Italy*.⁶²

1080 A.D. There was a great famine in *Denmark*.^{57, 72, 91}

1082 A.D. In *England*, there was a great famine.⁷²

Winter of 1082 / 1083 A.D. The Po River in *Italy* in December froze.⁶²

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.⁶²

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.⁶²

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.⁷²

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.”⁴⁷

From the 11th of November [1085] to the 1st 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*, 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 distemper 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.⁷²

1086 A.D. In *England*, there were heavy floods from rain.⁹² “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.”⁴⁷

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.⁹¹

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.⁷²

In 1087 in *England*, pestilence followed by famine, which caused great suffering.⁹¹

In the 21st year of William I in 1087, there was a famine in *England*.⁹⁰

In 1087 in *Denmark*, King Olaf I inherited the surname the ‘Hungry’ in consequence of the famine in his reign.^{57, 91}

1088 A.D. In Bagdad *Iraq*, the Tigris River overflowed and did much damage.^{47, 92}

1090 A.D. In Constantinople (*Istanbul, Turkey*), there were great floods.^{47, 92}

1091 A.D. In *England* on the 5th of October, a great hurricane came from the southwest and struck several parts of the country. In London about 500 houses destroyed.⁵⁷

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.⁹⁰

A storm struck in several parts of *England* on October 5th, especially at Winchelscomb (Winchcomb), in Gloucestershire, when the steeple of the church was thrown down.^{40, 41, 43}

A storm in London, *England* on October 17th, threw down 500 houses, unroofed Bow church and at Old Sarum (Salisbury), threw down the steeple along with many houses.^{40, 41, 43}

The roof and tower of Salisbury Church [in *England*] was broken down by thunder.⁷² [This account places this event in 1092]

On 1 October, a terrible tempest of thunder and lightning struck several parts of *England*, but especially at Winchcomb, 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.⁷²

On 5 November 1091 at Coutances, *France*, a violent storm accompanied by lightning, thunder and earthquake occurred.⁷⁹

1092 A.D. The winter in *England* was severe. The great rivers were frozen.²⁸

"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.²⁹

1093 A.D. In *England*, there were great floods, and afterwards severe frost.^{47, 92}

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.⁷²

In *Ireland*, "Great rains and inundations in summer and autumn."^{47, 92}

In *England*, great famine and mortality [death].^{57, 91}

1094 A.D. There were great inundations throughout *Ireland*.^{47, 92}

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.⁷²

The drought in 1094 in *France* was extraordinary.⁷⁹

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.⁷⁹

1095 A.D. A great snowstorm struck *Ireland* on January 3. Multitudes were killed.²⁸

In *England*, the winter was very severe.^{47, 93}

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 10th. 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.⁷²

1096 A.D. In *England*, the winter was very severe.^{47, 93}

The rains took up in harvest, then came most pernicious frosts which caused dearth and famine in *England*.⁷²

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."^{57, 91}

1097 A.D. In *England*, the winter was very severe.^{47, 93}

[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.⁶²

The great flood of 1097 in northern *France* did not permit the fall planting.⁷⁹

1098 A.D. In *England*, the winter was very severe.^{47, 93}

[In *England*] another oppressive year for endless taxes and gelds, and great rains, which scarce ever ceased; all low marshy grounds perished with floods and water.⁷²

1099 A.D. In *England*, there were rains and sea floods, “fatal to much people and cattle.” Thames much flooded on the festival of St. Martin (November 11).^{47, 92}

In *England*, the winter was very severe.^{47, 93}

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.⁷²

In *England*, there was famine from rain and floods.^{57, 91}

1100 A.D. The sea overflowed 4,000 acres of Earl Godwin’s land, in Kent, *England* since called Godwin sands.^{40, 41, 43}

East of Kent, *England* inundated. Goodwin Sands formed.⁴⁶

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.^{47, 92}

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.⁹⁰

[Some accounts place this event in the year 1098 or 1099] On the 3rd of November in 1099, “as well in *Scotland* as in *England*, the sea broke in over the banks of many rivers, drowning divers [numerous] towns, and much people, with an innumerable number of oxen and sheep, when Earl Godwin’s lands in Kent were covered with sands.”⁶⁹ In 1098 the land of Goodwyn Sands was swallowed up by the sea.⁷²

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.⁷²

The winter in 1100 in northern *France* was excessive.⁷⁹

[There was a famine in *Antioch* in 1100.⁹¹ But this famine was not caused by weather but by a long siege of the city and by warfare – the Crusades.]

1102 A.D. In *England*, there was a drought with excessive heat.⁴⁷

[In *England*] the summer was extremely hot.⁶²

[In *England*] was an excessively hot summer.⁷²

1103 A.D. [In *England*] on the Feast of Saint Lawrence [10 August] in the morning, a terrible wind did great damage ever was known to all sorts of fruits.⁷²

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*.⁷²

At the summer solstice there was a storm at Herbipolis [Würzburg, *Germany*], wherein such a prodigious piece of ice fell, that when broken into four quarters, four men could not carry it.⁷²

1105 A.D. In *England*, there were great floods, followed by famine.^{47, 92}

1106 A.D. In *England*, there was an inundation from the sea.^{47, 92}

On the first of the Ides of June [in *England*], there was a great earthquake and several inundations of the sea.⁷² [This event may have been a tsunami caused by a massive earthquake/landslide]

Men, cattle, lands and buildings suffered much from thunder, lightning, 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.⁷²

In *England*, there was famine from barren lands and then plague.^{57, 91}

1108 A.D. A great part of *Flanders* was overflowed by the sea.^{40, 41, 43}

Flanders inundated.⁴⁶

In 1108, *Flanders* was inundated by the sea, and the town and harbor of Ostend totally immersed.⁹⁰

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.^{47, 92}

1109 A.D. [In *England*], the year 1109 was remarkable for thunder and lightning.⁷²

In *Russia*, the water was high in the Dnieper, the Desna and the Pripet rivers.⁷⁶

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.⁷²

1111 A.D. In *England* the winter long and very severe; great scarcity followed.^{57, 91}

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.⁷²

1112 A.D. [In *England*], this was a most fruitful and plentiful year.⁷²

The summer of 1112 was very dry in southern *France*.⁷⁹

1113 A.D. In *England*, it was “so hot that grain, and some forests of wood, took fire.”⁴⁷

[In *England*], the heat was in June 1113, so strong that the crops and even forests fell into fire.⁶²

At Parma, *Italy* and Ravenna, *Italy* it rained blood both in the towns and fields. It was the same in Emylia [Emilia], *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* was drowned; whereupon a great number of Flemings fled to and became subjects of King Henry the 1st of England for some place to inhabit. And he gave them Pembrokeshire in Wales, where their posterity remains to this day.⁷²

1114 A.D. 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.⁷²

Winter of 1114 / 1115 A.D. The River Thames in *England* was frozen for 4 weeks.²⁹

Several bridges in *England*, being made of timber, were broken down by the severe frost.^{40, 41, 42, 43}

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”^{47, 93}.

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.⁷²

The winter was most rigorous with frost and snow and the destruction of cattle, that the oldest alive had never witnessed it in *England*.⁷²

On 23 April 1114, there was so great a snowfall in *Flanders* that it broke down the trees in many places.⁷²

1115 A.D. The frosts of 1115 in northern *France* began on December 22 and lasted until 25 February.⁷⁹

1116 A.D. A storm struck *England*.^{40, 41}

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.⁷²

In *Ireland*, there was a great famine, “during which the people even ate each other.”^{57, 91}

1117 A.D. In *England*, there was a famine from tempest, hail, and a year’s incessant rains.^{57, 91}

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].⁷²

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.⁷⁶

[In Jerusalem in 1117, there was famine not caused by weather. In May was a great plague of locust at Jerusalem, which ate up the herbs, trees, vines and sown corns.⁷²]

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.⁷²

On May 7, 1118, a severe frost destroyed the {grape} vines in most areas but especially in Auxerre, France.⁷⁹

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.⁷²

[In England], there was a violent tempest the whole day of Christmas.⁷²

1120 A.D. [There was a famine in Jerusalem not caused by weather. In Jerusalem in 1120, a famine caused by a "plague of mice and locusts."^{57,91}]

In July, there was a horrible tempest of hail at Treves [Prussia]. It overthrew many buildings. It did much damage at Halderstadt, 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.⁷²

1121 A.D. In England, all three spring months dry with excessive heat.⁴⁷

In England in 1121-22, there was a "great famine from long and cruel frost."^{57,91}

[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.⁷²

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.^{47,93}

[In England], on December 25th 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.⁷²

1122 A.D. In England on 11 April, there was a hurricane. On 26 August, there was a great hurricane.⁷²

In 1122, England experienced the greatest dearth.⁷² [This famine was made worst by "taxes, and Dane-gelt, endless."]

1123 A.D. – 1124 A.D. France and Germany.

In 1123-24 in France and Germany, there were famines from terrible weather and the greatest plague.⁵⁷

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.⁷²

Winter of 1123 / 1124 A.D. The vine and fruit trees in *France* were killed by the cold.⁵⁸

After Whitsuntide [White Sunday - Pentecost], a sharp frost killed the trees.⁷²

At Pentecost was a hard frost, which did harm to fruit trees and [grape] vines.⁷²

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.⁷² [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.”⁹¹ “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.”⁵⁷

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.⁷²

There were great inundations at Rome, *Italy*. Famine so great that multitudes of both sexes died of hunger.⁷²

Also refer to the section 1123 A.D. – 1124 A.D. for information on the famine in France and Germany during that timeframe.

Winter of 1124 / 1125 A.D. In 1124, the frozen Rhine River in *Germany* was crossed by pedestrians.⁶²

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. 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.⁶²

The [grape] vine and fruit trees in *France* were killed [by the extreme cold].^{58, 80}

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.⁷⁹

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*.⁷²

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.⁷⁹

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.⁷⁶

In *England*, there was a great flood on St. Lawrence's Day (August 10).^{47, 92}

In 1125 in *England*, great flood on St. Lawrence's Day; famine in consequence of destruction of crops.^{57, 91}

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.⁷²

In 1125, one-half the population of *Germany* died from starvation.⁹⁶

[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]." ^{57, 91}

In 1125 in *France*, continuous rain took away almost all the seeds after the month of May.⁷⁹

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* [a region of *Central Europe*], the trees burst from the extreme cold and the rivers were frozen over.⁶²

The harsh winter of 1126 in northern *France* lasted six weeks.⁷⁹

The [grape] vine and fruit trees in *France* were killed by the cold.⁵⁸

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].⁷⁶

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.⁷⁶

The frost in *England* was very severe.^{47, 93}

The year 1128 had the most terrible hard winter [in *England*]. In Easter fell much snow.⁷²

1130 A.D. In *England*, there was the greatest drought and hottest years.⁴⁷

In 1130, there was a great famine in Rome, *Italy*.⁷²

In Rome, *Italy* in 1130-31 there was a great famine.^{57, 91}

1131 A.D. In *England*, there was the greatest drought and hottest years.⁴⁷

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.⁷²

1132 A.D. In *England*, there was a great dearth.⁷²

Winter of 1132 / 1133 A.D. During the winter the cold was so intense in *Italy*, that the Po River was frozen from Cremona to the *Adriatic Sea*. The wine froze and burst the casks, and the trees split with a great noise.¹

In 1133, the Po River in *Italy* froze.^{58, 80}

The Po River in *Italy* was frozen from Cremona to the sea.³⁸

In 1133, the Rhône River in *France* froze.^{58, 80}

During the winter of 1133 the Rhône River in southern *France* froze as well as the wine cellars froze.⁷⁹

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° Reaumur (-20° C, -4° F). A great number of trees in *France* burst in the winter of 1133.^{58, 80}

Heavily loaded carts passed along the frozen Rhône River in *France* on the 5th of January 1133; as they would on the mainland.⁶¹

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.^{60, 62}

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.⁶²

1133 A.D. In *France*, there were great floods from rain.^{47, 92}

1134 A.D. In *Flanders*, there was an inundation from the sea.^{47, 92}

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.⁷²

The extreme drought of 1134 in northern *France* caused the failure of oats, barley and vegetables.⁷⁹

[Another account places this event in 1135] In 1135, an irruption of the ocean engulfed a large part of *Flanders, Holland* and *Friesland*.⁷⁹

[Another account places this event in 1136] The waters of the [English] Channel overflowed and swallowed part of *Flanders* with its inhabitants.⁷⁹

In 1134 at Cashel, *Ireland*, there was a great hail shower.⁹³

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!⁷⁶

[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.⁶²

1135 A.D. In *France* and *England*, there was a great drought.⁴⁷

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.⁶²

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.⁷²

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.⁷²

From 1135-37 in *England*, there was a great drought and famine.^{57, 91}

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.⁶²

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* with its inhabitants.⁷⁹

1137 A.D. In *England*, there was a general drought, with great heat: hence famine.”⁴⁷

[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 1139.⁶²

The drought of 1137 in *France* broke out in March and lasted until September. The drought caused well, springs and rivers to dry up.⁷⁹

In 1137 in northern *France*, the summer heat was stifling. It burned and overwhelmed.⁷⁹

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, *Germany*), Gloffaria, all on the same day.⁷²

From this drought, and the inexpressible cruelties and barbarities of King Stephen's reign, arose a great dearth and famine in *England*.⁷²

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.⁷⁶

1141 A.D. In 1141 in *England*, there was famine said to have lasted twelve years.^{57, 91}

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, *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 as a pigeon's eggs. One killed a woman dead. It did great damage to shipping in *Flanders*.⁷²

Winter of 1141 / 1142 A.D. The winter of 1141-42 in northern *France* was very harsh.⁷⁹

Winter of 1142 / 1143 A.D. The River Thames in *England* was frozen and crossed on foot.⁶²

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.⁷²

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.⁶²

In *France* in 1142, the ground remained buried under a deep layer of snow from December 6 to February 2.⁷⁹

In *France*, violent winds in January 1143 overturned many buildings and tore up the trees.⁷⁹

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.⁷⁶

1144 A.D. In *England*, there was a drought that lasted during all the harvest months and long after.⁴⁷

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.⁷²

Excessive rains delayed the [grain] harvest of 1144 in northern *France* until 25 August.⁷⁹

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.⁷⁶

1146 A.D. In *France* there was a famine.^{57, 72, 91}

1148 A.D. In *England* in April, there was great thunder and a hurricane for four days.⁷²

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 Zverinets.⁷⁶

Winter of 1148 / 1149 A.D. In *England*, the winter was dry and warmest to 1st April, then coldest to 15th May.⁴⁷

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 followed.⁷²

Winter of 1149 / 1150 A.D. The winter was severe in December 1149. The River Thames in *England* froze.²⁸

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.²⁹

The frost in *England* continued from the 10th of December to the 19th of February.^{47, 93}

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.⁷²

In 1149, the sea was frozen off the coast of *Holland*.⁶²

In the year 1149, the winter was more severe in *Flanders* 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.⁶²

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.⁷⁹

1151 A.D. In *England*, the summer was dry and hot, but the harvest was early and good.⁴⁷

[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.⁶²

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.⁷⁹

In 1151-52, 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.⁷²

In 1151-52, there was a famine in *Europe* and *Palestine*.^{57, 91}

1152 A.D. In *England* there was a drought from “13th March to harvest, neither rain nor dew. First, cold nights: frost, northerly winds; then greatest heat and dry, flies, gnats.”⁴⁷

In *Germany*, there were great floods on the Rhine River from rains.^{47, 92}

1153 A.D. In *Ireland*, a great famine raged in Munster, and spread all over *Ireland*.^{57, 91}

1154 A.D. There was a great frost in *England*.^{47, 93}

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.⁷²

In *England*, there was a famine from rains, frost, tempest, thunder and lightning.^{57, 91}

1155 A.D. In July 1155, Mortain, *France* was struck by thunder and storms with heavy rain.⁷⁹

1156 A.D. In *England*, there were rain and floods, lasting all the harvest.^{47, 92}

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.⁷²

In 1156 in southern *France*, excessive drought brought about winter.⁷⁹

1157 A.D. There was a great frost in *Italy*.^{47, 93}

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.⁶²

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.⁷²

In *Italy*, there was a famine after great snow and frost.^{57, 91}

In 1157, the summer was extremely hot and dry in *Italy*.⁶²

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.⁷⁶

1158 A.D. In 1157 or 1158 in *Italy*, there was a great overflow of the Tiber River. In *Normandy*, there were great floods.^{47, 92}

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.⁷²

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.⁷⁶

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."^{47, 92}

At the village Landaaren [now Landavran, *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.⁷²

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 [11½ pecks] for seven kunas [martenskins used as money]. Oh, there was great distress in the people and want!⁷⁶

1162 A.D. In *Holland*, there was an inundation from the sea; many people and cattle lost.^{47, 92}

In 1162, there was said to have been a great famine all over the world.^{57, 91}

On 14 March 1162, there was a great tempest of wind, thunder and lightning at Lübeck, *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.⁷²

1163 A.D. There were famine and plague in Aquitania [in *France*].⁷²

1165 A.D. In *Sicily*, there was an irruption of the sea; 12,000 people drowned.^{47, 92}

On Sexagesima Sunday (second Sunday before Lent), the sea swelled and rose three days together, and in *Sicily* it drowned 12,000 people.⁷²

In *Italy* [during the summer], red-hot winds dried up all the plants.⁶²

Winter of 1165 / 1166 A.D. In the Novgorod Republic [now part of *Russia*], during the winter, there was severe frost.⁷⁶

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.^{47, 92}

The months of January and February 1170 produced violent lightning and thunder storms in *France*.⁷⁹

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 1171.⁷⁹

1171 A.D. In *England*, there was an inundation of the sea; harvest destroyed in many places.^{47, 92}

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.⁷²

1172 A.D. In *Ireland*, “great floods destroyed numbers of men.”^{47, 92}

In *Germany*, great floods on the Rhine River.^{47, 92}

In 1172, there was a great inundation on the Rhine River.⁷²

[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.⁶²

1173 A.D. In *Holland*, a great flood considerably extended the limits of the Zuyder-zee.^{47, 92}

In January 1173, there were frequent thunder and lightning, which damaged houses and churches.⁷²

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, *France* experienced a flood.⁶²

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.⁷²

In 1175 in *England*, pestilence, followed by a great dearth.^{57, 91}

In 1175 in *France*, there was a very great flood in November. The flood destroyed the farms and the seed.⁷⁹

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.⁷⁹

1176 A.D. In Lincolnshire *England*, there was an inundation of the sea. This also struck *Holland*.^{47, 92}

In *England*, there was frost from Christmas to Candlemas.^{47, 93}

In *Wales*, a great famine and mortality [death].^{57, 91}

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.⁷²

In 1176 in northern *France*, a large frost stretched from December 13 to March 15.⁷⁹

In the Novgorod Republic [now part of *Russia*] in the springtime, the Volkhov River flooded for five days.⁷⁶

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.⁶²

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. There came a terrible hurricane with southwest winds which overthrew churches, houses, trees, etc. It was a most tempestuous stormy winter.⁷²

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.⁷²

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.⁶²

In 1179 in *England*, "Many floods from a most severe winter."^{47, 92}

The *French* historians cite great mortality of animals due to cold during 1179.^{58, 80}

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*.⁷²

1179 A.D. In *England* on the 5th of June, a hurricane struck *England* producing hail, thunder and lightning.^{57, 93}

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.⁷⁶

There was a general and great famine over *England* and *Wales*. There was terrible thunder and lightning on 16 August.⁷²

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.⁷⁹

In 1183, there was a great famine severely afflicting both *England* and *Wales*.^{57, 91}

1184 A.D. On 7 June 1184 in northern *France*, frost burnt the [grape] vines and [grain] harvest.⁷⁹

1185 A.D. In 1185, the winter [in *Northwestern Europe*] was severe.⁶²

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.⁶²

In 1186 [in *France*], the harvest took place in May and the grape harvest for the wine in August.⁶²

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. Then came a sweeping plague. In Corinthia in *Germany* [Greece?], great swarms of locusts, with prodigious large bodies eat up all sorts of green vegetables, hence a barrenness of land, dearth, famine and pestilence.⁷²

1187 A.D. In *England*, there were great floods.^{47, 92}

There was a grievous and pestilent mortality of men and cattle in *England*. There were great floods and inundations.⁷²

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.⁷⁶

1188 A.D. In *England*, there were inundations of the sea that "killed very much people and cattle."^{47, 92}

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*.⁷²

[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].⁶²

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.]⁷⁹

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.⁷⁹

In 1188, there was a great scarcity of food in north of *Ireland*.^{57, 91}

1189 A.D. A sore famine, and a very great mortality continued.⁷²

1190 A.D. In *England*, hail with thunder and lightning.^{57, 93}

In December at Messina, *Italy*, there was terrible thunder and lightning.⁷²

1192 A.D. In the Novgorod [*Russia*], the church of the Holy Apostles in Kholm was burned down; set afire by thunder.⁷⁶

1193 A.D. – 1196 A.D. France, Flanders and England

In *England* and *France* there was a famine that led to pestilential fever. This lasted from 1193 to 1195.⁹⁰

From great rains in *England*, most of the corn [grain] perished and was lost.⁷²

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.”^{57, 91}

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*, 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 age 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.⁷²

1194 A.D. A violent storm almost desolated a great part of *Denmark* and *Norway*.^{40, 41, 43}

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, *France*. So great a heat and drought at Thuringii [*German* tribe], that in many places of their river, people walked over dry footed. There was a famine in *France*.⁷²

Also refer to the section 1193 A.D. – 1196 A.D. for information on the famine in France, Flanders 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.⁷⁹

Also refer to the section 1193 A.D. – 1196 A.D. for information on the famine in France, Flanders and England during that timeframe.

1196 A.D. In *England*, there were great floods in March from rains.^{47, 92}

On the 3rd of the Nones of November there was a hurricane.⁷²

There was almost incessant rain for two months in 1196. This produced a terrible flood of the Rhône and Saône rivers in *France*.⁷⁹

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.⁶¹

Also refer to the section 1193 A.D. – 1196 A.D. for information on the famine in France, Flanders and England during that timeframe.

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.⁷²

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.⁷⁹

1199 A.D. – 1202 A.D. Egypt.

In 1200 in *Egypt*, there was a famine of great severity for deficient rise of the Nile River.^{57, 91}

There was a great dearth in *Egypt* from 1199-1202.⁸³

[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.⁸³

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.⁸³

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.⁸³

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.⁸³

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 [Faiium], Mahalleh [Mahalla], Alexandria, Damietta, and all other parts of *Egypt*, witnessed these scenes of horror.⁸³

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.⁸³

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.⁸³

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.⁸³

[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.⁸³

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.⁸³

1199 A.D. In *England*, there were serious floods from rain.^{47, 92}

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.⁷²

Also refer to the section 1199 A.D. – 1202 A.D. for information on the drought and famine in Egypt during that timeframe.

1200 A.D. [In *England*], the winter was excessively cold.⁷²

In 1200, *Ireland* was struck by a famine. In *Ireland*, “a cold foodless year”.^{57, 91}

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.⁷⁶

[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.⁷²

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.⁷²

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.⁷²

All summer 1202 was troubled by storms, which delayed many fleets leaving from the Flemish ports of *the Netherlands* bound for the Third Crusade.⁷⁹

Also refer to the section 1199 A.D. – 1202 A.D. for information on the drought and famine in Egypt during that timeframe.

1203 A.D. [In *England*], there was a very sore famine. Multitudes of poor died. There were bad seasons.⁷²

In *England* in 1203, there was a great mort [death] and famine from long rains.^{57, 91}

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.]^{57, 91}

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*.⁶²

In April 1204, a famine still prevailed in *the North* and *the East*.⁷²

1204 A.D. In 1204 in *Italy*, the summer was extremely dry and hot.⁶²

From late January to May 1204 in *France*, the heat and drought were unusual.⁷⁹

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.⁷⁹

In 1204, Auge and the neighborhood of Caen in northern *France* were almost submerged [by floodwaters].⁷⁹

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.^{28, 40, 41, 42, 43}

In *England* in 1205, there was frost from the 14th of January to 22nd March. “Frozen ale and wine sold by weight.” “In the seventh year of King John began a great frost, which continued till the 22nd 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.*”^{47, 93}
[*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 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.⁷²

The winter of 1204-05 was very harsh in *France, Flanders* 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.⁶²

The cold of 1204 in northern *France* surpassed everything we had seen in living memory.⁷⁹

1205 A.D. In *England*, hail the size of ducks' eggs with thunder and lightning. Much of the grain in the fields were destroyed.^{57, 93}

In *England*, there were many lives lost, houses overthrown, and the grain in the fields destroyed, by hail as large as hens' eggs.^{40, 41, 43, 56}

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.⁷⁹

On 5 December 1206 in *France*, lightning and thunder accompanied abundant rainfall. These rains brought excessive floods.⁷⁹

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.⁷⁹

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.²⁸

On January 17th 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.⁷²

In 1207, the River Thames in *England* was frozen for eleven weeks.²⁹

In 1207, the frost in *Britain* lasted fifteen weeks.^{41, 42, 43, 47, 93}

1208 A.D. In December 1208 in *France*, there were terrible rains and great floods, destroying bridges, houses etc. “Greatest ever seen in *France*.”^{47, 92}

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.⁷²

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.”^{47, 92}

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.⁷²

In *England*, in the year 1209, the winter was long and severe and followed by a dearth.^{47, 93}

In *England* in 1209, there was a famine from a rainy summer and severe winter.^{57, 91}

In 1209 or 1211, there were terrible thunders this summer, severe heavy rains, a stormy and cold winter, hence a scarcity and famine.⁷²

A severe winter struck *England* in January 1210 and lasted into February. There were great deposits of snow.²⁸

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.⁶²

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.⁷⁹

The *French* historians cite great mortality of animals due to cold during 1210.⁵⁸

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.^{47, 92}

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.⁷²

1212 A.D. Early frost destroyed the harvest in Novgorod, *Russia* in 1212 A.D. Children were sold as slaves for bread.²⁸

In Sicily *Italy*, there was an inundation from the sea, “thousands of people swept away by it.”^{47, 92}

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.⁷²

[Another account places the hailstorm in the year 1213.] In 1213 in *Italy*, hail like goose eggs.⁵⁷

The year 1212 was very dry in *France*.⁷⁹

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.⁷⁹

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].⁷⁶

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.¹

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.^{5, 40}

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.²⁸

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.⁵⁷

A powerful storm struck in 1215 on the coast of Calais, *France*. Hugh de Beanvais and several thousand foreigners, on their voyage to assist King John against the barons perished.⁹⁰

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 [1½ 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!⁷⁶

1216 A.D. The winter in *Italy* was similar to the year 1133 A.D.¹

The River Po in *Italy* was frozen to the depth of sixteen feet (4.9 meters).³⁰

In 1216, the Po River in *Italy* froze.^{58, 80}

In 1216, the Rhône River in *France* froze.^{58, 80} - froze to a great depth.⁶¹

The Rhône River in southern *France* froze in 1216.⁷⁹

In 1216, the Po River in *Italy* and the Rhône River in *France* froze to a great depth.^{60, 62}

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.⁶² [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.]

1218 A.D. In *England*, there was a great flood in the night in winter.^{47, 92}

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.⁶²

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 30th 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.⁷⁹

In 1218, large rivers in *France*, particularly the Seine and Loire Rivers were frozen and were crossed on the ice.⁶²

In 1218 at the siege of Damiata [now Dumyat] in *Egypt* in winter, the east wind blowing, the Nile River swelled and did great damage to the besiegers.⁷²

1219 A.D. In October 1219 in Nordland [*Norway*], “The St. Lawrence Lake broke out and drowned 36,000 people besides cattle.”^{47,92}

In 1219 in Nordland [*Norway*], 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.⁷²

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, *France*.⁷⁹

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.⁷⁹

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*.⁶²

1220 A.D. In *Poland*, there were floods caused by constant rains.⁹² In *Friesland the Netherlands*, there was an inundation in October.⁴⁷

In 1220, there was a considerable inundation in *Friesland*.⁴³

[Another account places this event in the year 1221.] In 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.⁷²

1221 A.D. In *England*, the frost was severe.^{47, 93}

1222 A.D. In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.¹

Violent rain occurred in London, *England*. The storm threw down several churches.²

Lightning and thunder, so dreadful, as to throw down several churches in February 1222.^{43, 56}

A violent rain occurred in London, *England*.^{40, 41 56}

In *England* in the year 1222, high tides and continuous rainstorms did great damage.⁹² 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.”⁴⁷

[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 30th, 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.⁷²

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.¹

When a cloud burst at Islebia [now Eisleben, *Germany*], the falling rain was so thick that many people were choked with its water.⁷²

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.⁷⁶

The rains that fell in April, May, June and July 1224, completely destroyed the nuts and grains in *France*.⁷⁹

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.⁷⁹

[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.⁶²

In *England* in 1224, there was a very dry winter and bad time for seeds; whence followed a great famine.^{57, 91}

In *England*, there was a great drought.⁴⁷

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.⁷²

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*, but we have, thank God, not heard that any man had died because of it."⁶²

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.⁷⁹

There was a long and severe winter in 1225, followed by an unparalleled famine, fatal to many. A great death of sheep in *England*.⁷²

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. 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 17th. 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.⁶¹

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.⁷⁹

In 1226, snow fell in *Syria*. In *England*, there was a terrible hurricane with a north wind.⁷²

Winter of 1226 / 1227 A.D. The frost in *England* in 1226 was severe and snow.^{47, 93}

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.³⁴

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 5 1227 and killed the olive trees.⁷⁹

The winter of 1226-27 was dry and very cold in *France*. The drought lasted until February 1227.⁷⁹

The frost lasted from 1226 in northern *France*, in clear weather and dry, since the first days of November until 5 or 6 February.⁷⁹

1227 A.D. In *Ireland* in 1227, there was a great famine throughout the country.^{57, 91}

1228 A.D. In Friesland [*the Netherlands*], an irruption of the sea caused 100,000 people to drown.^{47, 92}

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.⁷²

[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.⁶²

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.⁷⁶

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.⁷²

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.⁷⁶

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.⁷⁶

In 1230 (the 2nd 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 17th, 1228 (1st year of Sho-o) as recorded in a compilation of Government orders.⁸⁵

In *Italy*, there was a great overflow of the Tiber River; and floods in *France*.^{47, 92}

In 1230 in Rome, *Italy*, there was a famine after a deluge of the Tiber River.^{57, 91}

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.⁷²

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].⁷²

1232 A.D. In *Austria*, there was a general overflow of the Danube River.^{47, 92}

In 1232, the Danube overflowed its banks, did much damage. It drowned people, cattle, towns, corn and woods. Hence there was scarcity and famine.⁷²

1233 A.D. In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.¹

The rain was violent in London, *England*. It thundered 15 days together, with rain and floods that destroyed the fruits of the earth.^{2, 43, 56}

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.³⁹

In 1233 in *England*, there was a great tempest of wind, with rain and it thundered for fifteen consecutive days.^{57, 90}

In *England*, it thundered for 15 days together, with terrible tempest of thunder and rain.⁴⁰

[One account places this event in 1232.] There was great rain and floods in *England* in the spring, but on the morrow of Saint Martin's Day [11 November] in 1232 was great thunder and lightning, which continued 19 days together. A flood in July [1233] did significant damage.⁷²

Winter of 1233 / 1234 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. The winter in *Italy* was similar to the year 1133 A.D.¹

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.²⁸

In 1234, loaded carts and wagons crossed the ice on the frozen *Adriatic Sea* in front of Venice, *Italy*.^{38, 58, 80}

In 1234, the Po River in *Italy* froze.^{58, 80}

In 1234, the Rhône River in *France* froze.^{58, 80}

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.⁷⁹

The *Mediterranean Sea* was frozen over and the merchants passed with their merchandise in carts.^{2, 41, 42, 43, 47, 93}

The *Mediterranean* was again frozen over in 1234 A.D.; and a whole pine forest was killed by the cold.³⁰

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.^{60, 62}

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.⁷²

In 1233, in *England*, the frost "lasted till Candlemas."^{47, 93}

During the 18th year of Henry III reign (1234) in *England*, "was a great frost at Christmasse, 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."^{47, 93}

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.⁶²

[In *England*], the frost continued till Candlemas. There was no snow. Corn [grain] was lost. Herbs and roots of trees died.⁷²

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 that Saint Maxentius's Church was filled with dead corps.⁷²

In Novgorod [*Russia*], the Church of St. Luke in the Lyudin quarter was burned down from thunder in the evening of June 10.⁷⁶

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.^{1, 40}

[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.⁷²

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.^{57, 72}

In 1235 in *England*, famine and plague; 20,000 persons died in London; people ate horseflesh, bark of trees, grass, etc.⁹¹

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.⁸⁴

1236 A.D. The Danube River is frozen in its full depth for a considerable time.⁶⁰

The Loire River in *France* was frozen solid. The Danube was frozen over across its entire width and remained frozen for a considerable time.⁶²

During the winter of 1236 in northern *France*, the rivers froze.⁷⁹

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*.⁶²

1237 A.D. 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.⁷²

1239 A.D. In 1239 in *England*, there was a great famine “people eat their children.”^{57, 91}

A plague and such a famine that delicate mothers ate their tender children.⁷²

1240 A.D. In *England*, the River Thames greatly flooded from rain.⁹² Extended above 6 miles at Lambeth.⁴⁷

[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.⁶²

[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.⁷²

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.^{47, 93}

[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.⁷²

1242 A.D. [In *England*] on the Feast of Saint Edmund in 1242, there was a 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.⁷²

In 1242, there was an inundation of the Thames for above six miles at Lambeth.⁴³

1243 A.D. [In *England*] in 1243 and 1244, there were great droughts followed by a most fatal plague.⁷²

[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.⁷² In 1243 in *Hungary*, there was a great famine from Tartar invasion.⁹¹]

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*.⁷²

1245 A.D. A drought that began in 1242 [in *England*] finally came to an end in 1245 after the rains took up.⁷²

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”.²⁸

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.⁷²

1247 A.D. In *England*, from 1247 to 1250, there were several inundations of the sea: great losses.^{47, 92}

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.⁷²

1248 A.D. In *Germany*, there was a famine.^{57, 91}

There was a great famine in *Germany*. There was an eclipse of the sun and an inundation of the sea.⁷²

In *England*, from 1247 to 1250, there were several inundations of the sea: great losses.⁴⁷

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 [Posen, *Germany*?] was burnt by lightning and 300 men who came to the horse races were killed on the course. In Friffingen [Fridingen, *Germany*?] was such a plague of mice, which ate up corn, hay and all greens. The year 1249 was a rainy year.⁷²

In *England*, from 1247 to 1250, there were several inundations of the sea: great losses.⁴⁷

1250 A.D. In *England*, the frost was very severe.^{47, 93}

In *England*, from 1247 to 1250, there were several inundations of the sea: great losses.⁴⁷

[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, 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.⁷²

1251 A.D. In *England*, tides rise 6 feet higher than usual.^{47, 92}

In *Ireland* on the 29th of June, there was a great inundation of the River Shannon.^{47, 92}

There was a famine in *England* in 1251.⁹⁰

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.^{40, 41, 56}

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.⁷²

In 1251 in *France*, a great flood of the Doux River destroys and carries away the superb masonry bridge called the "Great Bridge" between Tournon and Saint-Jean-de-Muzois. The bridge was not rebuilt until 1382.⁶¹

[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*.⁶²

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.⁷⁶

1252 A.D. In *England*, there was the greatest drought all spring and summer. But during the harvest, there were great rains. Then in October and long after, drought again.⁴⁷

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; dearness of grain and scarcity of fruit.^{57, 91}

[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 1253.⁷²

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.⁷²

1254 A.D. In *England*, the frost was severe between the 1st of January to the 14th of March.^{47, 93}

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”.⁷²

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.⁷²

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.⁷²

1257 A.D. – 1259 A.D. England.

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.⁸⁴

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.⁸⁴

In *England* in July 1257, there were great floods from rains.^{47, 92}

In July 1257, there were excessive rains and floods. There was great scarcity of horses and cattle in *England*. All the marshes were like a flooded desert.⁷²

In *England* in 1257, the inundations of autumn destroyed the grain and fruits and pestilence followed.^{57, 91}

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.⁹¹ “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.”⁵⁷

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.⁷²

In 1259 in *England*, a great mortality reigned till summer then there was drought and plenty.⁷²

1257 A.D. In the year 1257, the winter in *Holland* was severe. The French chronicles recorded “In the Kingdom of *France*, the winter was too hard.”⁶²

[In *Europe*] in the summer of 1257, it was excessively hot and the heat did not let up until Candlemas (2 February).⁶²

Also refer to the section 1257 A.D. – 1259 A.D. for information on the famine in England during that timeframe.

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].⁶²

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.⁷⁹

Also refer to the section 1257 A.D. – 1259 A.D. for information on the famine in England during that timeframe.

1259 A.D. In *England*, there was a drought in summer, and great plenty.⁷²

In *England*, a great mortality reigned till summer then there was drought and plenty. A hurricane struck on 28 December.⁷²

Also refer to the section 1257 A.D. – 1259 A.D. for information on the famine in England during that timeframe.

1260 A.D. In *England*, there was “no rain all the year to August; then moderate showers only; oats and barley lost.”⁴⁷

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.⁷²

In *Germany*, there were great floods on the Rhine River.^{47, 92}

1261 A.D. It was a sore rainy year in *England*. But a great plenty of corn and wine abroad.⁷²

1262 A.D. In *Ireland*, there was a great destruction of people from plague and hunger.^{57, 91}

There was a great scarcity and famine in *Scotland* and *England* from last year’s rainy harvest.⁷²

1263 A.D. In *England*, “on St. Nicholas we began a month’s hard frost.”^{47, 93}

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.⁷²

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 on the 8th 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 40s. to 10 Merks or 7l. Wax rose to 8 or 9 Merks. Pepper from 6d. rose to 3s. Salt, iron, steel, cloth and all merchant goods were drained away and lost.⁷²

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.⁸⁴

1266 A.D. In *Scotland*, there were great inundations of the River Tay and the River Forth from the sea.^{47, 92}

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.⁷²

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 *Italy*.⁷²

In 1268, there was a terrible famine in *Sicily, Italy* and Vienna, *Austria*.^{57, 91}

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.²⁸

In the year 1269, the winter was severe in *Northern Europe*.⁶²

During the winter of 1269 the rivers in northern *France* froze.⁷⁹

In 1269, the Kattegat was frozen between *Sweden* and Jutland, *Denmark*.⁶²

In *England*, the frost lasted from 30th of November to 2nd of February.^{47, 93}

In *England* in February of 1269, there were great floods from the winter thaw.^{47, 92}

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.⁷²

1271 A.D. In *England*, on the 4th 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.⁷²

In *England* in 1271, there was a violent tempest and inundation; followed by a severe famine in the entire district of Canterbury.^{57, 91}

In 1271, there was pestilence and famine in the whole of *Ireland*.^{57, 91}

Winter of 1271 / 1272 A.D. The Friday, which preceded Christmas, brought great cold, few people remembered experiencing such extreme cold [in *Western Europe*].⁶²

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.⁷²

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 1*d.*, a hen for 2*d.*, 8 herrings for 1*d.*)⁷²

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, *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.⁶²

1276 A.D. In *England*, there were great floods from the sea and from the rains.^{47, 92}

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].⁷²

In Bagdad, *Iraq*, the city was inundated after the appearance of red flame.^{47, 92}

1277 A.D. In *Holland*, there were great inundations at Friesland, forming the Dollert Sea.⁴⁷

In 1277, there was an inundation at Friesland, since named the Dollet Sea.⁴³

[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.⁶²

1278 A.D. In *Italy*, there was a great overflowing of the Tiber River.^{47, 92}

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."].⁷²

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].⁷²

1280 A.D. In *England*, there were great floods all the summer; especially in August.^{47, 92}

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, *France*.⁷²

In 1280, more than 300 houses overwhelmed at Winchelsea in *England* by an inundation of the sea.⁹⁰

At Winchelsea, *England*, above 300 houses were overthrown by the sea.^{40, 41, 43}

Winter of 1280 / 1281 A.D. In *England* on 22 January began a very severe 50-day frost.⁷²

In *England* in 1280, the frost began on St. Vincent's Day (27 September) and lasted fifty days and was severe.^{47, 93}

1281 A.D. There was a grievous famine in *Poland*, great multitudes moved to *Russia* and *Hungary*.⁷²

There was a famine in *Poland*.^{57, 91}

In 1281, a powerful cyclone struck Hakata Bay, *Japan* causing 65,000 deaths.⁹⁸

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.¹

In 1281, the snow fell in great abundance in *Austria* and many houses were entirely buried in the open countryside.^{58, 80}

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*.²⁸

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*, 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.⁶²

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.⁷²

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.²⁹

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.⁷²

In northern *France*, fierce winds tore up the walnut [trees] and destroyed [church] steeples on November 24, 1284.⁷⁹

1285 A.D. In *England*, there was a great storm, “with violent lightning.”⁵⁷

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.^{40, 41, 43, 56, 90}

In *England*, there was a sudden great darkness, and then such drought and heat as killed most grain.⁴⁷

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.⁷²

The winter was very mild and rainy in *Italy*.⁶²

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, *Germany*.⁷²

There was a 23-year long famine in *England* that began in 1286.⁹¹

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.”^{47, 92}

In *England*, the winter was excessively rainy producing great floods. 1st June. Sea broke in from the Humber to Yarmouth, forced by the winds. In December on Suffolk and Norfolk coasts. Plague all the year.^{47, 92}

In *Selandria*, fifteen islands submerged by the sea, 15,000 people drowned.^{47, 92}

Fifteen islands in *Selandia* [Norway?] 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.⁷²

In *Holland*, 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”.^{47, 92}

It did not rain all summer in 1287 in *France*. Wells and springs dried up.⁷⁹

1288 A.D. In *England* during the winter, there was great frost and snow.^{47, 93}

In the month of March, the Rhine River froze below Basel (city situated at the border between *Switzerland, France* and *Germany*).⁶²

The frosts of 1288 in northern *France* killed the buds of the vines, all woods and orchards.⁷⁹

In *England* during the summer, there was heat and drought so intense as killed many. There were great deaths.⁴⁷

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.⁷²

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.⁶²

1289 A.D. In *England*, there was a great hailstorm, followed by heavy rains, greatly affecting the next year's harvest.⁴⁷

In 1289 in *England*, during the 17th 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.⁹³

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.⁷²

In *England* in 1289, a tempest destroyed the seed, and corn [grain] rose to a great price.^{57, 91}

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].⁶²

1290 A.D. [In *England*], there was a great dearth. Wheat sold for 12*s.* to 13*s.* 8*d.* per Quarter [quarter ton]. In winter, there was much snow but little frost.⁷²

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.⁷⁶

In *England*, there was a drought all summer.⁴⁷

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].⁷²

In *India*, there was a great drought.⁴⁷

In *India* in 1291, no rain fell in the provinces about Delhi and there was in consequence a most terrible famine.⁵⁷

In 1291 in Damascus, *Syria*, there was inundated caused by overflowing of streams.^{47, 92}

Winter of 1291 / 1292 A.D. In 1291 in *England*, the frost was severe all winter.^{47, 93}

In 1292, “the Rhine was frozen over,” and the snow is represented as being of an “enormous depth”.³⁰

In 1292, loaded carts crossed the Rhine River at Breisach, *Germany*, on the ice. The Caltégat Sea (Kattegat Sea) was frozen over completely with ice.^{60, 62}

In 1292, the winter in *Germany* and *Northern Europe* was very severe.⁶²

The winter of 1292 in northern *France* was very severe.⁷⁹

1293 A.D. On 14 May 1293 fell a great snow and with it a terrible wind. The storm did great damage in *England*.⁷²

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.⁷⁶

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.¹

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.^{2, 41, 42, 43, 47, 93}

In 1294, the Cattegat was covered with ice seven feet thick. Batteries of artillery were moved to and from the strait.⁶³

In 1294, The Cattegat entirely frozen.⁹⁰

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.⁷⁹

In *England*, there was a very great drought.⁴⁷

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].⁷²

In *England* in 1294, there was a severe famine. Many of thousands of the poor died.^{57, 91}

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 3rd of the Nones of April, there was a deep snow. Hail spoiled the corn [grain]. Famine oppressed those of Bourbon [*France*].⁷²

In 1295 in *England*, there were no grain or fruits, “so the poor died of hunger.”^{57, 91}

In *England*, hail, great concussion of the elements.^{57, 91}

In *Ireland*, there was a great dearth from 1294-96.^{57, 91}

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.¹

The sea between *Norway* and the promontory of Scagernit frozen over and from *Sweden* to *Gothland*.^{2, 40, 41, 42, 43}

The *Baltic Sea* was covered with ice from *Sweden* to *Gothland*.^{47, 93}

Never in living memory, has anyone seen a winter so cruel in *France* as that of 1296.⁷⁹

1297 A.D. In *Scotland*, there was a sore affliction of famine and plague.⁷²

In *Scotland* in 1297, calamitous famine and pestilence.^{57, 91}

1298 A.D. In 1298 during the 26th 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.”⁵⁷ [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.⁷²

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.”^{47, 72}

In December [in *England*], there was a hurricane. Then great calm, clear and hot. After that great floods.⁷²

In *Persia*, they were ravaged by famine and pestilence.^{57, 91}

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.⁶²

1302 A.D. There was a famine in *England*, *Scotland* and *Ireland*.^{57, 91}

Winter of 1302 / 1303 A.D. In 1302, the Rhône River in *France* froze.^{58, 60, 62, 80}

During the winter of 1302-03, the Rhône River in *France* was frozen over completely.⁶¹

The winter of 1302 in *France* was bitterly cold. The Rhône River froze and the olive trees died.⁷⁹

In 1302 in *Provence*, the year produced a severe winter.⁶²

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.⁷⁶

1304 A.D. In Damascus, *Syria*, there was an inundation.^{47, 92}

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.⁶²

In 1305 in *France*, there was a severe drought during the summer.⁷⁹

Winter of 1305 / 1306 A.D. In 1305, the Rhône River in *France* froze.^{58, 80}

In 1305, the Rhône River and all the rivers of *France* froze.^{60, 62}

In 1305, all rivers in *France* froze.⁷⁹

In 1306, the *Baltic Sea* was passable by foot passengers and horsemen for six weeks.²

In 1306, the *Baltic Sea* was covered with ice for 14 weeks, between the *Danish* and *Swedish* islands.^{41, 42, 43, 47, 93}

In the year 1305, the winter in *France* was very strong. The sea on the coasts of *Flanders* and *Holland*, was frozen to a width of one and a half miles.⁶²

During the winter of 1305-06 there was excessive flooding in *France* [spring thaw].⁷⁹

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.⁶²

In 1306 in *France*, an extreme drought ruled the spring and summer. The cold froze strongly the waters before they had diminished.⁷⁹

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.⁷⁹

Winter of 1306 / 1307 A.D. In 1307, the rivers of *France*, among others the Seine River, were frozen. Many rivers in *Flanders* were also frozen solid enough that carriages could ride across them.⁶²

In the year 1307 the winter in *Flanders* 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.⁶²

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.⁷⁹

1309 A.D. In 1309, there were terrible winds, which toppled many trees and buildings in *France*.⁷⁹

1312 A.D. A three-year famine struck *Bohemia* 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.⁷²

1313 A.D. The entire empire of *China* was devastated by a massive drought.²⁸

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. 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.⁷²

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 torn to pieces for food.⁸⁴

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.⁵⁷

In *Ireland* in 1314, famine and various distempers.⁵⁷

1315 A.D. *Europe* hit by incessant rains. These were followed by a famine so severe that Polish poor ate hanged bodies.²⁸

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.⁷⁹

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*.⁷²

In 1315 in *Thuringia*, *Poland*, and *Silesia*, there was a famine. This famine lasted years in *Lithuania*.⁹¹

Crop failures and starvation in Northern *Estonia*.³⁴

In *England*, there were great rains and floods during harvest; much grain spoiled.⁴⁷

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.⁹¹

There was a famine in *England* in 1315 that was so dreadful that the people devoured the flesh of horses, dogs, cats and vermin.⁹⁰

In 1315 in *Ireland*, there was famine and various distempers.⁹¹

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.⁶²

In 1315, the Po River in *Italy* froze.^{58, 80}

1316 A.D. *England* struck by 2 years of rains and floods. Famine killed thousands.²⁸

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.^{57, 91}

In *Ireland* in 1316, there was a great dearth. Eight captured Scots were eaten at the siege of Carrickfergus.^{57, 91}

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. When wheat was sold at 10d a bushel, it was so very cheap; but at 10s., it was monstrously dear.⁷²

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.⁶²

The pretty rough winter of 1316 in northern *France* lasted without interruption from late November to Easter.⁷⁹

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.^{57, 91}]

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.⁷²

1318 A.D. *China* experienced massive floods in which multitudes drowned.²⁸

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.⁷²

In 1318, the winter was severe in *France, Germany* and *Italy*. Wagons crossed on the ice on the Po River in *Italy*.⁶²

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.⁷²

1321 A.D. Ho-nan *China* experienced a severe drought that produced famine.²⁸

In *England*, there was the greatest drought, with heat.⁴⁷

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.^{62, 72}

In *England*, there was famine again.^{57, 91}

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.¹

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.⁶³

In 1323, the *Baltic Sea* was frozen and passable to travelers for six weeks.^{90, 93}

In 1323, a severe winter struck *Denmark*. The *Baltic Sea* was frozen.²⁸

In 1323, the *Baltic Sea* was frozen over and passable for foot passengers and horsemen for six weeks.^{30, 41, 42, 43, 47}

In 1323, the Rhône River in *France* froze.^{58, 80}

In 1323, the Po River in *Italy* froze.^{58, 80}

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, *Germany* and Danzig (now Gdańsk, *Poland*).^{60, 62}

The Rhône River in southern *France* froze in 1323.⁷⁹

In 1324, it was possible to travel from *Denmark*, Lübeck and Danzig on the ice.³⁸

In the year 1323 the winter was very hard in *France* and *Germany*. In February, a lot of snow fell.⁶²

1325 A.D. The Seine River in *France* froze twice at short intervals. The river was crossed with sleds with heavy loads.⁶²

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.⁷⁹

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.⁶²

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.⁷⁹

[In *Western Europe*] the summer of 1325 was extremely hot.⁶²

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].⁷⁹

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.⁷⁹

In *England*, the earth was very fruitful. Air temperature and sea calm.⁷²

1328 A.D. 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*.⁷⁹

1330 A.D. In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.¹

The rain was so violent; the harvest did not begin till Michaelmas (29 September).^{2, 39, 40, 41, 56}

In *England*, heavy rains; grain did not ripen; harvest not commenced till Michaelmas.^{47, 92}

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.⁷²

China experienced floods that ruined harvest and produced famine.²⁸

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 1331.⁷⁹

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.⁷⁹

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.⁷⁹

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.⁷²

In 1331 in *France*, a drought followed the wet winter.⁷⁹

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.⁷⁹

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.⁷⁹

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.⁷⁹

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.⁷⁹

1332 A.D. *China* experienced heavy rains and floods killing 7 million.²⁸

The Rhône River in *France* overflowed its banks and the floodwaters reached the territory of Donzère.⁶¹ [Other sources place this event at 1350 A.D.]

In *Ireland*, a peck of wheat sold for 22s.^{57, 91}

1333 A.D. – 1337 A.D. China.

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.⁸⁴

China experienced droughts and floods and famine. Four million people killed in floods.²⁸

In 1334 A.D. *China* experienced droughts and floods. Thirteen million were killed in the famines and floods in the Southern Provinces.²⁸

In *China* in 1337, a famine occasioned a pestilential epidemic.⁵⁷

1333 A.D. In Florence, *Italy* in November, there was a great overflow of the Arno River.^{47, 92}

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.⁶²

In the year 1334, all the rivers in *Provence* and *Italy* were frozen.^{60, 62} At Paris, *France*, the frost lasted two months and twenty days.³⁸

The frost of 1334 stopped all the rivers of *Italy* and *Provence*, *France*.⁷⁹

The winter of 1334 in *France* was very wet.⁷⁹

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.⁷⁹

In 1334, the Po River in *Italy* and the Rhône River in *France* froze.^{58, 80}

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.⁷⁹

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.⁷²

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.^{40, 41, 56}

In *England*, continued rainstorms; grain spoiled.^{47, 92}

In *England*, famine occasioned by long rains.^{57, 90, 91}

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.⁷²

In the Novgorod [*Russia*], autumn ice and snow drifted into the Volkhov River, carrying away fifteen stays of the great bridge.⁷⁶

Also refer to the section 1333 A.D. – 1337 A.D. for information on the famine in China during that timeframe.

1336 A.D. *Scotland* was desolated by a famine.^{57, 91}

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.⁷²

On August 4, 1336, a terrible storm broke out in Paris, *France* and its countryside. This storm toppled tents erected at Vincennes, *France* and uprooted thousands of trees in this woods.⁷⁹

Also refer to the section 1333 A.D. – 1337 A.D. for information on the famine in China during that timeframe.

1337 A.D. In *England*, there was a severe frost without snow.^{47, 93}

In *England*, there was a severe frosty winter without snow. Wheat was very dear.⁷²

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, *Russia* was burnt down and flooded.⁷⁶

In 1337 in *China*, there was a famine, which occasioned a pestilential epidemic.⁹¹

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.⁷⁶

In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.¹

In *England*, it rained from the beginning of October to December.^{2, 40, 41, 56}

In *England*, there was continuous rain from beginning of October to December.^{47, 92}

In *England*, there was a severe frost for twelve weeks, after rain.^{47, 93}

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.⁷²

The *Western Europe*, the Meuse River froze.⁶²

1339 A.D. In *England* on 22nd March, there was a great flood of the River Tyne; many lives lost.^{47, 92}

In *England*, 120 laymen, and several priest, besides women, were drowned by an inundation at Newcastle upon Tyne.^{41, 43}

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 40d. and sometimes less; barley 10d.; peas and beans 12d.; oats 10d.⁷²

In *Ireland* in 1339, there was a general famine.^{57, 91}

1341 A.D. The cold of this winter in *Livonia* (former Russian province, comprising present 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.⁶²

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.^{57, 91}

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.⁵⁷

1344 A.D. All the rivers in *Italy* were frozen over.³⁰

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.⁵⁷

1345 A.D. Rains began in *Italy* in July and lasted 6 months. Famines followed.²⁸

[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].⁷⁶

1347 A.D. Droughts struck Ho-tong *China*. Many died.²⁸

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.”⁵⁷

1348 A.D. In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.¹

It rained from Midsummer to Christmas, so that there was not one day or night dry together.^{2, 40, 41, 56}

[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.⁷²

In *England*, there were violent rains from Midsummer to Christmas “so that there was not one day and night dry together.”^{47, 92}

On 2 January,⁷² there was a flood of the River Ouse, which overflowed York, *England*, as far up as Micklegate.⁷²

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*.³⁹

The summer of 1348 in southern *France* was remarkably hot producing a drought.⁷⁹

A severe winter struck *Iceland*. The sea was frozen around *Iceland*.²⁸

[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*.⁷²]

1349 A.D. The winter was similar to the winter of 1323 A.D.¹

The *Baltic Sea* was frozen over and passable from *Stralsund* to *Denmark*.^{2, 41, 42, 43, 47, 93}

The *Baltic Sea* was frozen over.³⁰

1350 A.D. In *England*, there was a drought that came after floods, storms and meteors.⁴⁷

In 1350 in *England*, there were “floods, storms, tempests and fiery meteors in the air.”⁹²

In 1350 in *Barbary*, the grains exported from *England* caused a dearth in *England*.^{57,91}

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.⁷²

1352 A.D. In *England*, there was a drought.⁴⁷

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 scarce 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.⁷²

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.⁶²

Winter of 1352 / 1353 A.D. In *England*, the frost was “very cruel” from 6th December to 12th March.^{47,93}

In *England*, there was a terrible hard and long frost from 6 December 1352 to 12 March 1353.⁷²

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.³⁹

In 1353, there was a great famine in *England* and *France*.^{57,90,91}

In *Italy*, there was drought.⁴⁷

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 weighed 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.⁷²

[Another account places this event in 1355.] In *England* in 1355, there was great scarcity. Grain was brought from *Ireland*, which afforded much relief.⁵⁷

1356 A.D. In *England*, there was drought and heat.⁴⁷

In *England*, there was no rain in April, May and June.⁷²

In the Novgorod Republic [now part of *Russia*], in autumn the water was high [flood].⁷⁶

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.⁶¹

1357 A.D. 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.⁷⁶

1358 A.D. In Bologna, *Italy*, the snow was 10 Ellen (approximately 23 feet, 7 meters) deep.^{60, 62}

In 1358 in Bologna, *Italy*, the snow was 10 Braccia (approximately 22 feet, 6.7 meters) deep.⁸⁰

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].⁶²

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.⁷⁹

A prodigious amount of snow fell in Provence, *France* during the winter of 1358. The harsh rains that succeeded the winter produced devastating floods.⁷⁹

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.⁷²]

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.⁷²

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.⁶

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].^{2, 39, 40, 41, 43, 56, 57}

[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.⁹⁰

[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.⁹³

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.⁷⁹

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.⁷²

1361 A.D. In *England*, there was a drought, “very grievous in summer.”⁴⁷

In *England* after the beginning of May, there was a great drought, scarcity of corn [grain] and hay. There was a famine in *Poland*.⁷²

The summer of 1361 in southern *France* was remarkably hot.⁷⁹

Wine, fruit and wheat were plentiful in 1361.⁷⁹

The winter of 1361 in *France* was much wetter and warmer than usual: lots of trees flowered before Christmas.⁷⁹

In *Poland* in 1361, there was a famine.^{57, 91}

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.⁷²

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.⁷⁹

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.⁶¹

The winter of 1362 was very wet in *France*.⁷⁹

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.²⁸

In 1364, the Rhône River in *France* froze.^{58, 80}

In 1364, the Rhône River at Aries, *France* froze to a considerable depth; loaded carts traveled on the ice.^{60, 62}

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.⁶²

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.⁷⁹

In *England*, the frost was “very terrible” between the 16th of September to the 6th of April.^{47, 93}

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.⁷²

1364 A.D. The summer of 1364 in southern *France* was remarkable due to excessive heat and extreme cold.⁷⁹

1365 A.D. In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.¹

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.⁷²

It rained violently in *England*.^{40, 41, 47, 92}

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, and overran a neighboring village with its inhabitants.⁷⁹

1367 A.D. Violent winds struck in December 1367, during the night of the Feast of Saint Lucia [13 December] in Flanders and Brabant in Picardy, *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.⁷⁹

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.⁷²

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.^{57, 91}

1373 A.D. In the Novgorod Republic [now part of *Russia*], the Volkhov River flowed backwards for seven days [owing to floods downriver].⁷⁶

1374 A.D. In *Italy* in 1374-75, there was a famine.^{57, 72, 91}

The summer of 1374 in southern *France* was remarkably hot.⁷⁹

The year 1374 produced heavy rains in southern *France*.⁷⁹

In October 1374, flooding from the sea amid storms swamped several cities in *Holland*.⁷⁹

1375 A.D. In *England*, there was an excessive drought with heat.^{47, 72}

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].⁷⁶

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.⁷⁶

1381 A.D. In December of 1381 or 1382 in *England*, there were excessive long rains, great floods and losses.⁷²

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.⁵⁷

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.^{40, 41, 56}

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.⁹⁰

In different parts of *England*, many houses were thrown down by a storm, cattle destroyed and trees uprooted.^{41, 43}

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.⁶¹

There was no wind in *Germany* in 1382; yet it was a time of great plenty.⁷²

1383 A.D. 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.⁷²

Severe storms reigned over the *English Channel* in 1383.⁷⁹

1384 A.D. In 1384, an unbearable dry heat reigned throughout *France* from the spring until the middle of August.⁷⁹

The sources of water dried up during the summer of 1384 in *France* by the lack of rainfall and prolonged drought.⁷⁹

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.⁷⁹

Winter of 1384 / 1385 A.D. In 1384, during the winter the Rhine River, the Scheldt River and the Sea of Venice were frozen.¹

In 1384, the Rhine and the Gulf of Venice were frozen over.³⁰

During the year 1385, the winter was very cold in *Northern Europe*.⁶²

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.⁷²

In September 1386, a terrible wind with lightning and thunder reigned throughout the kingdom of *France*.⁷⁹

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.⁷⁶

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].⁷²

1390 A.D. In *England*, there was a great famine arising from the scarcity of money to buy food.^{57, 91}

The summer of 1390 in southern *France* was remarkably hot.⁷⁹

The year 1390 produced heavy rains in southern *France*.⁷⁹

A strong wind blew across the world on Christmas Eve 1390. The sea flooded beaches in *France*.⁷⁹

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.³⁹

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.⁷²

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.⁶² [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.]

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° Reaumur (-20° C, -4° F). A great number of trees in *France* burst in the winter of 1392.^{58, 80}

In the year 1392 in *France*, the winter was severe. The trees were shattered due to the extreme cold.⁶²

The winter of 1392 in *France* and in the North produced a very great cold.⁷⁹

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*.]⁷⁹

The persistent drought in the summer of 1392 dried up water sources and prevented the largest rivers in *France* from being navigable.⁷⁹

[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.^{57,91}

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.⁷²

1393 A.D. In *France*, the heat is so strong that the earth is burned and the rivers are dry.⁶¹

1394 A.D. 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.⁷²

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.⁷⁹

1396 A.D. In 1396 in *Holland*, 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.”^{47,92}

[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.⁹⁰ In 1400 at the Taxel, there was an inundation, which first raised the commerce at Amsterdam.⁴³

In the *English Channel*, there was another great storm, on the occasion of the second Queen of Richard II landing.⁵⁷

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.^{40,41,56} [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.⁹⁰

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.⁷²

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.⁷⁹

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.⁷⁹

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.⁶²

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.⁷⁹

1400 A.D. In 1400, the winter was very severe in *Northern Europe* and the frozen seas offered several armies an alternate route on the ice.⁶²

“In 1400, the seas froze in *Northern Europe*”.⁶²

1401 A.D. In May 1401, a terrible storm burst upon the Beauvoisis [Beauvoisin, *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.⁷⁹

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.⁷²

Winter of 1402 / 1403 A.D. The winter of 1402 was similar to the winter of 1323 A.D.¹

In 1402 the *Baltic Sea* was quite frozen over from Pomerania to *Denmark*.^{2, 40, 41, 42, 43, 47, 90, 93}

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].⁷⁶

1404 A.D. In *England*, there was an inundation from the sea.^{47, 92}

In *France* in June, a strong mist covered the whole country.⁶¹

In 1404 or 1406, there were great losses in Kent, *England*, in *Holland*, in *Zealand*, in *Flanders*, etc. by breaking in of the waters that overflowed the sea banks, to the drowning and loss of much cattle, etc.⁷²

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.⁷⁶

In *England*, there was a warm south wind all summer.⁷²

Winter of 1407 / 1408 A.D. The winter was similar to the winter of 1323 A.D.¹

The whole sea between Gothland and Geland was frozen, and from Restock to Gezoer.^{2, 41, 42, 43}

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.²⁸

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.⁷²

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.³⁹

In *England* in 1407, the frost lasted fourteen weeks; small birds perished. In the *Baltic Provinces* in 1408 the frost was very severe.^{47, 93}

In *England* during the winter of 1407-08, all the small birds perished from the frost.⁹⁰

The *Baltic Sea* was frozen over.³⁰

In 1408, the vines and fruit trees in *France* were killed [by the extreme cold].^{58, 80}

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.⁶⁰

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.⁶²

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.⁷⁹

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."⁶²

“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.”⁶²

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.⁶²

1408 A.D. A terrible hailstorm struck in Vexin, *France* on September 5, 1408. Hailstones, driven by a furious wind, were as big as ostrich eggs.⁷⁹

In *England* on 7 September, there was a great flood.⁷²

1410 A.D. In *Ireland*, there was a great famine.^{57,91}

1411 A.D. A terrible storm struck around Paris, *France* in 1411, on the Feast of the Conversion of St. Paul [January 25].⁷⁹

1412 A.D. In *India*, there was a great drought on the Ganges-Jumna Delta from 1412-1413.⁴⁷

In 1412-13 in *India*, there was a great drought followed by a famine which occurred in the Ganges-Jumna delta.⁵⁷

In *England* on 12 October 1412, the “sea flooded thrice without ebbing.”^{47,92}

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.⁷²

1413 A.D. In London, *England* on the 25th 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.^{41,43,56}

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].⁷⁶

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.⁷⁶

1418 A.D. In *England*, there was such a storm and hideous tempest as endangered the loss of the whole English Navy.⁷²

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.⁷⁶

Winter of 1419 / 1420 A.D. In 1420, the sea between Constantinople (Istanbul) and Iskodar (Üsküdar) *Turkey* was frozen and passable on ice.^{2,42,43,47,93}

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.⁶²

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 10th 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.⁶²

Winter of 1420 / 1421 A.D. [In *Europe*], the winter was so mild that in April 1421 there were cherries and in May grapes.⁶²

1421 A.D. The sea broke in at Dort, and drowned 72 villages, and 100,000 people and formed the Zuyder Sea.^{40, 41, 43}

On 17 April 1421, the sea broke in at Dort [Dordrecht, *the Netherlands*], and drowned 72 villages, and 100,000 people.⁹⁰

In 1421 in *Holland*, 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*. [Some authorities give the date of this event as 1446.]^{47, 92}

In 1446, the sea breaks in on Dort in *England* and drowns 100,000 persons.¹²⁸ [Some authorities give the date of this event as 1446.]

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.⁷⁶

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.]⁶²

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 12th and there was still ice at Notre Dame in March.⁷⁹

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.⁶²

1422 A.D. The weather was good for the crops in 1422 in Dijon, *France*. They completed the harvest on 28 August.⁶²

Winter of 1422 / 1423 A.D. The winter was similar to the winter of 1323 A.D.¹

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*.^{2, 41, 42, 43}

In 1423, one could travel between Lübeck and *Prussia* on the ice.³⁰

In 1423, the travelers went on the ice from Lübeck, *Germany* to Danzig (now Gdańsk, *Poland*).⁶²

In the winter of 1423, the shores of the *Baltic Sea* from Lübeck to Danzig were frozen.⁶²

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.⁶²

1426 A.D. The winter was similar to the winter of 1323 A.D.¹

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*.^{2, 41, 42, 43}

In 1426, the ice bore riding upon it from Lübeck to *Prussia*.⁹⁰

In 1426 in *North of Europe*, the ice carried traffic from Lübeck to *Prussia*.⁹³

One could travel between Lübeck and *Prussia* on the ice.^{30, 47}

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.⁷²

In *England*, famine from great rains.^{57, 91}

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.⁷⁹

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.⁶²

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 15.⁷⁹

1429 A.D. In *Scotland*, there was a dearth.^{57, 91}

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.⁷⁶

In 1430, the vine and fruit trees in *France* were killed [by the extreme cold].^{58, 80}

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*.⁶²

In the year 1430, the winter was very strict in the north and the [grape] vine suffered greatly in *Germany*.⁶²

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.²⁸

[Another source gives this as the winter of 1432-33.] “In 1432-1433, the Seine and all the rivers of *Germany* were frozen.”⁶²

1433 A.D. A terrible flood of the Rhône River in *France* ravaged the territory of Arles and destroyed a large number of cattle.⁶¹

In *Ireland*, there was a famine of great severity.^{57, 91}

Winter of 1433 / 1434 A.D. During the winter in 1434, the River Thames was frozen below Gravesend.¹

In *England* from 24 November to 10 February 1434, the River Thames was frozen below London-bridge to Gravesend because of the severe frost.^{2, 39, 40, 41, 43, 90}

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.⁷²

In *England*, the frost lasted from 15th November to 10th February. The River Thames frozen down to Gravesend.^{47, 93}

In *England* in the year 1434, a great frost began on the 24th of November, and held till the 10th 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.²⁹

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.⁶³

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 17th of April. The same year it snowed in *Holland* forty consecutive days.^{38, 60}

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, *France*. Winter ruled in the city for three months.⁷⁹

In 1434, it snowed in the *Netherlands* and in Paris, *France* for almost 40 days in a row.^{58, 80}

In 1433, the winter was very severe again in *Germany*.^{47, 62, 93}

In 1433, there were severe frosts, when the large fowl of the air sought shelter in the towns of *Germany*.⁹⁰

In 1434, all the rivers in *Northern Europe* and *Germany* froze. The River Thames in *England* froze at Gravesend.⁶²

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 17th of April." In *Holland* 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 1434.⁶²

1434 A.D. The summer weather was good for the wine in 1434. At Dijon, *France*, the vintage was ready on 1 September.⁶²

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.⁷⁹

1435 A.D. The winter of this year was remarkable for the duration and severity of cold. Winter in *Flanders* 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.⁶²

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.⁷⁶

During the summer of 1436 in southern *France*, humidity and heat competed.⁷⁹

1437 A.D. 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.⁷⁶

1438 A.D. In *England*, there was a great frost that was unusually long.^{47, 93}

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.⁷²

In *England* in 1438 “In the 17th 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.”⁵⁷

[Another account places this event in 1439.] In *England* in 1439, during the 18th 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.”⁵⁷

In *England* in 1438, there was a famine so great that bread was made from fern roots.⁹⁰

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.^{57, 91}

1440 A.D. In *England*, there was a scarcity and in *Scotland* a famine.^{57, 91}

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.⁷²

The year 1440 produced heavy rains in southern *France*.⁷⁹

1442 A.D. The rivers in the south of *France* froze.⁶²

In the year 1442, the king spent the winter in Montauban, *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*, a lot of the trees and fruits of the earth were frozen.⁶²

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.⁶²

In *Sweden* there was a famine.^{57, 91}

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.^{40, 41, 43}

In *England* on 1 February 1443, Saint Paul’s church was set on fire by thunder and lightning and a great tempest.⁷²

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).⁶²

1445 A.D. 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.]⁷⁶

1446 A.D. 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.]⁷⁶

1447 A.D. In *Ireland*, there was a great famine in the spring.^{57, 91}

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.⁷⁹

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.⁸⁶ [Parents were able to buy back their child's freedom when situations improved.]

1456 A.D. During the summer of 1456 in southern *France*, humidity and heat competed.⁷⁹

The year 1456 produced heavy rains in southern *France*.⁷⁹

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.⁶²

In 1458, the Danube River froze from shore to shore; an army of 40,000 men struck their camp on the ice.⁶²

The winter of 1458 was so severe that an army of forty thousand men camped on the Danube River.⁷⁹

Winter of 1459 / 1460 A.D. The winter of 1459 was intensely cold and similar to the winter of 1323 A.D.¹

In 1459, the ice bore riding on from Lübeck, *Germany* to *Prussia*, and the *Baltic Sea* was covered with ice from *Mecklenburgh* to *Denmark*.^{2, 41, 42, 43}

In 1459, the *Baltic Sea* was frozen. The ice was thick enough that individuals could cross between *Denmark* to Lübeck, *Germany*.²⁸

In 1460, the *Baltic Sea* was frozen, and horse passengers crossed from *Denmark* to *Sweden*.⁹⁰

In 1459, one could travel between Lübeck, *Germany* and *Prussia* on the ice.³⁰

In *Northern Europe* in 1459, the *Baltic Sea* frozen from *Mecklenburgh* to *Denmark*.^{47, 93}

In 1460, the Danube and the Rhine Rivers froze.³⁸

In 1460, the Rhône River in *France* froze.^{58, 80}

The winter of 1460 froze the Rhône River in southern *France*.⁷⁹

In 1460 the Rhône River in *France* and the Danube River remained frozen for several months.⁶¹

In 1460, the Danube River is frozen for 2 months. The Rhône River in *France* also freezes.⁶⁰

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*.⁶²

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.⁶³

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.⁶²

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.⁷²

1464 A.D. The winter of 1464 was very severe in the north [*Northern Europe*]. In *Flanders* 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.⁶²

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.⁶²

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.⁷⁹

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.³⁸

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.⁷⁹

In 1468 in *Flanders*, the frost was very severe; wine cut with hatchets.^{47, 90, 93}

In 1468, it took the axe to break apart the [frozen] wine being distributed to troops in *Flanders*.⁷⁹

In 1468, in *Flanders*, rations of frozen wine were cut and distributed to soldiers with a broken axe.^{58, 60, 80}

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.⁶²

1469 A.D. In March 1469, there was thunder and heavy rain in northern *France*.⁷⁹

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.⁷⁶

[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 7,000.⁷⁶

In May 1471 in *Ireland*, there was a great shower of hailstones, with thunder and lightning.⁹³

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.⁶¹

In *England*, the winter was rigorous and weather stormy.⁷²

In *India*, there was a famine in Orissa.⁵⁷

1472 A.D. – 1475 A.D. Hungary, England and France.

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.⁷²

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].⁷⁹

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.⁶²

In *England*, there was a great drought and heat after the two comets of 1472.⁴⁷

1475 A.D. The severe cold of 1475 destroyed the olive trees of Languedoc, *France*.⁷⁹

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.^{47, 92}

Locust and a great inundation of the Istula (Vistula River in *Poland*).⁷²

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, *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.⁷⁹

1477 A.D. In *England*, there was a drought with great heat; caused the plague.⁴⁷

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.⁶²

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.⁷²

1479 A.D. In St. Neots, (Huntingdon) *England*, there was a hailstorm, "when the stones measured 18 inches round."^{41, 43, 57}

In *England* in 1479, there were hailstorm in Huntingdonshire; stones 14 inches round.⁹³

1480 A.D. The Seine River in *France* was frozen and the ice carried [the weight of] carts.⁶²

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.⁷⁹

The winter of 1480 was severe and due to a large flood in Paris, *France* noteworthy.⁶²

1482 A.D. This was recorded as one of the coldest winters in *Holland*.⁶²

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.⁶²

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.³⁹

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.^{47, 90, 92}

[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.⁷²

On 7 June 1483, a great storm struck Paris, *France*.⁷⁹

In *France* in 1483, the summer weather was ideal because grapes were sold in the market on 13 June.⁶²

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.⁶²

1486 A.D. In *England*, there was a sore famine.^{57, 91}

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.²⁸

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.⁸²

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.⁶²

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, *France* could not leave their houses for two months.⁷⁹

1491 A.D. A great fall of rain in *Ireland* all summer.³⁹

In *Ireland*, there were great rain and floods all the summer; called the “Dismal Year.”^{47, 57, 92}

In *Ireland* in 1491, there was such a famine that it was called “The Dismal Year.”⁹¹

In *England*, there was considerable scarcity.⁵⁷

In *Poland*, there was a great dearth of cattle.⁷²

1493 A.D. The summer in *Belgium* was very warm. Grain and wines were sold at low prices in the area around Liège.⁶²

Winter of 1493 / 1494 A.D. In the year 1493, the port of Genoa, *Italy* was frozen.³⁸ - on December 25 and 26.^{60, 62}

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.⁶²

The Rhône River froze in 1493 in southern *France*.⁷⁹

1494 A.D. In *England*, great scarcity and high prices.⁵⁷

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.⁷²

On 24 August in 1494 or 1495, a hail tempest struck St. Nead’s. The hailstones were 18 inches about [circumference].⁷²

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.⁷⁹

1495 A.D. In *India*, there was a great dearth that occurred about this date in Hindustan.⁵⁷

The winter of 1495 produced a lot of rain, and the following summer produced many storms in southern *France*.⁷⁹

1497 A.D. There was an “intolerable famine throughout all *Ireland* – many perished.”^{57, 91}

1498 A.D. In *England*, there was a very great drought.⁴⁷

In *England*, this was a very droughty year and hay was very dear.⁷²

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*.⁶²

Winter of 1498 / 1499 A.D. The frosts of the winter appeared in Hainaut, *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.⁶²

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, *Belgium*.⁶²

In 1500, there was a great tempest in Rome, *Italy*, which did much damage to buildings.⁷²

1501 A.D. In *Germany* on 14 August, the Albis (Elbe) River overflowed.^{47, 92}

1502 A.D. In *Holland* the winter was severe and in Paris, *France*, the winter brought on a flood.⁶²

The summer of 1502 in southern *France* was hot and dry.⁷⁹

There was a drought in southern *France* in 1502.⁷⁹

1503 A.D. In *England*, there was a great drought in summer.^{47, 72}

The Po River in *Italy* was frozen and an army crossed the ice.⁶²

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.⁶²

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 15.⁶¹

The summer of 1504 in southern *France* was very hot.⁷⁹

In *Italy* in 1504, the winter was mild like springtime.⁶²

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.⁶²

1505 A.D. In 1505 because of a great famine in *Hungary*, parents killed and ate their own children.⁹⁶

Winter of 1505 / 1506 A.D. In 1506 in southern *France*, the winter was as mild as spring.⁷⁹

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.⁷⁹

1506 A.D. In 1506, a Fleet of 13 vessels were sailing from Lisbon, Spain 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.¹⁰⁵

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 6th). The fruit trees died off.⁶²

During the winter of 1506-07 in southern *France*, there was severe cold, and large snowfalls.⁷⁹

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 6th], 3.2 feet (974 millimeters) of snow fell on Marseilles. The mass of snow, fortunately protected trees and seeds from the cold.⁷⁹

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 6th).^{38, 60, 62}

1508 A.D. In *France*, there was a great flood called the “Flood of St. Onne”, which affected Vivarais, Velay and others.⁶¹

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.⁷²

1509 A.D. There was a drought in southern *France* in 1509.⁷⁹

1510 A.D. In *England*, there was excessive heat.⁴⁷

In *Italy*, there was a hailstorm “which destroyed all the fish, birds, and beasts of the country.”^{41, 43, 56, 57, 93} Some of the hailstones weighed one hundred pounds.⁴⁰

The year 1510 in southern *France* was humid and rain.⁷⁹

In Gulick and Juliers (now Jülich, *Germany*), 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.⁷²

Winter of 1510 / 1511 A.D. In *Holland* this winter was recorded as severe. In *Italy*, the cold was very intense, and the snow was plentiful.⁶²

1511 A.D. In *Ireland*, there was a great inundation, which produced considerable destruction.^{47, 92}

1512 A.D. In Bologna, *Italy* the snow fell so thick one could not see through it. This snow lasted until May.⁶²

In 1512, the grapevines froze to death during the summer in the countryside of Metz, *France*. The summer produced sinister cold.⁶²

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.⁷²

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 *the Netherlands* on the ice.⁶²

The winter of 1513-14 in *Flanders* was very severe. The loaded wagons traveled on the frozen rivers from Gorcum, *the Netherlands* to Cologne, *Germany* on the ice.⁶²

London, *England* experienced cold weather in January 1314, and the River Thames froze.²⁸

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.^{1, 40, 41, 43, 56}

“All *Germany* like a sea, and Cracovia [Krakow, *Poland*] flooded.”^{47, 92}

There was a fearful flood in Cracovia [Krakow, *Poland*], which drowned many people. There was such a great flood in *Germany* that the country suffered much loss and looked like an island.⁷²

In *England* in 1515, the River Thames was frozen so hard that carriages of all sorts passed between Westminster and Lambeth upon the ice.^{29, 47, 90, 93}

1516 A.D. – 1517 A.D. England.

In *England*, these years were hot and dry.⁴⁷

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, *France* on January 15.²⁸

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*.⁶²

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.⁷²

Also refer to the section 1516 A.D. – 1517 A.D. for information on the drought in England during that timeframe.

1518 A.D. [In *England*], the winter was very dry and cold.⁶²

The year 1518 in southern *France* was humid and rain.⁷⁹

1520 A.D. In *England*, on 18 June, there was a most terrible storm of wind and weather.⁷²

1521 A.D. In *Holland* on the 1st of November, there was “a dire inundation of the sea, and 100,000 drowned.”^{47, 92}

In 1521, there was an inundation in *Holland*.⁴³

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.⁷²

In *England* in 1521, there was famine and mortality.⁹¹ “Wheat sold in London for 20s. a Quarter [quarter ton].⁵⁷

In *India*, there was a very general famine in Sind [now *Pakistan*].⁵⁷

1522 A.D. The winter was severe [in *Europe*].⁶²

In *France*, there was a great flood at Vivarais.⁶¹

In *France* in 1522, they began the harvest at Dijon on 5 September.⁶²

In *Ireland* in 1522, there was a great famine.^{57, 91}

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.⁶²

In *England* in 1523, there was a severe famine.^{57, 91}

In *Turkey* from 1523-26, the rivers were greatly swollen, and pestilential diseases were prevalent.^{47, 92}

Winter of 1523 / 1524 A.D. In the year 1523 in *England*, the frost was “most severe”.^{47, 93}

In the year 1523 in *France*, the winter produced very severe winter storms.⁶¹

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.⁶²

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.⁷²

1524 A.D. In Naples, *Italy*, there was a terrible inundation.^{47, 92}

1526 A.D. In *England*, there was so great a death in London, that the terms were adjourned.⁷²

1527 A.D. In *England*, there was a great flood.^{47, 92}

In *England*, during the 18th year of Henry VIII, “In November [1526], December, and January [1527] fell such abundance of reine that thereof ensued great floods, which destroyed corne-fields, pastures and beasts. Then was it drie until the 12th April; and from that time, it rained every day and night, till the 3rd June: whereby corne failed sore in the yeare falling.”⁴⁷

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.⁷²

In *England* in 1527 during the 19th 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.”⁵⁷

In Rome, *Italy* on the 2nd of December, there was a great hailstorm.^{57, 93}

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*.⁷²

In *England*, there was a drought from the 1st February to 12th April, and all July and August.⁴⁷

In 1528 in Paris, *France*, the frost destroyed the wheat and vegetables.⁷⁹

In Augsburg, *Germany* on 19th July, there was a great hailstorm.^{57, 93}

In Venice, *Italy* in 1528, there was a famine.^{57, 91}

1529 A.D. In *Switzerland* on June 13 or 14, there was a great flood of the Rhine River at Basle. In *England* on October 2, there was a great flood of the River Thames.^{47, 92}

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.⁶²

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 4th, 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.⁷⁹

The year 1529 in southern *France* was humid and rain.⁷⁹

1530 A.D. A great sea flood (St. Felix's Flood) occurred on November 4 in *Holland*. 400,000 people drowned.²⁸

In *Holland*, there was a great flood in November.⁹²

In 1530, there was a general inundation by the failure of the dikes in *Holland*; the number of drowned said to have been 400,000.⁹⁰

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*).⁷⁹

In *England*, on November 4th and 5th 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.⁷²

In *England*, there was a great flood all the year. In Rome, *Italy* on 8 October, there was a great flood.^{47, 92}

In *France*, the heat was extraordinary during the summer.⁶¹

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.⁷²

1531 A.D. In *England* on the 16th of December, there was a great hailstorm.^{57, 93}

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.⁶¹

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.⁷²

1532 A.D. In *Holland*, there were great floods.^{47, 92}

1534 A.D. In *Poland*, there were extensive floods.^{47, 92}

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.⁶⁴

1535 A.D. In Zurich, *Switzerland* on the 15th of July, there was a great hailstorm.^{57, 93}

In 1535, it never stopped raining for two months in *France*.⁷⁹

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*.⁷⁹

The summer drought of 1536 dried up all sources [of water – springs, creeks, small rivers and lakes] in Provence, *France*.⁷⁹

[Due to the warm summer], the harvest began in Dijon, *France* [early] on 8 September.⁶²

Winter of 1537 / 1538 A.D. In Rome, *Italy* on the 12th of December 1537, there was a great hailstorm.^{57, 93}

In 1537 in *England*, the frost was very severe during December and January.^{47, 93}

In 1538 in *England*, the River Thames froze.⁶²

During the winter of 1537-38, in *England* in December and January there was severe cold, and the River Thames froze.⁶²

In 1537 in *England*, the summer was exceeding rainy. In December and January a great frost. The River Thames was frozen over.⁷²

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.⁶²

In 1538, the sea by the Kingdom of Naples, *Italy*, was dry for eight miles together.⁷²

1539 A.D. [In *Europe*], In December and January, it was so warm that the gardens were covered with flowers.⁶²

1540 A.D. In *England*, there was great heat and drought.⁴⁷

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.⁷²

[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 necessities 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.⁶²

The summer of 1540 was unusually hot in *France*.⁷⁹

In 1540, the island of *Sardinia* was desolated by a famine.^{57, 91}

From 1540 to 1543, there was a general famine in the Sind [now *Pakistan*].⁵⁷

1541 A.D. In *France*, it was extraordinarily hot.⁶¹

1542 A.D. In *Italy*, many harvests were done at Padua in May [very early because of the warm weather].⁶²

On 14 June 1542, there was a terrible tempest at Buda [Budapest, *Hungary*].⁷²

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.²⁸

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.³¹

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.⁶¹

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.⁷⁹

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.⁷²

Due to the extreme cold, the wine in barrels in *France* was reduced to ice, and had to be cut with an axe.^{38, 60}

In 1544, it was so cold in Paris, *France*, that wine froze, and it was sold in pieces by the pound.^{58, 80}

In 1544, the cold was so severe in *Holland* that wine was cut in blocks and sold by weight.⁶³

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."⁶²

The winter of 1544 was remarkably severe all over *Europe*. In *Flanders*, wine froze in casks, and was sold in blocks by the pound weight.⁷⁰

In *Flanders*, the wine in casks frozen into solid lumps.^{47, 90, 93}

In *England*, there was a great frost.^{47, 93}

1544 A.D. In *France* in November, the Rhône River produced flood disasters affecting Avignon, Arles, and Tarascon.⁶¹

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 *France*] and the floodwaters covered the plain for eight days.⁷⁹

1545 A.D. In *England*, a wonderful dearth and extreme prices.^{57, 91}

1546 A.D. In Mechlin, *Belgium* in August, there was a great hailstorm.⁵⁷

In Malines, Flanders in August, there was a great hailstorm.⁹³

1547 A.D. On 12 August in Tuscany, *Italy*, there was a great flood.^{47, 92}

[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.⁷²]

1548 A.D. In *Northern Europe*, oxen drawn sledges traveled on the frozen sea from Rostock, *Germany* to *Denmark*.^{47, 90, 93}

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.⁶¹

The cold reigned from 1548 throughout *Europe*.⁷⁹

In Louvain, *Belgium* on the 5th of September, there was a great hailstorm.^{57, 93}

The ice on most rivers in *Europe* is thick enough to bear heavy-laden wagons.⁶²

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.⁶²

The year 1548 was very rainy and accompanied by great floods in *France*.⁷⁹

1549 A.D. In *England* on 13th of June, there were severe rain floods.^{47, 92}

[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.⁷²]

In 1549 in *England*, there was a famine from neglect of agriculture.⁹¹

1550 A.D. In *England*, “The Thames flowed thrice in nine hours.”^{47, 92}

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].⁷²

1551 A.D. In January and February at Marpur [Marburg, *Germany*?], there were great floods.^{47, 92}

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.⁷²

1552 A.D. In Budissina (Bautzen, *Germany*) on 13 August, there was a great flood.^{47, 92}

The winter of 1552 was warm and dry in *Italy*.⁶²

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.⁶²

The dry heat of 1552 in northern *France* consumed all the plants in June.⁷⁹

Winter of 1552 / 1553 A.D. The winter of 1552-53 is recorded as a harsh winter in *Holland*.⁶²

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].⁶²

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.⁶²

1553 A.D. In *Germany* and *Holland* on 19th January, there were great floods on the Rhine River.”^{47, 92}

In 1553 in *France*, there was burning heat all the month of June.⁷⁹

Winter of 1553 / 1554 A.D. At the end of the year in 1553, heavy snowfalls in Velay, Gévaudan and Vivarais, *France*.⁶¹

1554 A.D. In *Ireland*, there were perpetual rain all winter; great floods.^{47, 92}

In *Ireland*, there were perpetual rain, hail, a tempest.⁹³

1555 A.D. In London, *England* on the 1st of September, there was a great hailstorm.^{57, 93}

In *England* on 21 September, there were great floods on the River Thames.^{47, 92}

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*.⁷²

[In *Western Europe*] the year 1555 was mostly excessively rainy.⁷²

1556 A.D. Lyon, *France* experienced a drought. The rain stopped for four and a half months, from March 26 until August 10.⁶¹

The summer of 1556 was hot in southern *France*.⁷⁹

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.⁶²

[In *Western Europe* in 1556, there was a great drought 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.⁷²]

In *England* in 1556 and 1557, there was a great scarcity of corn [grain] from the past great rains. All the corn was choaked 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.⁷²

In *England* from 1556 to 1558, there was a famine from great rains, bad and inconstant seasons, heat and long south winds.^{57, 91}

1557 A.D. In *France* on 10 September, there were floods near the district of Languedoc.^{47, 92}

This year in *France*, there was a great flood in the fouth of Languedoc, with so dreadful a tempest, that people imagined it was the last day. The rapid descent of the waters about Nismes, removed divers [numerous] 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.⁷²

1558 A.D. In *England*, there was drought the whole year and hot.⁴⁷

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 [tornado]. 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.⁷²

In July 1558, a storm of hail in Northamptonshire, *England*, when the stones measured 15 inches in circumference.⁴³

In March 1558, there was a most destructive hurricane in *England*.⁷²

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.⁶²

1559 A.D. The grape harvest in Dijon, *France* took place on 4 September, which is 20 days earlier than average.⁶²

In *England* on 5 September 1559, there was a terrible tempest of wind and thunder.⁷²

1561 A.D. In Brussels, *Belgium* on the 21st of April, there were great floods.^{47, 92}

In 1561, there was another great scarcity of corn [grain] in *England*.⁷²

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.”⁹²

The winter of 1561 in northern *France* was one of the toughest.⁷⁹

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*.⁶²

The winter of 1562-63 was severe in *Flanders*. 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 5th there was no ice on the river to be seen.⁶²

1563 A.D. In Leicester, *England*, there was storm.⁴⁰

During the night of 9 January 1563, a great tempest of wind and thunder at Leicester, *England*, which did great damage.⁷²

In *England*, from the 1st to the 12th of December, there was greater thunder and lightning than any alive remembered.⁷²

In 1563 in London, *England*, famine and pestilence, said to have taken off 20,000 people.^{57, 91}

1564 A.D. In Louvain, *Belgium* on the 24th of January, there was a great hailstorm.^{57, 93}

In Essex, *England* on the 17th of July, there was a great hailstorm.^{57, 93}

In Northamptonshire, *England*, there was a hailstorm “when the stones measured 15 inches in circumference.”^{57, 93}

A storm of hail in Northamptonshire, *England*, when the stones measured fifteen inches in circumference in July 1558.^{40, 41, 56} [This event most likely occurred in 1564.]

In *England* on the 20th of September, the River Thames greatly overflowed.^{47, 92}

In *England* on the 20th of September, was a great flood in the River Thames. Marshes overflowed, and cattle drowned.⁷²

In *England* on the 26th of December, there was a great hailstorm.⁵⁷

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.²⁹

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.⁷²

In *England* beginning on 21 December 1564, there were diversions on the frozen River Thames.^{47, 90}

In *England*, there were fairs on the frozen River Thames in 1564.⁹⁰

In *England* in 1564, there were diversions on the frozen Thames.⁹³

In *England*, the frost lasted six weeks.²⁹

In 1565, the Rhône River froze across its full width in Aries, *France*.^{38, 60}

In 1565, the Rhône River in France froze.^{58, 80}

In 1565 in the *Netherlands*, the Scheldt River frozen so as to bear laden wagons.^{47, 90, 93}

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.⁷⁹

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.⁶²

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.⁶²

1565 A.D. In Louvain, *France*, there was a great inundation from the sea; wind.^{47, 92}

In *England* on 20 May 1565, there was a hailstorm that extended into several counties including Dorset, Surrey and Monmouth.⁹³

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.⁷²

In 1565 throughout the *British Isles*, there was an extended famine.^{57, 90, 91} 2,000,000*l.* was said to have been expended in importation of grain.⁵⁷

1566 A.D. In *England*, there was a drought all summer and during harvest.⁴⁷

In Chelmsford, (Essex) *England*, there was a hailstorm that destroyed 500 acres of grain.^{41, 57, 93} That destroyed 500 acres of corn.⁴⁰

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] in *Hungary*, broke out the Hungarian Fever 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*, and *Flanders*; 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.⁷²

The rains of 1566 were stormy in southern *France*.⁷⁹

On 26 December 1566 in *England*, there was a great hailstorm.⁹³

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.⁷²

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.⁷²

1568 A.D. In *England*, the summer was excessively hot, with a dearth of cattle.⁴⁷

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.⁷²

On the 18th of March there was a most dismal and destructive hurricane in *England* and *Holland*. 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 2,000 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.⁷²

Winter of 1568 / 1569 A.D. From the 11th to the 21st 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.^{38, 60, 62}

In 1568, the Rhône River in *France* froze.^{58, 80}

On 11 December 1568, the carts cross the Rhône River in southern *France* and the ice held until the 21st.⁷⁹

It was reported that the winter in 1568 in Châtellerault, *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, *France*.⁶²

1569 A.D. In *England* and *France*, there were great floods.^{47, 92}

In *Italy*, there was a great dearth of corn [grain] from excessive rains and mildew.⁷²

1570 A.D. The entire year of 1570 in northern *France* produced a suffocating heat.⁷⁹

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.⁷⁹

In *England* on the 5th of October, there was an inundation from the sea.^{47, 92}

On the night of 5 October 1570, a great hurricane struck *England*. Near Rye, 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.⁷²

In *Holland* there was an inundation. A strong northwest wind occurring during the high tides drove the sea with such violence against the dykes 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.^{47, 92}

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.⁷

In *Holland* 400,000 people drowned in 1570 A.D.^{5, 40}

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 Netherlands* 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.³²

A terrible storm broke out in Antwerp, *Belgium* in 1570. In the village of Saint-Marceau, *France*, there were the most impetuous, terrible, horrible winds that were ever heard.⁷⁹

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.^{38, 60, 62}

In 1570 to 1571, the Rhône River in *France* froze. The [grape] vines and fruit trees in *France* were killed by the cold.^{58, 80}

The winter of 1570-71 froze the rivers in *France* for three months. The fruit trees were destroyed down to the roots.⁷⁹

[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*, 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.⁶²

1571 A.D. In *Flanders, France and Germany* in August, there were great floods.^{47, 92}

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.⁷²

In *England*, a southerly, rainy, cloudy, ugly harvest.⁷²

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].⁷²

1572 A.D. In *England* in 1572, spring, summer and even into harvest were very moist and watery, with a south wind.⁷²

Winter of 1572 / 1573 A.D. In *England*, there was a hard frost from 2nd November to 5th January and also a late spring.^{47, 93}

In *England* the winter was extremely cold. Heavy snowfall fell on the Feast of the Second Epiphany in November.⁶²

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.⁷²

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.⁷²

On 2 February, *Switzerland* was so cold that Lake Constance froze for 60 days.²⁸

In 1572, the winter was very severe in *Flanders*. The Maas (Meuse) River flooded and came out of its banks from the melting snows towards the end of February.⁶²

1573 A.D. In *Holland* on the 1st of September, there was an inundation from the sea.^{47, 92}

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.⁶²

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.⁷⁹

1574 A.D. In *Leyden, Holland*, a violent equinoctial gale broke through the dykes. By this means the city, then besieged by the Spaniards, was saved.^{47, 92}

In *Ireland* in 1574, there was a shower of hail, which swept away good strong houses, and smothered whole flocks and herds.⁹³

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 and southerly. Most of the year, there was neither wind nor thunder.⁷²

1575 A.D. *Europe* experienced a cold winter beginning in November. The Rhine River froze and there was snow until April.²⁸

The winter of 1575 in *France* was one of the most rigorous.⁷⁹

In 1575 in northern *France* the weather was greatly inconsistency and produced an inequality of air.⁷⁹

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.⁷²

1576 A.D. There was a great silence of grasshoppers over all *Italy* this moist rainy summer.⁷²

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.⁷²

1578 A.D. In Brassil [*Brazil*] on the 7th of April, there was a great hailstorm.^{57, 93}

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.⁶²

The summer of 1578 in northern *France* was very wet and produced a searing heat.⁷⁹

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.⁷⁹

1579 A.D. In *England* in September and October, there was a great inundation from the sea and from rains.^{47, 92}

In *England*, there was a “most hard” frost.^{47, 93}

In *England* on 4 February, it began to snow and continued to the 8th 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. 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, *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.⁷²

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.⁷⁹

1580 A.D. The summer of 1580 was hot in southern *France*.⁷⁹

The years 1580 and 1581 in southern *France* were marked by storms and floods.⁷⁹

Thunderstorms or rainstorms desolated Provence, *France* in 1580.⁷⁹

1581 A.D. In 1581, *Persia* was desolated by famine and plague.^{72, 91}

The summer of 1581 was hot in southern *France*.⁷⁹

The years 1580 and 1581 in southern *France* were marked by storms and floods.⁷⁹

Thunderstorms or rainstorms desolated Provence, *France* in 1581.⁷⁹

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.⁷²

1582 A.D. – 1589 A.D. Ireland.

[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-Caoin 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.*”⁸⁴

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*.^{57, 91}

During 1588 and 1589 in *Ireland*, there was a great famine period, “when one did eate another for hunger.”^{57, 91}

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.⁷²

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.⁴⁷

The summer of 1583 was hot and dry in *England*. In Dijon, *France*, the grape harvest was early on 13 September.⁶²

The summer of 1583 was hot in southern *France*.⁷⁹

In 1583, floodwaters of Rhône River knocked over the ramparts [city walls] of Arles in southern *France* and the Camargue [river delta] flooded.⁷⁹

In *England*, this summer was excessively dry and hot near the end of the season.⁷²

Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.

1584 A.D. In *England*, there was a great hailstorm, “stones 8 or 9 inches about.”^{57, 93}

The winter of 1584 was severe in *Germany*.⁶²

In 1584, a powerful cyclone struck Backerganj, *Bangladesh* causing 200,000 deaths.⁹⁸

Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.

1585 A.D. In *Europe*, the winter was so mild that the grain remained in the ears all the way to Easter.⁶²

Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.

1586 A.D. [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.]⁷²

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 2*l.* 1*s.* 4*d.* per Quarter [quarter ton]. Rye at 2*l.* 2*s.* 8*d.* and malt at 1*l.* 14*s.* 4*d.* There was a grievous dearth in *Hungary*.⁷²

There was a famine in *Hungary*.^{57, 91}

In the year 1586 in *England*, in the 26th 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 and 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.⁵⁷

Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.

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.⁷²

The *Belgians* groaned under a terrible plague and famine. For the inhabitants of great towns and villages in *Flanders* 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*, and the united provinces, their navigation and shipping saved them. Multitudes of people flocked thither.⁷²

The summer of 1587 was hot in southern *France*.⁷⁹

Also refer to the section 1582 A.D. – 1589 A.D. for information on the famine in Ireland during that timeframe.

1589 A.D. In London, *England*, on the 18th of February and on the 1st of August, there were severe hailstorms.^{57, 93}

The cold winter of 1589 was so harsh that it completely froze the Rhône River. Mules, carriages, carts, all crossed in Tarascon, *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.⁷⁹

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 heat.⁴⁷

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. 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 1556.⁶²

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.⁷²

In *England* in September, there was hail, with thunder and snow.^{57, 93}

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* on January 3rd [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.]⁶²

In *Italy* in 1591, there was a famine.^{57, 91}

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 1592.⁷²

1592 A.D. In *England*, there was an extreme drought; want of water.⁴⁷

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.⁷²

In June, the River Thames, in *England* was dry at London-bridge and many people passed and repassed on the riverbed.⁴⁰

The winter was so cold in *Austria* that wolves entered Vienna and attacked men and beast.²⁸

1594 A.D. In *England* during the 36th 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."⁴⁷

In 1594 in *England*, there were floods in Surrey, Cambridgeshire and Hertfordshire.⁹²

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.^{57, 72}

In 1594 in *England* and *Hungary*, there was a famine.⁹¹ 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].⁵⁷

Winter of 1594 / 1595 A.D. *Europe* experienced a cold winter. The Lagoons of Venice froze and didn't thaw until February 1595.²⁸

In 1594 in *Italy*, the Port of Venice was frozen.^{58, 80}

In 1594 A.D., the sea at Marseilles, *France* and Venice, *Italy* froze.^{38, 60}

In 1594, the sea froze on the coast of Marseille, *France*.⁷⁹

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*.⁶²

In *Europe*, the Rhine and Scheldt Rivers, and the *Adriatic Sea* at Venice froze.^{47, 90, 93}

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.⁶³

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.⁶²

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*.⁷⁹

1595 A.D. In *Germany*, there were considerable floods.^{47, 92}

In 1595 in *Holland, Guelderland*, the tract of the Rhine, *Austria, Bohemia, 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.⁷²

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.⁷²

In 1595-96 in *Italy, Germany*, etc. there was a famine.^{57, 91}

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.⁷²

In *England* in 1595, during the 36th 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 27th of June by whipping, setting on the pillory and long imprisonment.⁵⁷

1596 A.D. In *England*, there were floods all summer.^{47, 92}

In Wells, *England* in December, there was a great hailstorm.^{57, 93}

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.⁷²

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."⁶²

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.⁶²

The summer of 1596 was hot in southern *France*.⁷⁹

The winter of 1596 was very rainy in northern *France*. The Marne River covered one third of the town of Lagny.⁷⁹

Winter of 1597 / 1598 A.D. This winter was memorable in *Germany*.⁶²

1598 A.D. In *England*, there was a very severe frost in January.^{47, 93}

In *England*, there was a great drought with flies and gnats.⁴⁷

In *England*, the summer was excessive heat and drought. Swarms of fleas, flies and gnats abound. Armenian apples were very plentiful.⁷²

The summer of 1598 was extremely hot and dry in *England*. In Dijon, *France*, the grape harvest fell on 23 September.⁶²

In Rome, *Italy*, there were considerable floods.^{47, 92}

In Pegu [*Myanmar*] in 1598, there was a very severe famine.^{57, 91}

[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.⁷²]

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.⁴⁷

In *England* during the months of March, April, and May, it was cold and dry. During June and July, it was hot and dry.⁷²

The months of June and July in 1599 were hot in *England*. The grape harvest in Dijon, *France* was held on 13 September.⁶²

In *England* in November, there were floods.^{47, 92}

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.⁶²

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.⁷⁹

During the winter of 1600 in Lyon, *France*, many people lost limbs because they froze in the extreme cold.⁸⁰

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].⁷²

1600 A.D. – 1602 A.D. Russia.

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.⁸⁴

In *Russia* in 1600, there was a great drought.⁴⁷

In *Russia* in 1600, there was a famine and plague, of which 500,000 died and 30,000 in Livonia [currently *Latvia* and *Estonia*].^{57, 91}

1600 A.D. In *England*, there was a cold, dry summer.^{57, 91}

Also refer to the section 1600 A.D. – 1602 A.D. for information on the drought and famine in Russia during that timeframe.

1601 A.D. During the winter of 1601, the olive trees in *Provence* were damaged by the cold.⁶²

The winter of 1601 in southern *France* killed all the olive trees.⁷⁹

[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.⁶²

In *Ireland* in 1601 to 1603, there was great scarcity and want. Cannibalism again reported.^{57, 91}

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.⁷²

Also refer to the section 1600 A.D. – 1602 A.D. for information on the drought and famine in Russia during that timeframe.

1602 A.D. In *England*, it was dry and cold during the harvest and winter with north winds.⁴⁷

In Pisaurum, Urbino, *Italy* in 1602, the year was long cold and humid with a dry harvest and winter with north winds.⁷²

There were rains and floods in the years 1602 in northern *France*.⁷⁹

Also refer to the section 1600 A.D. – 1602 A.D. for information on the drought and famine in Russia during that timeframe.

1603 A.D. Loaded carriages passed the Rhône River in *France* on the ice.^{38, 60, 62}

In 1603 in southern *France*, the carriages crossed the Rhône River on the ice.⁷⁹

In 1603, the Rhône River in *France* froze.^{58, 80}

In 1603, the winter in the south of *France* was very severe. Wagons passed over the frozen Rhône River on the ice.⁶²

[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.⁷²]

1606 A.D. In *England* on 29 March, there were general floods.^{47, 92}

On the Eve and Easter Day 1606, a terrible wind shook *France* and *Europe*.⁷⁹

Winter of 1606 / 1607 A.D. The winter of 1607 [in *Europe*] passed without a significant frost.⁶²

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.^{47, 90} Flood also in Coventry, which destroyed 257 houses.^{47, 92}

In *England*, “Upon Tuesday, being the twentieth of January last past 1607, in diuers places, as well in the westerne parts of *England*, as also in diuers other places of the realme, there happened such an overflowing of waters, such a violent swelling of the seas, and such forcible breaches made into the firme land, namely, into the bosomes of these counties following, that is to say, in the counties of Gloucester, Sommerset, together with the counties of Munmouth, Glamorgan, Carmarthen, and diuers and sundry other places of South Wales; that the like never in the memory of man hath ever bin seine or heard of; the suddayne terror whereof stroke such an amazed feare into the hearts of al the inhabitants of those parts, that eury one prepared him selfe ready to entertayne the last period of his lives distruction, deeming it altogether to be a second deluge, or an universal punishment by water.”⁴⁷

In *England*, both summers were dry and hot.⁴⁷

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*.⁷²

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 15.²⁸

The winter of 1607 in *England* had a great frost that lasted off and on for 7 weeks.⁷²

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 were 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." ²⁹

During the winter of 1607-08 in *England*, fires and diversions on the frozen River Thames lasted for seven weeks. ^{47, 90, 93}

In *England*, there were fairs on the frozen River Thames in 1607-08. ⁹⁰

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. ⁶²

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, 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*, 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. ⁶²

In 1608, all our rivers in *France* froze. The cold lasted from December until March. The cold killed all the [grape] vines. ⁷⁹

[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. ⁸⁰

In 1608, the *French* historians cite great mortality of animals due to cold during this year. ^{58, 80}

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. ⁶²

In 1608 in *France*, the Loire River overflowed its banks and caused destruction of property. ^{47, 92}

The spring in *Italy* was warm and moist. The harvest inconstant. Corn [grain] and grapes ill got; hence an epidemic. ⁷²

Winter of 1608 /1609 A.D. The winter of 1609 [in *Europe*] passed without a significant frost. ⁶²

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.²⁸

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.⁷²

In 1609, in *England*, the frost was severe and long.^{47, 93}

In 1610, The River Thames in *England* was frozen and carried [the weight of] pedestrians.⁶²

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.⁶²

1610 A.D. In *England*, it was excessively hot and dry; harvest inconstant.⁴⁷

In *England*, being an excessive hot dry summer after the frost, there was plentiful wine.⁷²

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.⁶²

In 1610, Dresden, *Germany* was visited by a famine.^{57, 91}

1611 A.D. In *England*, there were floods from rain all November and December.^{47, 92}

1612 A.D. In *England*, from 1st January to 1st May there was a north wind, which produced dry cold weather.⁴⁷

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.⁷²

1613 A.D. In *Germany* and *France*, all the grain was destroyed by rain.^{47, 92}

On 25 June 1613, with a terrible thunder storm, with rain and hail struck Rouen, *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.⁷⁹

1614 A.D. In Lincolnshire, *England*, the sea came 12 miles inland.^{47, 92}

Thunderstorms or rainstorms desolated Provence, *France* in 1614.⁷⁹

Southern *France* was very dry in 1614.⁷⁹

Winter of 1614 / 1615 A.D. In *England*, there was frost from 17th January to 7th 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.”⁴⁷

In *England* in 1615, there was frost from 17 January to 7 March.⁹³

[Another source places this winter in 1613/1614.] 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 followed. Corn [grain] next summer was very good and cheap.⁷²

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.⁶²

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.⁶²

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.⁶²

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.⁶²

1616 A.D. In *England*, during the summer there was a drought and it was excessively hot.⁴⁷

In *England*, the summer was excessively scorching hot and droughty.⁷²

[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.⁶²

In Manchester, *England*, there was an extraordinary flood.^{47, 92}

1617 A.D. In Catalonia, *Spain*, there were great floods; 15,000 people perished.^{47, 92}

In 1617, an inundation occurred at Catalonia, *Spain*, where 50,000 persons perished.⁹⁰

The winter of 1617 [in *Europe*] passed without a significant frost.⁶²

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 *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]⁷⁹

1619 A.D. In Thuringia, *Germany* in July, there were great rain floods.^{47, 92}

The winter of 1619 [in *Europe*] passed without a significant frost.⁶²

1620 A.D. In *Germany* in November, there were great floods.^{47, 92}

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*.⁶²

In *England*, there were fairs on the frozen River Thames in 1620.⁹⁰

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*.”⁶²

During the winter of 1620, the Sea between Constantinople (Istanbul) and Iskodar (Üsküdar) *Turkey* was frozen.¹

In 1620, the sea between Constantinople (Istanbul) and Iskodar (Üsküdar) *Turkey* was passable on the ice.^{30, 41}

Winter of 1621 / 1622 A.D. In 1621 in *England*, the frost was very severe from the 24th of November to the 7th of December.^{47, 93}

In *Italy*, during the winter of 1621-22, the Venetian fleet was arrested by the ice in the lagoons of Venice.”^{38, 60}

The winter of 1621-22 was excessive in *Europe*. The Adriatic Sea froze from December to January.⁷⁹

In 1622, the rivers in *Europe* and the Zuyder Zee were frozen. Ice covered the Hellespont [in *Greece*].⁹⁰

In 1621 in *Italy*, the Port of Venice was frozen.^{58, 80}

In 1622, *Europe* experienced a cold winter. All the European rivers and the Zuyder Zee (*Zuiderzee*) in the *Netherlands* froze.²⁸

In 1622 in *Greece*, ice covered the Hellespont.^{47, 93}

The frost was very strong in the winter of 1621-22 in *Flanders* and northern *France*. The Dutch lost half their army due to the cold and hunger before Sluis.⁶²

Winter of 1622 / 1623 A.D. 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.⁶²

1623 A.D. In *Austria* and *Hungary*, the Danube River greatly overflowed.^{47, 92}

Winter of 1623 / 1624 A.D. In 1623 in *Eastern Europe*, the Danube River froze during the winter.^{47, 93}

In 1624, the Danube River froze in *Germany*.⁶²

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.⁶²

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.⁶²

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." ⁶²

1626 A.D. In *England*, there were great hailstorms on the 29th of March and on the 25th to 30th of April. ^{57, 93}

In *England* on 6 June, there were great floods. ^{47, 92}

In *England*, during the summer there was a drought and it was excessively hot. ⁴⁷

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. ⁷²

In the summer of 1626, excessive heat was in *England*. The first grape harvest in Dijon, *France* was held on 1 October. ⁶²

1627 A.D. In *England*, there was a frost from the 20th January to 12th February. ^{47, 93}

In *Austria* on the Danube River in September, "A cloud loaded with a sea of water burst." ^{47, 92}

In Apulia (Naples), *Italy*, there were great floods. ^{47, 92}

In Apulia (Naples), *Italy*, 16,000 souls were lost by great floods. ⁷²

1628 A.D. In 1628, the plague was ushered into Ausburgh [Augsburg, *Germany*] by a great famine in August and September. ⁷²

1629 A.D. In Mexico City, *Mexico* on 30 June, there was a deluge from the mountains. The effects continued for several years. ^{47, 92}

1630 A.D. – 1631 A.D. India.

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. ⁸⁴

In 1631 in *India*, there was a great drought and this drought extended through *Asia*. ⁴⁷

In 1631 in *India*, there was a general famine caused by drought and war. This extended throughout *Asia*. ⁵⁷

1630 A.D. In *Scotland*, there were great floods on the River Clyde. ^{47, 92}

In *England* in 1630, there was a dearth. Bread made of turnips, etc. ^{57, 91}

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. On 10 May 1631 in Magdeburg, *Germany*, the city was taken by a storm, and shortly afterwards a fire broke out and burned it entirely, with the exception of 139 houses. It was estimated that 20,000 people were killed, burned or smothered, etc., whereof 6,000 were drowned in the Elbe River.⁹²

Also refer to the section 1630 A.D. – 1631 A.D. for information on the drought and famine in India during that timeframe.

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.⁶²

The drought of 1632 in *France* lasted from 12 July until 15 September.⁷⁹

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 died from the extreme cold.⁶²

1633 A.D. In Cork, *Ireland*, there was a “prodigious flood of the sea”. The flood swept away some of the public buildings and bridges.^{47, 92}

1635 A.D. In *England*, there was a severe frost from the 15th of December to the 11th of February.^{47, 93}

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.⁷²

In *England*, it was hot and dry during the summer and harvest (fall).⁴⁷

In 1635 in Holstein, *Germany* was so great a flood as drowned 6,000 people and 50,000 cattle.⁷²

Winter of 1635 / 1636 A.D. In *Western Europe*, the carts drive on the ice on the Maas [Meuse] River.⁶²

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.⁶²

In *England*, the winter was uncommon and unseasonably warm.⁷²

In *England* on the 30th of January 1636, there was hail, with rain, snow and thunder.^{57, 93}

1636 A.D. In *England*, it was hot and dry during the summer and harvest (fall). The winds came from the south or west.⁴⁷

In *England*, the summer was hot and droughty. There were winds from spring to winter from either the south or west.⁷²

In 1636 in Dijon, *France*, they collected the wine on 4 September, which is 20 days earlier than the average beginning in the year 1559.⁶²

Winter of 1636 / 1637 A.D. In *England*, there were seven days of very hard frost in February 1637.⁷²

1637 A.D. In *England*, it was excessively hot and dry.^{47, 72}

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 1523.⁶²

In East Friesland, *Holland* on the 1st of September, there were great floods.^{47, 92}

1638 A.D. In *England*, it was excessively hot and dry.^{47, 72}

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.⁶²

During the winter of 1638, the French galley ships were arrested by the ice at the *Marseilles Sea*.^{38, 60, 62}

The winter of 1638 in southern *France* cause more damage than the winter of 1599-1600. The port of Marseille froze around the galleys.⁷⁹

The winter of 1638 was so severe in *Provence* that in the port of Marseille (*France*), the water froze around the ships.⁶²

1639 A.D. In Montbéliard, *France* on 21 June 1639, a cold wave struck that was so strong as in the full cold of winter.⁶²

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.⁷⁹

In *England* in October, there were great floods.^{47, 92}

1640 A.D. In Dresden, *Germany* on the 23rd of September, there were great floods.^{47, 92}

In *England*, on October 11 through 14, there was a most severe frost. It froze up all the rivers and brooks.⁷²

1641 A.D. In *England*, there were hailstorms on the 25th of June and the 14th and 19th of August with rain.⁵⁷

In *England*, there was a great hailstorm on 25 June 1641. There were further hailstorms in *England* on August 24 and 29.⁹³

In Montbéliard, *France*, on 27 July 1641 it froze. In Burgundy, *France*, the grape harvest began only on 3 October.⁶²

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 18th of November to the 21st 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.³⁸

1642 A.D. In *England*, in 1642 and 1643, the summers were excessively hot.⁴⁷

In the news of the siege of Perpignan, *France* written by Louis XIII, we read, under date of May 24, 1642, the army experienced excessive heat.⁷⁹

[In 1642 in Kaifong [Kaifeng], *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.⁹²]

1643 A.D. In Thuringia, *Austria*, there were great floods.^{47, 92}

In *England*, in 1642 and 1643, the summers were excessively hot.⁴⁷

In *England*, the spring was very moist, almost constant rain. The summer was excessively hot.⁷²

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.⁶²

1644 A.D. In *Spain* on 6 June, there were great floods.⁴⁷

In *Spain* and *Holland*, there were considerable floods.^{47, 92}

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.⁶²

In October 1644, a great Atlantic hurricane struck the western coast of *Cuba* and the Straits of Florida causing approximately 1,500 deaths.¹⁰⁷

1645 A.D. In *England* on the 3rd of July, there was a hailstorm with rain.⁵⁷

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].⁷¹

In *England*, there was a severe frost from the 8th of December to the 17th of January.^{47, 93}

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.⁶²

In *England*, the summer was excessively hot and dry.⁷²

1646 A.D. In Friesland, *Holland* and Zealand, *Denmark*, there were great inundations. Some authorities state that as many as 110,000 persons were drowned.^{47, 92}

The sea broke in at Dordrecht in *Holland* 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.⁷²

In *England*, there were hailstorms on the 4th of May; 11th and 12th of July; and 17th of August.^{57, 93}

1647 A.D. – 1648 A.D. England.

In *England*, the weather was variable in 1647, but very rainy in 1648.⁷²

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].”⁴⁷

Winter of 1648 / 1649 A.D. In *England* on 22nd January, "Now was the Thames frozen over and horrid tempests frown'd." ^{47, 93}

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]. ⁷¹

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. ⁷⁹

In *England*, there were very general floods. ^{47, 92}

In 1649 there was a famine in *Scotland* and northern *England*. The plague raged in *Ireland* and Shropshire, *England*. ⁷²

In 1649 and 1650, there was a famine in *Scotland* and the North of *England* from rains and wars. ^{57, 91}

In 1649 in Lancashire, *England*, there was a famine caused by the ravages of the armies. A plague followed. ⁵⁷

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. ⁷²

In Leicester, *England* on the 29th of April, there was a hailstorm. ^{57, 93}

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. ⁶²

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. ⁷²

In 1650 and 1651 in *Ireland*, there was a famine throughout the country. Sieges of Limerick and Galway. ^{57, 91}

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]. ⁷¹

In Dorchester, *England* on the 23rd of August, there was a hailstorm with stones 7 inches in circumference. ^{41, 43, 56, 57, 93}

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. ⁶²

In *England*, the years 1651-54 produced scorching hot dry summers. ^{47, 72}

Thunderstorms or rainstorms desolated Provence, *France* in 1651.⁷⁹

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.⁷²

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.⁷⁹

1652 A.D. In *England*, the years 1651-54 produced scorching hot dry summers.^{47, 72}

In *England*, the summer was excessively hot and dry.⁷²

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.⁶²

In Copenhagen, *Denmark*, the summer was excessively hot and dry.⁷²

1653 A.D. In *England*, the years 1651-54 produced scorching hot dry summers.^{47, 72}

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.⁶²

1654 A.D. In *England*, the years 1651-54 produced scorching hot dry summers.^{47, 72}

There was a great drought in southern France in 1654-56. Rains were very rare.⁷⁹

1655 A.D. In *England* in January, there were considerable floods.^{47, 92}

There was a great drought in southern *France* in 1654-56. Rains were very rare.⁷⁹

Winter of 1655 / 1656 A.D. In 1655-56, the Seine River in *France* was frozen from the December 8th to the 18th. 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.^{38, 60} [Another account gives this as the winter of 1656-57.] "The Seine froze from 8 to 18 December 1656."⁶²

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, several people were found frozen to death.⁶²

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].⁷⁹

1656 A.D. In Rome, *Italy*, there were floods.^{47, 92}

There was a great drought in southern *France* in 1654-56. Rains were very rare.⁷⁹

In 1656 and 1657 in Rome, *Italy*, there was a famine.^{57, 91}

In *England* beginning on 20 July 1656, there was two separate hailstorms in Norwich in quick succession. The following accounts were published.⁹³

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.⁷²

In *Denmark*, the summer was very unequal with heat, rain and south winds.⁷²

1657 A.D. In *England*, this year produced a scorching hot dry summer.⁴⁷

In *England*, the spring to the end of summer was most excessively hot, even scorching both night and day.⁷²

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.⁷⁹

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.³⁵

In 1658, Charles X, King of *Sweden*, traversed the *Little Belt* with his army, artillery, caissons, baggage, etc.^{38, 60}

In 1658, Charles X of *Sweden* crossed the *Little Belt* over the ice from Holstein, *Germany* to *Denmark*, with his whole army.⁹⁰

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.⁶³

In 1658 in *Northern Europe*, the army of Charles X of *Sweden* crossed the ice from *Holstein* to *Denmark* – horse, foot and artillery.^{47, 93}

During the winter of 1657-58 in *France*, an uninterrupted frost occurred from the 24th of December 1657 to the 8th 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 11th to the 18th of February.^{38, 60}

Europe experienced a cold winter. There was great snow in *Rome, Italy* on 27 February 1658.²⁸

In 1658, the *Seine* River in *France* was completely frozen from the first days of January to the 21st. 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*.⁶²

The winter of 1658 in *France* destroyed the olive trees. The winter was accompanied by deep snows.⁷⁹

In *England*, there was a frost from 1st December to 10th March with a “north wind”.^{47, 93}

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.⁷²

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.⁶²

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 22nd the river began to swell. On the 27th and 28th 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 28th, 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 28th, 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."⁶²

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].⁷¹

1658 A.D. 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.¹

In *Europe*, “the day that Oliver Cromwell died (3rd September), a storm so violent and terrible extended all over Europe.”^{40, 41, 43, 56, 57}

On 3 September 1658, the day that Cromwell died, there was a hurricane throughout *Europe*, which did very considerable damage.⁹⁰

In Faversham (Kent), *England*, there were considerable floods.^{47, 92}

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, *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.⁷²

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.⁶²

Winter of 1658 /1659 A.D. During the winter of 1659 [in *Europe*], there was no frost or snow.⁶²

1659 A.D. In 1659, there was a great hailstorm in Staffordshire, *England* that destroyed poultry and hares.⁹³

Winter of 1659 / 1660 A.D. In *Provence* and in *Italy* the winter was very cold again. The olive trees were destroyed, almost completely.⁶²

1660 A.D. In *England* on the 11th of November, there were great floods in the River Thames valley.^{47, 92}

In *England*, the winter was stormy and tempestuous, causing great harm in many places. In the midst of it much thunder and lightning.⁷²

1661 A.D. In *India*, there was a great drought in the Punjab.⁴⁷

In *India*, there was a famine caused by a drought, confined to the Punjab.⁵⁷

In Kent, *England*, there were considerable floods.^{47, 92}

In *England*, there were great hailstorms on 11th April and 11th October.^{57, 93}

1662 A.D. A great storm struck London, *England* on February 18.^{40, 41, 43}

On 30 July there was a prodigious storm of hail at Ormskirk, *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.]⁷²

Winter of 1662 / 1663 A.D. There was intense frost at Paris, *France* from the 5th of December 1662 to the 8th of March 1663.^{38, 58, 60, 80}

During the winter of 1662-63, the Seine River in *France* froze in December 1662 completely.⁶²

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.⁶²

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.⁷⁹

In *England*, a very hard frost occurred on 28th November 1662. A severe frost occurred from the 28th of January to 11th of February 1663. The 8th of February 1663 being a very hard frost.^{47, 93}

1663 A.D. In *England*, on the 28th 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.”^{47, 93}

In *England*, there was a great death of cattle from a most severely rainy wet autumn.⁷²

The summer of 1663 was cold and rainy in Doubs, *France*. The grapes in Dijon, *France*, were not harvested until 8 October.⁶²

Winter of 1663 / 1664 A.D. The winter was very mild and rainy in *Prussia*.⁷²

1664 A.D. In London, *England* in January, there was a great hailstorm at Charing Cross.^{57, 93}

Winter of 1664 / 1665 A.D. In *England*, there was a frost from 28th December to 7th February. The 6th of February “one of the coldest days, they all say, ever felt in *England*.”^{47, 93}

In *England* in the latter end of 1664 began a most severe frost which continued to the latter end of March 1665.⁷²

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.⁶²

1665 A.D. In *England*, there were great flooding of rivers, and inundations from the sea.^{47, 92}

In *England* in February, there was a great tempest, accompanied by thunder, and lightning.⁷²

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.⁷²

1666 A.D. In *England*, it was intensely hot and dry.⁷² There were east winds. The Great Fire of London occurred.⁴⁷

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.⁶²

In *England* on the 31st of July, there was a severe hailstorm and rain.^{57, 93}

On 14-15 August 1666, a great Atlantic hurricane struck the islands of *Guadeloupe* and *Martinique* causing approximately 2,000 deaths.¹⁰⁷

In *England* in October, there were great floods.^{47, 92}

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]⁷²

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.⁷²

1667 A.D. In *England*, there was a frost from the 15th of February to the 19th of March.^{47, 93}

In 1667, "On the 16th of March, a sharp northeast wind began to freeze very strongly, the sea that lies before Amsterdam; the D on the 17th was solid; on the 18th 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 1st of April is stopped."⁶²

The winter in 1667 was very severe in *Holland*, but extreme cold occurred late in the season, from 16 March to 1 April.⁶²

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.⁶²

1668 A.D. In *England*, on the 17th of December, there was a great hailstorm with rain.^{57, 93}

1669 A.D. In *England*, the entire year was dry.⁴⁷

[In *Holland*] 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.^{62, 72}

On 30 October 1669, there was a frightful hurricane of whirlwind in Northamptonshire, *England*.⁷²

On 20 June at *Inspurg, Germany*, there was a violent tempest of rain, hail, thunder and lightning. At *Schwatz, 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.⁷²

Winter of 1669 / 1670 A.D. In *England* in 1669, the frost was severe with some remissions.^{47, 72, 93}

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.]¹

In 1670, the cold was intense throughout *Europe*.³⁰

In 1670, sleighs traveled safely across the *Little and Great Belts*.⁶²

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.⁶²

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.⁷⁹

In *Prussia* in 1670, the waters of the Rhine River frozen at *Coblentz [Koblenz]* from the 11th to 17th of January, so that the artificers (artistic craftsman) exercised their several trades upon the ice (ice fair on the Rhine).^{47, 93}

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, that 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.⁷²

1670 A.D. In *Bridgewater (Somerset), England*, there were great floods.^{47, 92}

On 13 October 1670, there was a frightful hurricane of whirlwind in Northamptonshire, *England*.⁷²

The year 1670 was hot and dry in southern *France*.⁷⁹

1671 A.D. In *Dijon, France* in 1671, the grape harvest began on 16 September.⁶²

1672 A.D. The winter [in *France*] was severe and the cold weather lasted for three months.⁶²

In May 1672, the drought lowered the water in the l'Yssel [l'Jssel River in *the 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 5.⁷⁹

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. On 8 December 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. After this, very long heats, causing excessive sweating both by day and night. Trees budded, flowers appeared as in April or May. 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. Great was the damage done to exotic plants by this and the frosts of 1683, 1684, 1709, 1716 and 1740. On 2 September, there was shocking thunder and lightning at Leeds.⁷²

1673 A.D. At Hartshead in Yorkshire, *England*, an inundation struck on 11 September.^{40, 41, 43}

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.⁶²

In *England*, 1673 was a cold unseasonable bad year, and a very late lean harvest.⁷²

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*.⁶²

The winter of 1674 was remarkable in *Holland* because of its severity and because of the late arrival in February. On 4 April we skated on the sea at Haarlem, *the Netherlands*.⁶²

[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.⁷²

The Camargue [river delta] in *France* was covered by the floodwaters of the Rhône River in 1674.⁷⁹

Thunderstorms or rainstorms desolated Provence, *France* in 1674.⁷⁹

1675 A.D. In Burgundy, *France* in 1675, the grape harvest began on 14 October.⁶²

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.⁷²

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.¹⁰⁵

[In *England*], the summer was exceedingly cold.⁷²

In Dijon, *France* in 1676, the grape harvest began on 9 September.⁶²

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.^{38, 60} The Maas (Meuse) River remained frozen from Christmas until the 15th of January.⁶²

In 1676 in Paris, *France*, there were 35 days of frost.^{58, 80}

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.⁷⁹

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.⁶²

1678 A.D. In *England* on the 18th of January, there was a great hailstorm.^{57, 93}

In Middlesex, *England*, there were considerable floods.^{47, 92}

In *England*, the year was all dry, hot and clear.⁴⁷

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.⁷²

In *England*, there was a frost from the 9th of December to the 9th of February, with one remission.^{47, 93}

1679 A.D. [In *England*] October was a month of continued rains.⁷²

1680 A.D. In Oxford, *England* in June, there were great floods.^{47, 92}

In *England*, the summer was hot and dry.⁴⁷

[In *England*], the winter was a long severe frost and an intense cold. The summer was excessively hot.⁷²

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*.⁶²

In *Ireland*, there was "an inundation near Londonderry."^{47, 92}

In Breslaw [now Wrocław, *Poland*], there was great heat during the summer.⁷²

Winter of 1680 /1681 A.D. In 1680 in *England*, the frost was long and hard.^{47, 93}

The winter was intensely cold in *Europe*. The Little and Great Belts in *Denmark* were frozen, and many people perished.¹

This year the cold was so severe as to split whole forests of oak trees.³⁰

In 1680 in southern *France*, the cold kills all the olive trees.⁷⁹

The winter in 1680 was in *Italy* and *Provence* very severe. In *Provence*, the olive trees froze to death.⁶²

1681 A.D. In *England*, all the spring and summer was dry.⁴⁷

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.⁷² In Dijon, *France*, the grape harvest began on 9 September.⁶²

In *England* on the 1st of May, there was a great hailstorm.^{57, 93}

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.¹

1682 A.D. In *England*, “Rain, hail, floods, all the summer.”^{47, 92}

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.⁷²

1683 A.D. In Dijon, *France*, the grape harvest began on 13 September.⁶²

Winter of 1683 / 1684 A.D. During the winter, the River Thames in *England* was frozen below Gravesend.¹

The frost in *Britain* lasted for 13 weeks.^{2, 40}

In *England*, there were fairs on the frozen River Thames in 1683-84.⁹⁰

In *England* on 9 September 1683, it was very rainy and then to the 16th, 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.⁷²

In 1684, the River Thames at London, *England* froze eleven inches (28 centimeters) thick and was traversed by loaded wagons.^{38, 60, 80}

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.⁶³

Severe winter in *England*. The River Thames froze for 2 months and there was a frost fair that began on 1 January.²⁸

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.²⁹

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.⁹⁰

“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.”⁹⁰

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.”^{47, 93}

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.⁸

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.²⁹

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.⁷ According to some sources, ice formed for a time between Dover (*England*) & Calais (*France*), with the two sides joined together.⁹

It is also credibly attested that vast solid cakes of ice, of some miles in circuit, breaking away from the eastern countries of *Flanders* and *Holland*, &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.²⁹

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*, 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.”¹⁰

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.”¹⁰

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.¹⁰

On February 9 there was sea ice in the *English Channel*. The ice between Dover and Calais were “joined together”.²⁸

The frost was also very severe in *Northern Europe*. Ice 27 inches (69 centimeters) thick in the harbor of Copenhagen.^{47, 93}

The winter of 1684 was excessively cold in northern *France*.⁷⁹

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° Reaumur (-20° C, -4° F). A great number of trees in *France* burst in the winter of 1683-84.^{58, 80}

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* with carts.⁶²

The winter of 1684 was so cold in the northern *France*, but it was mild and dry in the south.⁷⁹

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* and *Holland*, 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* and *Belgium* in February and March, all the rivers were frozen over.⁶²

1684 A.D. In *England*, the spring was dry and cold and the summer was very hot and dry.⁴⁷

In *England*, the summer was intensely hot and dry, and preceded by a very cold severe winter, and droughty spring.⁷²

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).⁷⁹

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.⁶²

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.⁷²

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.⁷²

1686 A.D. In *Italy*, during the years 1686-89 there was a great drought.⁴⁷

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.⁶²

On 25 May, there fell at Lisle, *France*, 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.⁷²

In 1686, there was an inundation in Yorkshire, *England*, when a rock opened, and poured out water to the height of a church steeple.^{90, 92}

1687 A.D. “By excessive rains, and a violent storm, there happened a great inundation in Dublin, *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.”³⁹

In *Ireland*, there were excessive rains; great flood in Dublin.^{47, 92}

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.⁷²

In *England*, the frost lasted from the 8th of December to the 30th of January with some remissions.^{47, 93}

In *Italy*, during the years 1686-89 there was a great drought.⁴⁷

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.⁶²

[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, *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.⁷²]

1688 A.D. In *Italy*, during the years 1686-89 there was a great drought.⁴⁷

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.⁶²

In Norenberg [Nuremberg, *Germany*], there was a rainy cold harvest.

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.²⁸

In *England*, there were fairs on the frozen River Thames in 1688-89.⁹⁰

The winter in 1688 in *Germany* was very severe.⁶²

The winter in 1688 was severely cold in *Germany* with great snow, followed by a sudden thaw and heat.⁷²

1689 A.D. In *Italy*, during the years 1686-89 there was a great drought.⁴⁷

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.⁷²

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.”⁶²

In 1689, LaHire in *France* began taking observations using precipitation gauges. The year 1689 ranked as the driest year for next thirty years.⁷⁹

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.³⁰

In 1690 in *Ireland*, there was famine and disease.^{57, 91}

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.”²⁹

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].⁷¹

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.⁶²

In 1690 in *Italy*, there was a famine from rains.^{57, 91}

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.⁷²

1691 A.D. In *Italy*, it was hot and dry.⁴⁷

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*.⁶²

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.⁷²

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.⁷²

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.¹

Wolves came into Vienna, *Austria* and attacked men and women, owing to the intense cold and hunger.³⁰

In 1691, the wolves, driven by the cold, entered Vienna, *Austria*, and attacked cattle and men.⁹⁰

In 1691 in *Europe*, the severity of the weather drove the wolves into the cities, Vienna, etc.^{47, 93}

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.⁶³

1692 A.D. 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.⁶²

There were rains and floods in the years 1692 in northern *France*.⁷⁹

In Norenberg [Nuremberg, *Germany*], the winter was very wet and cold. The harvest was very cloudy, rainy and cold.⁷²

[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.⁷²

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.⁷²

In *England*, the summer was very rainy.⁷²

Winter of 1692 / 1693 A.D. In 1692 in *Germany*, the winter was extremely warm.⁶²

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.⁷²

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.⁷²

In *Italy*, there was excessive scorching heat and great drought in 1693.⁷²

In *Italy*, it was hot and dry.⁴⁷

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 11th 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.⁷²

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.⁶²

In 1693 in *France*, there was an awful famine.^{57, 90, 91}

[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.⁷²

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.⁷²

On 20 March 1693 at Oundle, *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.⁷²

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.⁷²

Winter of 1693 / 1694 A.D. In 1693, in *Germany* and *Italy*, the frost was severe in November and December.^{47, 93}

In *Italy*, the winter was characterized by the most severe and scarcely to be paralleled cold frost and snow.⁷²

1694 A.D. In *Italy*, it was hot and dry.⁴⁷

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 1695.⁷²

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.⁷⁹

The severe sandstorm struck *Scotland* on 2 November 1694. The village Culbin was covered over and lost for 230 years.²⁸

From 1694-1699 in *Scotland*, there was a famine. In *England*, there was a great dearth from rains, colds, frosts, snows; all bad weather.^{57, 91}

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.⁷⁹

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).⁶²

Sea ice completely surrounded the whole island of *Iceland*. *England* experienced a cold winter. There was continuous snow for 5 weeks. In *Bohemia* during June, the summer was very cold and 3 intense frosts occurred leading to famine.²⁸

At Ausburg [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.⁷²

At Ulm, *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.

1695 A.D. At Ulm, *Germany*, all August to 1 September, it was cold and rainy. September and October were very cloudy and excessively cold.⁷²

In *Ireland*, in the spring and summer of 1695, there were many stinking fogs in Limerick and Tipperary.⁷²

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.⁷²

[In *Italy*], there were profound deluges in 1695.⁷²

At Posen, [Poznań, *Poland*], the summer and harvest of 1695 was one continued winter of cold rain, raw frosts, mildew, etc.⁷²

At Posen, [Poznań, *Poland*], the summer began on 10 September and lasted till 10 December.⁷²

Winter of 1695 / 1696 A.D. 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).⁶²

At Posen, [Poznań, *Poland*], the winter continued to 10 March 1696.⁷²

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.⁷²

At Hildesheim, *Germany*, up until 10 March there was warm moist winter weather. Following that was some weeks of severe winter weather.⁷²

1696 A.D. In *England*, there was a great storm on the east coast; 200 coasters and other vessels, and most of their crews, lost.⁵⁷

In 1696 a storm struck on east coast of *England*: 200 colliers and coasters lost, with most of their crews.⁹⁰

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.^{40, 41, 43, 56}

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 17th of July to the 14th of August, both night and day, there were heavy showers daily. It laid all barley and oats. To the 23rd 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 11th, there was a hard frost. No snow this winter two inches deep.⁷²

At Posen, [Poznań, *Poland*] went without rain in 1696; hence a great scarcity in 1697.⁷²

Winter of 1696 / 1697 A.D. In *England*, the frost was severe.^{47, 93}

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.⁷²

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.¹

At Mansfield in *Germany*, January and February were intensely cold. March and part of April were unsettled, cloudy, snowy, rainy, frosty and clear. April the 1st and May began with hot summer weather,

but followed by great storms of hail, especially the 21st, which did much damage. On the 27th 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 10th to October, great rains and shifting winds. November was cloudy and snowy. December was mild and rainy, but ended cold.⁷²

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 21st of June, there was excessive cold. On 16 and 17 July, frost and mildew blasted the corn. August to the 10th, 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.⁷²

On 9 April 1697 in *Wales*, hailstones fell in Flintshire weighing 5 ounces.⁹³

In Cheshire and Lancashire, *England* on the 29th 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."^{40, 41, 43, 56, 57}

In Cheshire and Lancashire, *England* on the 20th 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."⁹³

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.⁷²

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.⁹³

In Hertfordshire, *England* on the 4th of May, hailstones fell 14 inches in circumference; destroyed trees and corn in a most dreadful manner.^{40, 41, 43, 56, 57}

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.⁹³

Excessive heat reigned again in July 1697 in northern *France*.⁷⁹

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.⁷⁹

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.⁷²

Winter of 1697 / 1698 A.D. On 25 November 1697 in London, *England*, there was ice three inches thick. December 12th and 15th it was hot; the 12th, 18th, 19th and 20th, 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 26th 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 29th 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 26th of February, the ice was four inches thick. On March the 24th and 26th, thunder and lightning, warm sunshine all day with sulfurous clouds and hot evenings. On April the 11th, 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 25th, there were showers of fierce great hail with thunder and sunshine mixed. On April 27th, there was thunder and a storm of hail after. April was a cold month. On the 30th 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.⁷²

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 9th there was a great deal of red lightning with unceasing thunder. There were no gooseberry tarts till July. On the 30th 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 6th, 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 29th, 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 7th 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.⁷²

1699 A.D. Charleston, South Carolina in the *United States* was nearly depopulated by an awful tempest and inundation.¹

In *Britain*, the harvest was hot and dry; drought until the following January.⁴⁷

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.⁶²

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.]⁷²

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 20th or 21st] fell a great snow and the cold continued till May. The cold ended in long rains.⁷²

In 1699, a powerful cyclone struck Sunderbans coast, *Bangladesh* causing 50,000 deaths.⁹⁸

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 22nd and 23rd, it was sultry hot, like the summers of old. The 24th 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 28th 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.⁷²

1700 A.D. 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.⁶²

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].⁷²

At Breslaw [now Wrocław, *Poland*], the summer, harvest and winter were pretty temperate.⁷²

At Leeds, *England* on 27 April, there was a terrible storm of thunder and lightning.⁷²

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 10th 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 16th 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 26th 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 19th. 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 8th a hard frost and then rains; on the 13th a dreadful storm; but from the 15th to the 18th it was mild; from the 24th to the 29th there was sunshine and fine weather; but on the 31st it was frost.⁷²

In 1700, there was a famine in *England* from the rain and cold of the previous year.^{57,91}

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.⁷⁹

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.⁶²

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).⁷⁹

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.⁷²

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.⁹⁶

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 26th 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 12th 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 13th 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 16th 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.⁷²

1702 A.D. In 1702, the winter was very mild in *Italy*.⁶²

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.⁶²

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 1st 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.⁷²

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 26th 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.⁷²

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.⁷²

1703 A.D. The River Thames in London, *England*, rose so high at Westminster, that the lawyers were brought out of the hall in boats.⁴⁰

This was a very mortal summer in *England*. The rainy season, which began in November 1702, continued till far into February 1703. From the 14th to the 28th 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 16th, it was excessively hot with much thunder and lightning and soaking showers. From 16 to 21 May, it was pleasant. Then to the 30th, 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 24th 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 23rd, 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 23rd was bright and the 24 & 25 there were steams, and then on the 26th 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 1,000.⁷²

[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.⁷²

On 15 May 1703 in *France*, at Illiers there were hailstones as large as a fist.⁹³

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.¹

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."²⁹

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* great damage was done.^{47, 57}

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.^{40, 41, 43, 56}

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.⁵⁵

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*, 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 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.⁹⁰

Kinder, the Bishop of Bath, and his lady were killed in a great storm in *England* in 1703 from falling chimneys.⁴⁰

In 1703, a dreadful tempest struck *England*.¹²⁸

In 1703, there was a famine in *India* in Thar and Parkar districts of Sind [now *Pakistan*].⁵⁷

1704 A.D. In *England*, it was the hottest and driest summer known for twenty years.⁴⁷

In *England*, January set in with a hard frost. Ice was three inches thick. On the 19th of January, there was stormy weather. On the 20th, there was a very great storm with a tempest of thunder, lightning and hail in Cornwall. 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 23rd, 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 drougthy year. The grass was all burnt up.⁷²

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.⁶²

At Augsburg, *Germany*, this was a temperate favorable year throughout.⁷²

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 1705.¹

In Philadelphia, Pennsylvania in the *United States* the winter of 1704 was long and severe, with many deep snows.¹

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.”²⁷

1705 A.D. In *England*, it was very dry until the end of August.⁴⁷

In *England* from the winter to March, the weather was exceeding dry. Only February began with a little rain. In March to the 15th, the weather was mild and dark with fogs. On the 19th, 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 20th, 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 15th 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 15th, 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 6th was rain; from 7th to 19th, there was calm and glorious sunshine; to the 24th 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 15th to the 19th. 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 29th 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.⁷²

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.⁷²

In *Ireland*, there was a flood in Limerick; half Limerick drowned.^{47, 92}

There were great rains and floods over the continent of *Europe*.^{47, 92}

In *Germany*, to the 1st of June, it was very uncomfortable, cold, snowy, rainy, windy with a late spring. In June it was clear and cold to the 8th, then rainy to the 11th, 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.⁷²

The summer of 1705 was extraordinary because of the unusual heat in southern *France*. In Montpellier, *France*, especially on the 30th 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.⁶²

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.⁷⁹

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.⁶²

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).⁷⁹

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 3rd, thunder joined the hurricane.⁷⁹

1706 A.D. 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.⁶²

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.⁷⁹

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.⁷²

In *England*, there was excessive heat and drought during the summer. In October, there was excessive rain and floods in Denbighshire, *Wales*.⁷²

In *England*, from 14 December 1705 to 3 January 1706, the sun was not seen three times. The 3rd of January was a fine day. The 3rd to the 7th was overcast. On 7 January, it was very cold. On the 8th, it snowed all day. On the 9th, there was frost with some snow. On the 10th, there was an inch and a half of snow. On the 11th, there was a cold thaw, sleet, various weather, but mostly cold. There was frost and

snow to the 25th. 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 9th, 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 23rd, there was a hot sun but a cold night. April was a very dry month. In May to the 4th, there were rains and some thunder. From the 3rd to the 20th, it was very dry. On the 20th, 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 8th was rainy. From 8 to 20 October, the weather was mostly fine. It was misty to the 24th. 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 5th of November, there was frost and sunshine. The 6th to the 10th produced much rain, except on the 8th there was sunshine. From 10 to 12 November, there were such rains, that the post could not get into Yarmouth till the 14th, and even then he was fetched in a boat. To the 17th 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 4th, there was calm winds, overcast or fog. From 4 to 17 December, it was very wet with all sorts of weather. From the 18th to the 31st, the winds were southerly, most partly overcast, but a few clear days. December ended very cold.⁷²

Winter of 1706 / 1707 A.D. In *England*, the frost lasted from the 1st of January to April.^{47, 93}

1707 A.D. In Dagenham (Essex) *England* in May, there was a great inundation, continuing over several years.⁴⁷

In Dagenham, in Essex, *England*, on December 17, 1707; there was an inundation of the sea. These inundations continued until 1721.^{40, 41, 43}

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).⁶²

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 8th 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.⁷²

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 22nd, there were gentle breezes, hazy air; often sunbeams. In the 3rd 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 6th, there were blowing winds and small showers. On the 7th and 8th, 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 11th 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 5th. From 8 to 12 August there was a good harvest and calm sea. But on the 12th, there was a sudden shower of prodigious drops of rain. From the 18th to the 25th, 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 3rd to the 5th, it was very cold. From the 6th to the 11th, it was hot. From the 11th to the 17th, it was most cold. From the 21st to the 26th, it was mild. From the 23rd to the 26th, 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 3rd, 6th, 23rd, and 30th 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 19th. Then there was some hail, snow and rain. The 23rd, 24th and 25th of November was calm with fogs. The 26th and 27th 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 3rd and 4th. The only frost was on the 14th. On 26 December, there was rain.⁷²

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.⁷²

May, June, July and August was all very dry in *Italy*.⁷²

On 3 and 26 July, there were great floods in *Ireland*. August the 9th in the county of Down in *Ireland*, the day being calm, overcast, sultry and hot; there was a terrible thunder and lightning storm.⁷²

1708 A.D. In *Germany*, this was a seasonable mild year until after the 1st 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.⁷²

In *England*, January was a moist, wet, rainy, variable month. From 28 January to 12 February, there was frost. On the 9th and 10th of February, there was snow six inches deep. The ice was three to four inches thick before the snow. On the 12th began a thaw. On the 15th 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 6th came showers. On the 8th and 9th of March, there was frost and ice. There was snow in the morning of the 10th 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 3rd to the 7th, the sun gleams hot. From the 4th to the 8th, there was hoarfrost. The 12th of April was hot like in July. There was no rain in April between the 2nd and the 28th. May was a dry month with very little wind. It was a dry cold month. In June from the 1st to the 22nd, there were cold easterly or northerly winds. The first week of June was dry. From the 16th to the 24th, there were claps of thunder with rain. On the 17th or 21st, there were cold rains. The month of June ended with small showers. On the 9th of July, there was thunder. On the 16th 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 10th, the heat drops. There is a flying fog or mists but mostly sunshine. From the 13th to the end of August, the weather was moist. There was thunder and lightning from the 22nd to the 30th. On 30 and 31 August, it was very rainy. On the 1st and 2nd of September, the weather was temperate, yet faint. There were some small rains. On the 6th, 9th, 10th, and 12th of September, there was loud thunder, lightning and rain. The last half of September was generally dry. October the 1st to the 20th, it was cold both day and night. The winds were northerly, but moderate, except for the 14th, 15th, 19th and 20th; thence to the end of the month, the winds were moist and southerly. On the 1st, 11th, 16th and 18th of October, there was ice. The 30th was hot. From 1 to 11

November, the weather was dry with still winds. From the 11th to the 13th there were drizzles or squalls with little rain. The 19th and 20th was dry. From the 23rd to the end of November, the snow laid two inches deep. On the 25th, 26th and 27th, it was hard ice. In December to the 19th it was dry, blowing winds. On the 15th, 17th, 18th, 20th, 23rd, and 24th, there was misty foggy weather. On the 23rd, there was a halo with fog and a rainy evening. On the 25th, 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).⁷²

Thunderstorms or rainstorms and an earthquake desolated Provence, *France* in 1708.⁷⁹

Winter of 1708 / 1709 A.D. The winter in *Europe* was very severe and it lasted until March.²⁸

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.³²

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*.³²

In *England* on 28 December 1708, there was a great storm at night. On the 29th, 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 30th, it severely froze in the house with a dreadful cold. On the 31st, 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 12th to the 15th 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.⁷²

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 14th, 15th, 16th, and 17th of January, there were thaws. But from the 22nd to the 28th 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 12th to the 15th, 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 4th week of May, it still continued cold, the Elm trees yet naked [without leaves] in Norfolk and Suffolk, *England*.⁷²

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.⁷²

In 1709, the *Adriatic Sea* was frozen and the olive trees killed in *Southern Europe*.⁴²

In 1709, the *Adriatic* and *Mediterranean Seas* were frozen at Genoa, *Italy*; Marseille, *France*; and Celle, *Germany*.⁶⁰

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.³⁸

The chill of 1709 broke out on 6 January and lasted until the 24th. 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 Cette (now Sète) on the ice. Finally, even the sea froze off the coast of Cette (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*.⁷⁹

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 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.⁶²

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.³³

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.⁸¹

In 1709 in *Italy*, the Port of Venice was frozen.^{58, 80}

In 1709, the vines and fruit trees in *France* were killed [by the extreme cold].^{58, 80}

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.³²

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.⁶²

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).⁶²

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).⁶²

Seine River in *France* was frozen over completely. The Garonne River is covered with ice, and at Balaruc was travelled across on the ice.⁶²

In *Holland, 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*. On 8 April, the *Baltic Sea* was completely covered with ice as far as anyone armed with a telescope could see.⁶²

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 aronswurzel, 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.⁶²

During the winter in London, *England*, the River Thames was frozen below Gravesend. The winter was recorded as being intensely cold throughout *Europe*.¹

[In *England*], a great frost for three months, with heavy snows, from December 1708 to March 1709.^{2, 41, 43, 90}

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*.^{47, 93}

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.²⁹

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!¹

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.⁶²

In *France* in 1709, there was a severe famine throughout the kingdom.^{57, 91}

In *Scotland* and *England* in 1709, there was a famine from the rain and cold.^{57, 91}

In *England* after a hard winter, on 19 May, the hawthorns just began to blow, and on the 21st 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 25th 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 8th of August, barley and oats first cut in the south. On the 27th, 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 31st, 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.⁷²

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 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*.⁷²

Winter of 1709 / 1710 A.D. On December 25, 1709, 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.⁵⁵

1710 A.D. 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.⁶²

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*.⁷²

In *England*, the first week of January produced moderate weather from the 3rd to the 7th. The second week spits a little snow. The third week had dark easterly winds. On the 12th and 13th and from the 19th to the 24th 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 3rd of March, there were gooseberry leaves. On the 10th, 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 6th 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 24th to the 27th was hot. The 28th 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 1st 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 5th and 6th, there was a great deal of rain to lay the corn. On the 14th, there was thunder. The 20th 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 8th. There were several squalls on other days with some very fine days in between. The 16th of August produced thunder,

the 23rd was sultry, and the 25th 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 10th 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 9th with a dreadful storm of wind with floods of rain.⁷²

1711 A.D. In *England*, the frost was severe up to March.^{47, 93}

In *England*, there was moderate weather from the 1st to the 12th of January. From the 16th to the 18th, 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 5th of February was three inches thick on the coast. Then there was a thaw to the 8th, yet the old ice remained three inches thick. There were mixed days of frost and thaw to the 13th. The old ice was still ½ inch thick. On the 15th, there was a snowstorm that ended in rain. On the 16th of February, there was frost. On the 20th to the 27th, there was all frost. On the 24th, there was a very high tide and the winds blew hard producing a squall of hail. On the 17th, 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 27th 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. Currents remained only in flower. The codlings in bloom and many of the blooms blasted. On the 18th of April at Norwich, there was a dreadful tempest of thunder, lightning and rain. On the 21st, 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 19th of May, but apples not out of bloom till the 26th. June began as May ended, with cloudless sun, and starlight to the 7th of June. On the 7th, there was a dreadful tempest of thunder with prodigious hail. On the 18th was thunder and showers. On the 19th, there was a very high tide. It was a cold week. July began showery. The 10th to the 19th was fine weather. The first part was hot and the next 5 days cold. The 21st to the 28th of July was showery at London. August produced a variety of weather. September was the finest month since May. October produced squally weather. The 2nd to the 12th was warm; the 14th to the 16th – hot; on the 12th – wind and rain; on the 18th and 19th – gray dews or hard frost; on the 23rd – rain; on the 26th and 27th of October – rain, wind and darkness. November was mostly warm with a great deal of rain. On the 15th, there was a frost. In December, there was some fine weather. From the 9th to the 13th, there was fog with a little wind. The same from the 17th to the 19th. Then there was snow and frost to the 29th. The ice was three inches thick.⁷²

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].⁷¹

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.⁷⁹

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.⁶²

In the region of Carniola, Austria [now *Slovenia*] in 1711, there was a famine from rain and mildew. This famine continued several years.^{57, 91}

In 1711 in Mobile, Alabama in the *United States*, the city was almost destroyed by an inundation at the mouth of the Mobile River.⁹²

1712 A.D. It was noted that on 6 August 1712 in *low-Hungary*, the heat was excessive. 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.⁶²

The summer of 1712 was very hot in *France*.⁷⁹

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.⁷⁹

In *England*, January began mild. The evening of the 1st, there was southerly rains. To the 22nd 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 8th of February, there was small hail. Hoarfrost and snow laid on the ground. There was frost and snow on the 9th. February produced little rain. March began with wind. On the 4th to the 12th, there was a clear frost, with snow lying four inches deep, with a very cold thaw. On the 13th and 14th, ice not exposed to the sun was 1 ½ inches thick. On the 26th of March, it rained all day. April began with rain and sleet. From the 2nd to the 5th, there were some free showers. In the afternoon on the 16th, there were some fierce showers. On the 18th and 19th, there were hot days with much lightning. The rest of April was hot and fine weather to the end of the month. On the 26th, there were thunder and a shower. May was mostly a fine month both night and day. On the 4th, 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 27th and the 29th were showery. July produced hot weather. It was a glorious month. July began on the 1st with thunder, wind and showers. On the evening of 8 July, there was great rain. On the 15th, there was great rain at Norwich. August the 1st rained hard. From the 2nd to the 6th, there was a hazy sunshine. On the 18th of August, there were fierce showers. On the 29th, it rained hard with thunder. On 3 September, it rained for 24 hours. On the 6th, it rained all morning. On the 20th, it rained all night. On the 26th and 29th 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 17th, there was lightning. From the beginning of December to the 8th, 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 15th and 16th, there was frost with hail and rain. On the 17th, there was snow 1 ½ inches deep. On the 18th, three more inches of snow fell.⁷²

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 25th, there was a storm. From the beginning of February to the 7th, there was wind and rain every day. The 8th to the 16th produced fine days and nights. From 19 to 23 February, there was rain, sleet and hail. The 22nd produced very great rain. The 24th to the 28th was mostly dry. Gooseberries began to look green and currant bushes were considerably started. On March the 3rd, 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 15th to the 21st) 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 16th, there was thunder with rain and hail. On the 30th – thunder, and on the 31st - fierce showers. The hawthorns and pears were in bloom on the 9th. The apples and some gooseberries were in bloom on the 19th. The winter apples were in full beauty on May 29. June had little rain. On the 20th of June, the hawthorns were still blossoming. There were frequent showers from 2 to 16 July. From the 15th to the end of July, there were great rains lasting several whole days. August began with great rains and stormy weather. On the 13th to the 15th, there were fogs early and fine hot weather during the days. Then to the 23rd, there was the most glorious sunshine and moonshine. September began with squally blowing rain, hail and snow. From the 4th to the end of September, there was not much wind, but hot sunshine, glorious weather. From the 14th to the 18th, there were remarkable dews. The weather was squally at times from the 20th to the end of September. October was generally calm. October began showery. On the 8th, 10th, and 20th, it rained all day. There were great rains from the 17th to the 24th. There was showery weather to the end of the month. On 30 October, hail lay on the ground. On the 4th, 5th, and 16th 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 13th. The weather was so warm that primroses blossomed. There were great dews from the 20th to the 26th. 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.⁷²

1714 A.D. In Philadelphia, Pennsylvania in the *United States* the winter of 1714 was very mild after the 15th of January; trees and shrubbery were in bloom the first week in February, and the spring was unusually mild.¹

In Mobile, Alabama in the *United States*, the city was almost destroyed by an inundation at the mouth of the Mobile River.⁴⁷

In *England* in January, the month was mostly cold but there were little frosts. On the 6th, 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 19th, 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 1st to the 12th, 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 13th and the 31st.” By 16 March, the currants had grown to an inch long. From the 26th to the 31st, 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 3rd of April, it froze indoors. This frost lasted four or five

days, and the nights were cloudless. From the 9th to the 12th, the 15th, and the 17th of April, the temperature was warmer than normally seen in May or June. The 12th 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 4th to the 6th. It was mostly cold, very dry and clear to the 24th. Gooseberries and currants were not all out of bloom. On the 19th, there was distant thunder with hail and rain. On the 27th, 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 1st to the 3rd. It was stormy from the 6th to the 10th. 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 24th, the sea roared loud. Then on the 25th the winds blew hard. On the 26th 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 23rd, and it was very fine. On the 26th, 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 24th, the temperature was 30.5° F (- 0.8° C). December began mild. From the 7th to the 9th, there was a hard frost and the ice was 1 ½ inches thick. The 16th was rainy. From the 11th to the 18th, there was frost with some snow. On 20, and 26 to 29 December, there was a hard frost. On the 31st 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.⁷²

1715 A.D. In *England*, from the beginning of the January to the 5th, there was a hard frost with winds blowing hard. On the 2nd, 3rd, and 6th, it froze indoors. On the 9th and 10th, 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 19th 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 22nd, the ice was 1 ½ inches thick. March was variable with soft showers at times. On the 7th, the ground was dry to the diggers. Currants shot scarce an inch long. There were soft showers during the beginning of April. From the 16th to the 24th, it was dry. April ended with squalls or large rains. On the 11th of April, the hawthorn blossomed. On the 20th, 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 28th, 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 2nd to the 9th of July, there were vast rains and floods. On the 3rd and 9th 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 3rd, 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 2nd at Saxmundham 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 5th to the 7th. Then blowing weather from the 7th to the 10th. The middle of September was very hot with large dews. The month ended with showers on the 25th to the 27th. The first half of October was warm weather with a great deal of rain or large dews. The 17th was hot and faint. The 18th was sultry hot. The 20th 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.⁷²

[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.⁸⁷]

Winter of 1715 / 1716 A.D. The winter was recorded as being intensely cold throughout *Europe*.¹

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*.²⁸

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.⁶²

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.⁷⁹

In *England* on the 10th and 11th of November 1715, there was frost. On the 13th and 14th, it was very cold. There were frequent rains to the 18th. 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 1st of December was mild. The 2nd produced a hard frost. On the 3rd, it rained all day. From the 3rd to the 15th, there was a hard frost. The 15th produced frost with a little snow. On the 16th, it spits snow. From 17 to 21 December, there was a hard frost. On the 21st, it snowed all day and all night. On the 22nd, it snowed all day. The snow was 4 inches deep on the level. On the 23rd, the winds moved the snow into drifts. The fields were now naked. To the 30th, there were severe frosts. On 30 and 31 December, the ice along the coast was six inches thick.⁷²

In *England* in January 1st, it thawed a little; on the 2nd there was frost and snow; on the 3rd frost. On the 4th, it spits snow all day, there was frost and it snowed three inches deep at night. From the 6th to the 10th, there was a hard frost. On the 10th, there was frost and snow; the thermometer was nearly as low as it had been in 1709. On the 11th, there was frost, snow and the ice was 8 inches thick. From the 12th to the 15th, there was a hard frost, and snow at times. On the 18th, the frost relented but it snowed in the afternoon. On the 19th and 20th, there was frost and it snowed all day. On the 22nd, it thawed. On the 23rd, there was a hard frost and snow. On the morning of the 24th, there was frost, snow, and fog and then it thawed at night and rained. On the 25th, there was a small rain. On the 26th, there was fog, thaw and then frost. On the 27th, there was frost, fog and in the afternoon wetting fog. On the 28th fog; on the 29th frost. On the 30th, there was frost with much old ice. The new ice was 9 inches thick. On the 31st, there was frost and in the afternoon a thaw and wetting fog. (On the 16th of January, the spirits in the thermometer were as low as in 31 December 1709.)⁷²

In *England*, from the beginning of February to the 8th, the weather was often foggy, cloudy and wet. On the 8th, there was hail, snow and a frost. There was a hard frost on the 9th and 10th. On the 11th, there was a frost with the old ice still thick on the water. From the 12th to the 14th, there were fogs, spitting snow or rain. The 15th was clear with most of the snow gone. The 16th and 17th were clear with some mist. The 18th and 19th produced a hard frost. The 20th to the 27th was mostly clear. The 27th produced snow, sleet, hail, and squally weather. The 28th was clear. And the 29th produced a small shower. The first half of this month was cold, the rest moderate.⁷²

On the 1st of March in *England*, there was frost, squalls of rain and hail. On the 2nd, there was snow two inches and frost. On the 3rd, frost indoors, squalls of snow and small hail. The 4th and 5th was clear. The 6th and 7th were sweet days. The 8th was good. On the 9th and 10th, there were squalls of snow and hail. The gooseberry leaves were just opening, yet the trees looked naked. On the 11th, the weather was good. On the 12th, there were small rains. The 13th and 14th were clear. There was a hard frost on the 15th. On the 16th and the 17th, there were small showers. During the night of the 18th, there was rain. The 19th was smirry, yet clear. The 20th was clear. There were fierce squalls on the 21st. The 22nd was gray with some little hail. The 23rd was a little smirry. The 24th was a dull day. On the 25th and 26th, the weather spits small hail. From the 27th to the 31st, there was frost and thick ice. March was mostly cold. On the 24th, there were blooms on some gooseberries. The currants were open. On the 1st of April, there was frost and thick ice.⁷²

In 1715-16 in *England*, a fair was held on the River Thames.^{2, 41, 43, 90}

In *England* in 1716, the River Thames froze at London and many set up shops on the ice.^{58, 60, 62, 80}

In *England* in 1716, a fair held on the Thames; oxen roasted.^{47, 93}

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.⁹⁰

In 1716 A.D., booths were erected on the ice on the River Thames at London, *England*.³⁸

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."²⁹

1716 A.D. In *England*, the years 1716 to 1719 were exceedingly hot and dry.⁷²

In *England* on the 2nd and 3rd of April 1716, the weather was clear. The morning of the 4th was misty. The 6th was clear. The 7th produced fog. The 8th and 9th was frost and clear. The 10th to the 12th were clear. The 13th was clear with some fog. On the 14th, it was clear with some fog in the valley. The 15th was clear. The 16th was clear, but produced 2-inch hail at Norfolk. The 17th produced small rain. The morning of the 18th produced small rain. To the 27th, the weather was clear, or cloudy with some smirrs. The 27th was hazy. The 28th was squally, rain and hail and in the afternoon small rain. On the morning of the 29th, it was rainy and then clear. The middle of the month was moderate, but the end of the month was warm.⁷²

In *England* from the beginning of May to the 15th, the weather was cold, dry and mixed. On the 15th and 16th, there was thunder and rain. On the 17th, the weather changed from foggy, to clear, to rain, to great rain. On the 18th, there was thunder. In the morning of the 19th, there were showers and thunder. The 23rd had an overcast rainy night. The 24th was hot with small showers. The 25th was cloudy. The 26th was showery with thunder, hail and rain. From the 27th to the 29th, 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 26th, 27th, and 28th did not reach *Holland*.⁷²

In *England*, June began with northwest winds with small showers and then southwest winds to the 10th 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 20th and 21st, 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].⁷²

In *England*, the winds in July were westerly, most with showers and squalls. On the 6th, there was thunder. On the 11th, there was loud thunder.⁷²

In *England*, in August the winds were variable. The first half of the month was dry with some sweet smirrs. On the 14th and 15th, there was much rain. On the 16th everywhere was dry; except Yarmouth had showers.⁷²

In *England*, it was excessively dry until the end of August.⁴⁷

The River Thames in *England* on September 14, was dry both above and below the bridge (London bridge).⁴⁰

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.⁵⁵

In *England*, September was squally weather. The barometer dropped for the 1st to the 14th finally reaching 28. On the 5th, there were sudden furious rains and winds. On the 8th, there was thunder. On the 11th, there was lightning. The 12th was calm. On the evening of the 13th, 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 1st.)⁷²

In *England*, in October the weather was temperate during the first three weeks but often with quite a bit of rain. On the 2nd, it rained for 24 hours; but not a hard rain. The 4th was similar but with less rain. From the 14th to the end of the month, the weather was mostly dry. The 24th and 29th produced hard frosts.⁷²

In *England*, from the beginning of November to the 17th, the weather was dry and calm. From the 19th to the 24th, there was abundant rain and fierce squalls.⁷²

In *England*, from the 1st to the 9th 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 18th. The weather to the end of the month was variable.⁷²

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)." ¹

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.^{24, 25}

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.^{24, 25}

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.^{24, 25}

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.^{24, 25}

1717 A.D. 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.⁵⁵

An inundation in *Holland* and Zealand, *Denmark* caused 1,300 inhabitants to be drowned. The inundations also struck Holstein, *Germany* the same year.^{40, 41, 43}

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*.^{47, 90, 92}

In *England*, during three years (1717-19) there was little rain but rich dews.⁴⁷

In *England*, the years 1716 to 1719 were exceedingly hot and dry.⁷²

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 2nd to the 9th, there were frosts. The five weeks up to this point had been dry and calm. From the 9th to the 16th, 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 29th of March, some gooseberries began to bloom. The month of April began dry and cold. The cold continued to the 12th with squally weather. On the 12th, it rained. On the 20th, gooseberries and currants blossomed. It was squally through April. May began as April ended. May was a temperate month. On the 4th of May, codlings bloomed. From the 16th to the 19th, there was much rain. From the 20th to the 25th, there were smirrs at times and cold northerly winds. On the 26th, there was rain; on the 28th, there was thunder. June began dry and sultry hot. From 7 to 21 June, it was dry. On the 9th, there was thunder and lightning with a free shower. On the 15th, there was a shower. On the 29th, 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 9th, there was rain in the evening. The rest of the month was hot and dry.⁷²

In *France*, there was not a cloud in the sky between the 11th and 22nd of July. On the 22nd 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 27th of July, there was great thunder and rain between Paris and Clermont. On the 30th, it rained. In the first of August at St. Omers, it was showery. The same at Dunkirk early on the 2nd.⁷²

In *England*, there was rain at a distance in Dover on the 3rd of August. On the 5th, it was squally. There was dry cloudless sunshine till the 16th of August. On 16 August at Ipswich, there were evening showers. It was the same on the 17th. On the 18th at Leostoss, it was showery. On the 19th at Yarmouth, there was lightning followed by rain. On the 20th, 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 21st, 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 unmasted. September began hot for the season. There were little wind, with fogs and overcast skies. On the 3rd of September, there was continual loud thunder with intermittent lightning and rain. On the 7th it was squally and then smirry to the 21st. On the 21st, it rained early and then it was mostly dry to the 29th. 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 6th to the 9th, there was rain. On the 21st, 28th and 29th, there was frost. On the 21st, there was small or thick rain all day, then hail in the evening and a great dew on all the glass. On the 23rd, 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 14th 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.⁷²

1718 A.D. In *England* there was a short severe frost.^{47, 93}

In *England*, during three years (1717-19) there was little rain but rich dews.⁴⁷

In *England*, the years 1716 to 1719 were exceedingly hot and dry.⁷²

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.⁶²

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 11th, 21st and 23rd.⁷⁹

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 1719.⁷⁹

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.⁶²

1719 A.D. 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*).^{40, 41, 43, 56}

In *Sweden*, a great snowstorm, wherein 7,000 Swedes, on their way to attack Drontheim, perished on the mountains.^{47, 57, 90}

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."⁹³

In *England*, during three years (1717-19) there was little rain but rich dews.⁴⁷

In *England*, the years 1716 to 1719 were exceedingly hot and dry.⁷²

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.⁷⁹

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.⁶²

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.⁷⁹

1720 A.D. In Northampton, *England*, a great flood did considerable damage.^{47, 92}

1721 A.D. In Adige, *Italy*, terrible floods occurred in the valley through which this river (the ancient Athesis) runs.^{47, 92}

1722 A.D. In Yorkshire, *England*, extensive rains caused great damage; known as “Ripponden Flood” occurred on May 18, 1722.^{40, 41, 43, 47}

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 18th 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.⁵⁹

[Another source places this event in 1771] In 1771, in Yorkshire, *England*, there was a dreadful inundation, called Ripon Flood.^{90, 92}

A hurricane struck *Jamaica* on August 20, 1722.^{40, 41, 42}

Port-Royal in *Jamaica* destroyed by a hurricane on August 28, 1722.^{40, 41, 43, 56}

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*.⁵⁵

Carolina in the *United States* was greatly damaged by the storms in August 1722.^{40, 41, 43, 56}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

February 5th – moderate weather. February 12th – fine weather. February 28th – wet, stormy weather. March 5th – fine weather again. March 16th – charming day. April 9th – thunder and lightning, rain and hail. April 30th – thus far it was a very cold, dry spring. May 31st – fair weather concludes the month. July 30th - the hottest day that has been this year. An exceeding dry time, as ever was. September 30th – very hot for this time of year. October 20th – very cold. October 27th – excessively cold. December 2nd through the 9th – very hot indeed for the time of year, more so than ever was known before.⁷⁸

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.⁶²

1723 A.D. In *England*, it was cold and dry after February.⁴⁷

In Madrid, *Spain*, there were great floods; many persons of distinction drowned.^{47, 92}

In 1723, at Madrid, *Spain*, several of the Spanish nobility and other persons of distinction perished from an inundation.⁹⁰

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.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: January 3rd – raw, cold weather. February 1st – a summer day. February 24th – the greatest storm and highest tide that has been known in this country. April 30th – 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 1st of the month, a man in Cambridge mowed a quantity of English grass. May 2nd – cooler weather. May 25th – 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.⁷⁸

1724 A.D. In Adige, *Italy*, there were great floods in the valley.^{47, 92}

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.⁶²

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].⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: April 11th – the peach trees now begin to blossom. July 23rd – a very great drought, everything burnt up. December 14th – first snow fell today. December 29th – considerable snow but followed and consumed by rain. This month we have had something like winter weather.⁷⁸

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.¹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: April 30th – it is has been a very cold month. May 29th – this has been a cold month, and no rain.⁷⁸

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*.⁶²

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.⁷⁹

Winter of 1725 / 1726 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1726 on January 23rd and 24th – very severe cold. The river froze over. January 31st – this has been a very smart, close [overcast] winter. February 3rd – the river froze over last night. February 9th – more moderate, the river breaking up. February 16th – the river froze over again. February 28th – 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.⁷⁸

1726 A.D. In *Europe*, there were great inundations and floods “all over Europe.”^{47, 92}

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.⁶²

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, *France* indicated his barometer was perfectly still from 2 February until 1 September of 1726.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 2nd – more moderate. March 14th – the fish had not come upon the usual ground here. April 27th – people generally planting. This month has been wet and uncomfortable weather. 'Tis thought in these parts to be a very backward spring. May 20th – the peach and apple trees but now began to blossom. May 27th – there was very little pleasant weather this month. June 20th – there was a very great drought this spring. September 30th – this month had been cool, but no great frost yet. October 30th – several days past were pretty cold.⁷⁸

On October 22, 1726 a tremendous hurricane occurred at *Jamaica*, which destroyed several plantations and a great fleet of ships.⁵⁵

Winter of 1726 / 1727 A.D. In 1726, sleighs passed over the ice from Copenhagen, *Denmark* to *Sweden*.^{38, 60}

In 1727, they drove on carriage from Copenhagen, *Denmark* to *Sweden*. In February, the Seine River in *France* was frozen.⁶²

The cold winter of 1726 was excessively [cold] without being too long in Montpellier and Marseille, *France*. The cold killed thousands of orange trees.⁷⁹

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. 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.⁶²

1727 A.D. The Delaware River near Philadelphia, Pennsylvania in the *United States* was frozen and closed for three months of the winter.¹

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 7th 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.⁷⁹

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.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

February 10th – snowed all day. February 11th – a very cold day. February 13th – the river froze over this morning but broke up in the afternoon. February 16th – a most charming pleasant day. February 24th – a very pleasant day. March 30th – we had very uncomfortable weather this month. The spring is thought to have been very backward.⁷⁸

In *Ireland* during the years 1727-29, corn [grain] was very dear. Many hundreds perished. Many immigrated.^{57, 91}

Winter of 1727 / 1728 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1728 on January 1st – 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 11th – for several days past, there was a spell of comfortable weather. January 13th – a very terrible snowstorm all day. The snow that fell today is almost two-feet (0.6 meters) deep upon a level. January 18th – 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 8th – until this day there was no appearance of winters breaking up. March 15th – 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.⁷⁸

1728 A.D. On August 15, twenty-three ships were forced on shore by a terrible hurricane at South Carolina, in the *United States*.⁵⁵

Carolina in the *United States* was greatly damaged by storms in August 1728.^{40, 41, 56}

The Delaware River near Philadelphia, Pennsylvania in the *United States* was frozen and closed for three months of the winter.¹

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.⁶²

1730 A.D. [In Chili (*Chile*), the city of Concepcion was inundated.^{40, 43, 47} 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.]

The peak temperature in Aix, *France* during the summer reached 94.3° F (34.6° C).⁶²

1731 A.D. 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.⁵⁵

In Cheltenham, in Gloucestershire *England*, a storm caused 2,000*l.* damage in June, 1731.^{40, 41, 56}

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 1719.⁶²

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.⁷⁹

Winter of 1731 / 1732 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).⁶²

In 1731, the snow in *England* was remarkably deep.^{41, 43, 56}

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).⁶²

1732 A.D. On 30 May 1732 in *Ireland*, there was a prodigious shower of hail.⁹³

Winter of 1732 / 1733 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1733 on January 8th – cold. January 13th – this whole week produced a spell of warm weather. January 29th – it did not seem to be very cold, yet it froze over to Purpoodock [now Cape Elizabeth] last night. February 8th – prodigious blustering and cold. February 16th – it thawed all last night. February 22nd – ice still lies as far as North Yarmouth. A man may walk over to Hog Island [on the ice]. February 28th – it was melancholy to see so much snow as has fallen so late in the year. March 10th – there has been little of the snow melted yet. March 21st – comfortable weather. March 22nd – snow mostly consumed. March 27th – pleasant. March 29th – the snow in the woods is near four-feet (1.2 meters) deep. April 4th – cloudy and cold. April 13th – pleasant day. April 16th –

Stroudwater River still froze over. April 20th – a cold and backward spring. April 23rd – it was said to have snowed at Saccarappa [now Westbrook] last night, knee deep.⁷⁸

1733 A.D. In *St. Kitts*, twenty ships were lost to a storm on June 30.^{40, 41, 43, 56}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:
 June 29th – it was a wonderful year for grass. August – pigeons were very plentiful. We kill more than we could eat. August 20th – trout, with a net, got 16 dozen this morning. September – generally a pleasant month. October 24th – it froze in the shade all day. November 4th – turnips are exceedingly plentiful. November 24th – warm weather. December 7 – wonderfully pleasant most of this month.⁷⁸

In *India* in 1733, there was a famine confined to the north western provinces.⁵⁷

1734 A.D. In *Holland*, the frost was very severe; but none in *Sweden* or *Norway*.^{47, 93}

In Belper (Derbyshire), *England*, a flood carried away the bridge over the River Derwent and did other damage.^{47, 92}

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.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:
 January 11th – blustering and cold. January 19th – rain. January 28th – pretty comfortable. February – pleasant weather generally this month, though some days were cold. March – all along warmer and pleasanter than April last year. April 4th – as hot a day as found in summer. April 19th – Jack finished planting potatoes. April 25th – there was vastly more potatoes planted the year than ever. May 9th – though the spring was at first very forward, things didn't progress as promised. May 22nd – very warm and pleasant. June 21st – there never was (I believe) such a year for grass. July 4th – the raspberries began to ripe. July 8th – We hear that at Boston, people died of excessive heat. July 23rd – it is (I believe) as fruitful a year as ever was. September 6th – extraordinary cold. September 13th – pleasant. September 30th – we began to dig our potatoes, so early, because we have so many to dig. November 1st – feed is good yet. December – to the end of this month the weather was very moderate.⁷⁸

A hurricane struck *Jamaica* on September 1, 1734.^{40, 41, 42, 43, 56}

Winter of 1734 / 1735 A.D. On 6 January 1735, the temperature in Siberia at Kirenginiki in *Russia* was -120° F (-84° C).²⁸

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 25th.⁷⁹

1735 A.D. 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.^{40, 41, 43}

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.⁷⁹

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 28th – this has been a summer month; only two or three cold days. March – not so pleasant as the last month. April 9th – cold and windy. April 17th – quite hot. April 21st – same. July 10th – people began to mow. August 11th – 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.⁷⁸

The peak summer temperature in Port Louis, *Mauritius*, occurred in January and was 90.7° F (32.6° C).⁶²

1736 A.D. 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.³⁹

The River Thames in London, *England*, rose so high at Westminster, that the lawyers were brought out of the hall in boats.⁴⁰

In *England*, the snows were remarkably deep.^{41, 43, 56}

In Philadelphia, Pennsylvania in the *United States* the winter of 1736 was intensely cold and many people perished.¹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

February – a close [overcast] cold winter. February 28th – it looked promising for a forward spring. March 15th – severely cold. April 10th – a hot day. April 11th – the spring looks promising. April 17th – we dug the lower garden, and sowed carrots, parsnips, etc. May 29th – it was through the whole month, except one week, cold and raw. July 9th – sowed turnip seed. The fowls and chickens have destroyed the grasshoppers. July 25th – 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 3rd – we pulled up all our turnips. Fine weather. December 30th – hardly any winter yet.⁷⁸

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.⁶²

In Algiers, *Algeria* from May to October, the following weather was observed:⁶²

Hot days	124 days
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.⁶²

Winter of 1736 / 1737 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1737 on January 2nd - 'Tis thought the ground was frozen four-feet (1.2 meters) deep. January 3rd – there is no wood, little corn; sad complaints everywhere. January 4th – Corn has been secured but the grain mills are inoperative [because the water is frozen]; people know not what to do. January 11th – it snowed all day. January 16th – a level snow of about eight-inches (20 centimeters) but turned to rain. January 17th – glare of ice. January 18th to 22nd – snow. January 27th – more snow.⁷⁸

1737 A.D. 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.⁶²

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.¹

At the mouth of the Ganges River in *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.^{40, 41, 43, 56}

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.^{47, 57, 90}

In 1737, the Hooghly River Cyclone struck *India* and *Bangladesh* causing 300,000 deaths.⁹⁸

In *Italy* and *Spain*, the frost was very severe; none in *Holland* or *Germany*.^{47, 93}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January 31st – pleasant. February – rains and pleasant weather alternately. March 5th – it is a melancholy time in regard to the scarcity of corn; some have had none for several weeks. March 26th – it was a very backward spring indeed. March 30th - 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 2nd – the gooseberry bushes look quite green. April 11th – snowed all day. April 18th – cloudy and cold. April 20th – it looks no more like spring than it did a month ago. No plowing or gardening yet. April 21st – all the talk is – no corn, no hay, and there is not a peck of potatoes in all the eastern country. April 25th – there is no grass at all. May 2nd – we sowed our peas, and lower garden. May 4th – a multitude of creatures were not able to get up; many have died [because of starvation]. May 9th – warm today. May 10th – the whole neighborhood without milk. May 17th – the grass hasn't grown because of a lack of rain. May 20th – a joyful, seasonable rain. May 24th – very pleasant. June 4th – corn is 10s. a bushel in Boston; hardly any to be got. July 18th – there never was, in the memory of man, more seasonable weather. July 20th – grass is very thin. July 22nd – no feed on the Neck [peninsula]. July 27th – grasshoppers plentiful. August 8th – the grass began to shoot. September – various weather this month, but on the whole a fine season for the corn to dry. October 10th – cold. October 19th – fine weather. October 23rd – 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 5th – there has been some rains. November 24th – no grinding; we had a bag of corn go from mill to mill, for about two months, and not ground yet. December 18th – it was remarkable that there had been no northwesterly winds this fall or winter.⁷⁸

In Philadelphia, Pennsylvania in the *United States* the winter of 1737 was intensely cold and many people perished.¹

1738 A.D. On 27 February 1738 in Dublin, *Ireland*, there was a great hailstorm accompanied by thunder and lightning.⁹³

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].^{58, 80}

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 23rd – 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 27th – the frost is generally out of the ground. It looks likely for a forward spring. April 11th – Jack dug the lower garden. April 14th – 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 15th – hot weather. May 23rd – fine, pleasant day. May 29th – abundance of rain. July 7th – grasshopper. The drought came on very severely, and prevailed in such a manner, as the like was never known. September 3rd – more raccoons, jays, and red squirrels than ever was known. The weather this month generally pleasant. November 5th – there was, I think, more grass now than in the summer. November 23rd – cold weather. November 27th – 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.⁷⁸

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.⁶²

On 25 July 1738 in *England*, there was a great hailstorm in Bedfordshire, Middlesex and Suffolk.⁹³

1739 A.D. In *France* in 1739, there was a severe famine.^{57, 91}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 11th – no appearance of any feed [i.e. grass] yet. April 20th – we have remarkable seasonable weather. April 30th – there has been no rain for about a month past, except a small shower. August 31st – we have had more hot weather these four days past, than all the summer together. September 17th – last night there was a very white frost that killed the tops of our potatoes. October 8th – the cold weather prevails as far as Boston, so that there is no business going forward.⁷⁸

In *India* in 1739, there was a famine in Delhi and its neighborhood.⁵⁷

Winter of 1739 / 1740 A.D. In 1739, the winter was recorded as being intensely cold throughout *Europe*.¹

Denmark experienced a cold winter between 29 September 1739 and May 1740. Wolves crossed the ice.²⁸

During the winter of 1739-40, the *Baltic Sea* froze.³⁷

During the winter of 1739-40, the *Baltic Sea* was completely covered with ice.⁶⁸

In 1740, *Denmark* and *Prussia* experienced very intense frost.^{47, 93}

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, *Spain* froze over, and navigation was suspended in the *Greek Archipelago* on account of the danger from floating ice.⁶³

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 23rd to the 24th 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.⁶²

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.⁷⁹

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.⁷⁹

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, *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.⁶²

In 1740, the River Thames at London, *England* was frozen over.^{38, 60}

In *England*, there were fairs on the frozen River Thames during the winter of 1739-40.⁹⁰

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”.⁹⁰

In 1740, the *Zuiderzee* froze completely. The River Thames in *England* was also frozen over completely.⁶²

In *England*, an intense frost as perhaps was ever known in those parts, began about Christmas and continued eight weeks.³⁹

In *England*, a frost began on 24 December 1739 and continued nine weeks, or 103 days.^{2, 40, 41, 43}

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.”^{47, 93}

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.”²⁹

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 pater-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.”²⁹

In *England*, 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.”⁴⁷

In *England*, “This month (January) the frost, which began the 26th 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.”^{47, 93}

In *Ireland*, during 1739-40, potatoes destroyed by the frost. Wheat sold for 42*s.* per kilderkin [about 18 gallons or 82 liters].^{57, 91}

In Philadelphia, Pennsylvania in the *United States* the winter of 1740 was very cold and stormy. The Delaware River was closed until the 14th of March.¹

1740 A.D. In *England*, there were great floods from the breaking up of the frost and snow of the preceding severe winter.⁴⁷

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, *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 20th of September due to the cold and rain. In Boulogne, *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.⁶²

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.⁷¹

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 1658.⁷⁹

In April 1740 in *Ireland*, there was excessive cold with hail.⁹³

At Antigua in the *West Indies*, there was a violent storm in August 1740.^{40, 41}

There was a violent storm off the coast of *England* on November 1.^{40, 41, 43, 56}

In Dublin, *Ireland*, there were heavy rains and great floods; shipping at Dublin injured.^{47, 92}

In *England* during 1740-41, there was a famine from frost, cold, exporting and hoarding up of corn.^{57, 91}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January – this month was generally fair and pleasant. February 18th – 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 27th – warm southerly weather. March 3rd – a summer day. March 10th – same. March 18th – warm. March 29th – charming weather. April 14th – the spring does not look very promising. April 23rd – exceeding hot. April 30th – a pleasant day. May 11th – a very backward, cold spring. June 25th – we have had the finest, most seasonable weather that can be; everything is promising. July 22nd – it begins to be a dry time. July 28th – the last month was ideal as any for growing, as ever was in the memory of man. August 10th – there has been an uncommon season of hot weather this summer.⁷⁸

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 19th of December to the 13th of March. Many creatures died from hunger and cold. As late in the season as the 19th of April, snow fell to the depth of three feet (0.9 meters).¹

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.²⁶

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.³²

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.³²

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."²⁶

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1740 on October 28th – it began to snow. October 29th – significant snow melt, yet it is still three-inches (8 centimeters) deep. November 5th – I believe no man ever knew so wintery spell so early in the year. December 3rd – 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 21st – 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 29th – the Fore River has been shut up [blocked by ice] a day or two. December 30th – several persons walked over to Purpoodock [now Cape Elizabeth on the frozen ice]. In 1741 on January 1st – a little cooler, but a pleasant day. January 7th – 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 11th – I rode over the [frozen] river. January 19th – the whole week produced a spell of charming weather. January 27th – a charming pleasant day. January 29th – much cooler. April 10th – melancholy time, the snow lying, and little hay. April 25th – the snow melted wonderfully. April 30th – roads now settled [became hard] surprisingly; the reason for this was the frost failed to penetrate the ground the winter past. May 1st – fair, hot, sunshine but easterly wind. I saw one patch of snow on the Neck [peninsula].⁷⁸

1741 A.D. In Canterbury, *England*, there was a storm on September 8th.^{40, 41, 56}

In *Scotland* in 1741, there was a famine from terrible shake-winds when corn [grain] was ready for reaping.^{57, 91}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 2nd – raw, rainy. May 3rd – rain showers. We hear there is a famine in Ireland and a universal scarcity. May 4th – 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 9th 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 18th – 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 23rd – a hot summer day. May 24th – it was extraordinarily hot; I sweated much during the afternoon preaching. May 25th – 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 10th – 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 30th – exceedingly hot Sabbath, people dying almost from the heat. From the 25th 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.⁷⁸

Winter of 1741 / 1742 A.D. In 1741 in *England*, there was all frost or rain from 15th September to 1st February. "All frost or rain."^{47, 93}

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 11th and 12th 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.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:
In 1742 on March 11th – the snow is four-feet (1.2 meters) deep in the woods.⁷⁸

1742 A.D. In Limerick, *Ireland*, there was a great flood; much damage.^{47, 92}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:
April 18th – comfortable Sabbath. April 25th – unusually hot. May 6th – the grass grows wonderfully. May 29th – same. Very hot weather for a week past. October 18th – some unusually hot days about this time. December 23rd – charming weather everyday. December 29th – wonderful weather for about ten days past; there has been no cold weather yet.⁷⁸

Winter of 1742 / 1743 A.D. The Seine River in *France* was entirely frozen over.³⁸

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.⁶²

Frost in *England*.^{40, 41, 43}

In *England*, by the 18th 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."^{47, 93}

The winter of 1742-43 was severe in *France* and Quebec, *Canada*. In Paris, *France*, the Seine River froze on the night of the 26th/27th 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).]⁶²

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.¹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:
In 1743 on March 1st – 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.⁷⁸

1743 A.D. 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.⁹³

On 15 July 1743 in *England*, there was a hailstorm at Middlesex and Leicestershire.⁹³

A major heat wave struck Peking (now Beijing), *China* on 25 July 1743. Eleven thousand people suffered heatstroke. The temperature was 120° F (49° C).²⁸

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).⁸⁰

A storm struck Tewkesbury, in Gloucestershire, *England* on August 18 causing 1,000*l.* damage.^{40, 41}

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."⁹³

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 28th – 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 1st – an uncommonly dry time. May 7th – refreshing rains. June 1st – Indian corn wants heat. June 20th – a very dry time; people fear a drought. June 22nd – it rained plentifully. June 27th – there are millions of worms, in armies, appearing and threatening to cut off every green thing; people are exceedingly alarmed. July 1st – days of fasting are kept in one place and another, on account of the worms. July 28th – an exceeding scarce time for hay: it is £7 to £8 a load. August 1st – fine growing season. October 31st – wonderful weather, moderate and dry. November 7th – 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.]⁷⁸

Winter of 1743 / 1744 A.D. In 1744, the Seine River in *France* was entirely frozen over.³⁸

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).⁶²

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).⁶²

1744 A.D. The maximum temperature during the summer on a plantation on the Comewyne River, [*Suriname*], was 89.4° F (31.9° C).⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 29th – 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 1st – a fine season as ever was known. May 31st – 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 15th – a wonderful year for grass and hay, both English and salt. August 20th – 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.⁷⁸

On 4 June 1744 in *England*, there was a great hailstorm in Gloucestershire.⁹³

A hurricane struck *Jamaica* in October, 1744.^{40, 41, 42, 43}

Port-Royal in *Jamaica* destroyed by a storm on October 20, 1744.^{43, 56}

Winter of 1744 / 1745 A.D. In 1745 in *Russia*, the frost was unusually severe.^{47, 93}

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.⁷⁹

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.⁶²

1745 A.D. In Dublin, *Ireland*, there was a great flood; serious damage to bridges.^{47, 92}

In Yorkshire, *England* in May, there was a hailstorm with stones measuring 5 inches round.^{40, 41, 43, 56, 57}

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.⁹³

The high temperatures observed during the summer were:⁶²

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 Nimes; 33.2 inches (844 millimeters) in Toulon; and 32.7 inches (830 millimeters) in Bordeaux.⁷⁹

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 30th – this month has been like February; wonderfully pleasant, and like a normal April. June – so cool a June has not been known. August 18th – a good hay season. September 30th – no frosts till a night or two ago. October 26th - warm and pleasant.⁷⁸

In *India* during the years 1745-52, there was a famine in Nara districts of Sind [now *Pakistan*], and Thar and Parkar.⁵⁷

Winter of 1745 / 1746 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1745 on November 16th – uncomfortable weather; deep snow in Boston, Massachusetts that lied on the ground all week; a considerable snow in Portland, Maine. December 27th – thus far moderate, and hardly like a normal December. December 31st – a blustering, severe night. This is the first day that looks like winter. No sledding yet. In 1746 on January 31st – a fine, moderate winter thus far. Only two short cold snaps. February 24th – the snow is three or four feet (0.9 or 1.2 meters) deep in the woods. February 28th – the snow is still as deep as at any time this winter. March 20th – a severe month, quite unlike the last. The snow still covers all the Neck [peninsula].⁷⁸

This winter in *Russia* was of great severity. In Astrakhan in the *southern European Russia*, the thermometer fell to -23° F (-30.6° C). In Paris, *France* the coldest day was 15 February with a reading of 15.6° F (-9.1° C). The Seine River produced ice floes twice, once on 14, 15 and 16 February, and again on 13 and 14 March.⁶²

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.⁶²

On 24 June 1746 in *England*, there was a hailstorm in Kent.⁹³

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 27th – a sweet pleasant day. April 11th – Jack dug the upper garden. April 12th – the spring is uncommonly forward. April 18th – I sowed peas, carrots, etc. April 29th – the most part of the week has been as dry as midsummer. May 4th – the creatures were let on the Neck. June 9th – a fine growing season. June 26th – the weather turned very dry. July 9th – a melancholy drought advances. July 31st – there was a little rain this morning, but the ground is exceeding dry. August 15th – it is thought the present is the greatest drought that ever was in New England. August 24th – plentiful showers. August 29th – it rained like a flood. September 29th – an unusual, moderate growing season. October 5th – it was like springtime; the grass grew surprisingly. Pleasant weather the latter part of the month. November 25th – Indian corn 25s. a bushel. November 30th – hay at Boston £20. December 1st – very pleasant day.⁷⁸

The maximum temperature during the summer at Mahon, *Island of Minorca*, was 86.9° F (30.5° C).⁶²

Winter of 1746 / 1747 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1746 on December 15th – severely cold. In 1747 on January 12th – our whole bay froze over entirely.⁷⁸

1747 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January 19th – moderate weather. February 28th – since the 7th, the weather was pleasant and moderate. March 31st – there were no high winds this month or lion-like days; the month was more like April. We had our upper garden dug. April 3rd – it is thought the spring is full month forwarder than usual. April 9th – the grass grows wonderfully. April 16th – English beans and peas came up in our garden. April 30th – 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 24th – the earth had a fine green face. June 30th – everything is wonderfully flourishing. July 10th – mowed some of my hay. July 20th – mowers exceeding scarce. September 29th – 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 28th – the fall was dry; no water at the mills, or grinding.⁷⁸

On 8 July 1747 in *England*, there was a great hailstorm in Gloucestershire and Somersetshire.⁹³

Winter of 1747 / 1748 A.D. In 1747, the winter was recorded as being intensely cold throughout *Europe*.¹

In December 1747, the barometer went down to 36 millimeters in less than two days. Strong winds from the south and southwest dominated Paris, *France* around the same month.⁷⁹

The winter of 1747 was very severe in *Russia*.^{2, 40, 41, 43}

On the morning of 13 January 1748, the Seine River in *France* began to ice up. On the 15th, the river was completely frozen. On 7 March, the ice drove home.⁶²

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.⁶²

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.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1747 on December 24th – the snow, though settled considerably, was a full three-feet (0.9 meters) deep. December 30th – this was a very unpleasant month. January, 1748 – a cold, snowy month. February – a cold, snowy, uncomfortable month. February 11th – 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 1st – comes in smiling; the rest of the month, generally cold and snowy. April 1st – comes in joyfully. April 8th – the snow is all gone, except in a few drifts. April 23 – the earth looks beautifully green. May 15th – unusually hot, dry weather. May 20th – it was about seven weeks since there were 5½ feet (1.7 meters) of snow on the ground.⁷⁸

1748 A.D. 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, *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.⁶²

In *England* in 1748, there was an extended famine.^{57, 90, 91}

On 12 June 1748 in *England*, there was a great hailstorm in Berkshire and Surrey.⁹³

On 23 August 1748 in *Wales*, there was a great hailstorm in Glamorganshire.⁹³

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 31st – melancholy time; all the talk is about the heat and drought—never the like [seen before]. June 2nd – exceeding raw and cold. June 14th – an epidemic cold prevails. June 20th – dry time comes on again: there were [light] showers frequently, but no rain in the country this year. July 4th – fine showers. July 10th – dying hot. It was a most melancholy dry time; the grass in the pastures was all burnt up. July 19th – a steady rain. July 31st = 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 31st – dry, dry, very dry, and very hot. September 6th – reviving rains. September 24th – a white frost. September 29th – wonderful, hot summer day; the grass grows as fast as ever I saw it. October 2nd – we dug our potatoes; no appearance of moisture in the ground.⁷⁸

Winter of 1748 / 1749 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1748 on October 10th – the ground froze hard this morning. November 22nd – a moderate fall day. December – generally pleasant. December 30th – severe snowstorm. December 31st – cold, and the year ends stingingly. In 1749 on January 3rd – a very cold month. The river froze over on the 3rd day, and was still frozen on the 19th. February – a cold month. March 11th – an uncommon springlike day, but most of March was very cold. March 30th – snow gone.⁷⁸

1749 A.D. This winter was severe in *Switzerland* and in Friesland (*the Netherlands*). In *France*, the weather remained nearly constant fairly mild.⁶²

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.⁶²

The summer of 1749 brought temperatures in the range of 98.6° to 100.4° F (37° to 38° C) to Languedoc, *France*.⁷⁹

On 15 May 1749 in *England*, there was a great hailstorm in Derbyshire and Worcestershire.⁹³

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 8th – the ground is fit for plowing. April 21st – planted potatoes. May 31st – a melancholy dry time. June 9th – the same. June 24th – the grasshoppers cause more spoilage than the drought. June 29th – they have eaten up entirely an acre of potatoes. July 3rd – 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 13th – as many grasshoppers as ever, but they are a new growth. July 24th – 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 14th – our potatoes turn out universally small.⁷⁸

Winter of 1749 / 1750 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1749 on October 18th – snow. November 22nd – cold day. November 25th – severely and unusually cold. November 29th – 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 11th – warm, calm and pleasant for this time of the year. March 18th – raw [cold]. March 23rd – snow. March 28th – more snow.⁷⁸

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 30th of May, snow lay on the ground.¹

1750 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: March 30th – pleasant. April – some cold and some pleasant weather. May 31st – a wet and cold month, and yet there are millions of little grasshoppers not killed [by the cold]. June 30th – 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.⁷⁸

In 17 March 1750, the Meuse River overflowed its banks from the melting of heavy snow from the winter. In *Austria*, *Bohemia* and *Hungary*, the winter was severe. In *France*, the cold was neither sustained nor severe.⁶²

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.⁶²

On 11 July 1750 in *England*, there was a hailstorm in Middlesex and Surrey.⁹³

Gloucester, *England* damaged by a violent rain on September 2, 1750.⁴¹

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].⁷¹

In the year 1751 Paris, *France* received 24.7 inches (627 millimeters) of annual rainfall instead of average 20.9 inches (530 millimeters).⁷⁹

The maximum temperature during the summer in Cap [Cape Town, *South Africa*], was 110.8° F (43.8° C) on 23 February.⁶²

On 7 March 1751, there was a terrible storm in Nantz (Nantes, *France*), which destroyed 66 square-rigged vessels, and 800 seamen perished. On 8 December, a still more destructive storm occurred at Cadiz, Spain in which 100 vessels were lost, and three thousand sailors perished.¹

The drought of 1751 was intense in southern *France*.⁷⁹

There was a storm at Nantz, *France*, where 66 vessels and 800 sailors were lost on March 7th.^{40, 41, 43, 56}

On 20 May 1751 in *England*, there was a hailstorm in Yorkshire.⁹³

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: January 6th – no snow on the ground. January 7th – snowstorm. January 12th – thaw. January 15th – the frost is entirely out of the ground. January 21st – weather like found in May. January 24th – 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 28th – pleasant weather still. Thus winter ends, a wonder through the whole. March 5th – snowstorm. March 13th – fine spring weather the rest of the month, except the four last days. April – a cold blustery month. May 8th – our English cherries did but today begin to bloom. May 17th – they are now in all their gaiety of blooming. May 23rd – growing season. May 30th – never did things grow faster, nor never a better prospect. June 5th – very cold. June 15th – a wonderful time for grass, but the Indian corn wants heat. June 26th – seasonable weather. July 31st – the freshets [floods] have carried away many bridges, hay, etc. on Presumpscot River. Saccaribig bridge and the Presumpscot great dam broke. October 4th – we began to dig our potatoes. November 16th – moderate weather. November 24th – another wonder of a day, so calm, warm and delightful.⁷⁸

A hurricane struck *Jamaica* on August 10, 1751, causing 300,000 pounds of damage.^{40, 41, 42, 43, 56}

There was a storm at Cadiz, *Spain*, where 100 ships lost on December 8th.^{40, 41, 43, 56}

Winter of 1751 / 1752 A.D. 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).⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1752 on January 1st – the harbor froze over this morning; the whole bay was shut up. January 12th – people, since the 1st, constantly passed over to Purpoodock [now Cape Elizabeth] on the ice. January 14th – 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 27th – 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.⁷⁸

1752 A.D. In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.¹

The maximum temperature during the summer in Aleppo, *Syria*, was 95.0° F (35.0° C).⁶²

On 29 July 1752 in *England*, there was a hailstorm in Gloucestershire and Somersetshire.⁹³

The rain was so violent in *Wales* that it destroyed 10,000 sheep on 19 September 1752.^{40, 41, 47, 56}

On 19 September 1752 in *Wales*, there was a great rainstorm; 10,000 sheep drowned.⁹²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 2nd – raw, cold; everything was backward. May 15th – the trees do but now begin to blossom. May 30th – raw, easterly weather, as it has been all the month. June 15th – there was a promising prospect of grass, and the Indian corn started wonderfully. July 9th – begun to mow the upper ground. August 12th – 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 21st – there has been more thunder and lightning, and it has done more harm this summer all over New England, than ever was known. August 31st – dry weather. September – dry, dry, dry; melancholy drought. September 30th – it rained and stormed in the night a great deal. October 9th – a storm of rain. October 30th – we wonderfully fail in our sauce by reason of the drought.⁷⁸

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.⁶²

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 31st – the spring surprisingly warm and forward. May 18th – the first pleasant day this spring. June – the season is uncommonly forward. August 26th – the grasshoppers have done much damage. October 24th – the frosts held off wonderfully.⁷⁸

On 24 May 1753 in *England*, there was a great hailstorm at Hoxton near London; windows broken and trees greatly damaged.⁹³

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.⁹³

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.⁹³

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.⁹³

On 24 June 1753 in *England*, there was a hailstorm in Middlesex.⁹³

On 11 July 1753 in Toul, *France*, the hailstones were 3 inches in diameter.⁹³

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.⁹³

In August 1753 in *France*, there was a violent hailstorm near Lyons; some of the stones weighing over a pound.⁹³

Charleston, South Carolina in the *United States*, was severely injured by a hurricane on September 15th, 1753.⁴²

In *Ireland*, there were great inundations through the country.^{47, 92}

In *Germany* and *Holland*, there was a great overflow of the Rhine River.^{47, 92}

This year was one of the hottest summers of the 18th 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.⁶²

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.¹¹

The *Baltic Sea* froze.³⁷

In 1754 in *Denmark* and *Poland*, the frost was very severe.⁹³

During the winter of 1753-54, the *Baltic Sea* was completely covered with ice.⁶⁸

The winter in *England* in 1754 was very severe.²

Frost in *England*.^{40, 41, 43}

During the winter in *England* in 1754, the frost was very severe; especially at Bath and in the southwest of *England*.^{47, 93}

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).⁶²

1754 A.D. In *England and Scotland*, there were great rainstorms in early spring.^{47, 92}

In *Germany and Holland*, there were serious floods.^{47, 92}

In 1754, there was an inundation in *Holland*.⁴³

On 14 June 1754 in *England*, there was a terrific hailstorm in Monmouthshire and Gloucestershire. 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.⁹³

On 15 June 1754 in *England*, there was a great hailstorm in Devonshire.⁹³

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.⁹³

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 1719.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January and February – generally moderate and pleasant. March 6th – the frost seems almost out of the ground. March 15th – cold, and froze hard. April 6th – this is the 13th day of fair, dry, and therefore pleasant weather. April 18th – this is the 25th day of pleasant weather. April 31st – cold, but dry. May 13th – cloudy and foggy; the grass grows surprisingly well. May 23rd – a remarkable hot day. July 1st – 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 1st – we have no potatoes growing this year, because of grasshoppers. September 22nd – there was a melancholy drought. October 24th – a great storm; the earth is filled with water. November 5th – 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 23rd – unusually moderate and pleasant all this fall. December 13th – since the second day of this month, the weather has been pleasant, and the ground bare. December 27th – no sledding yet.⁷⁸

Winter of 1754 / 1755 A.D. The cold on January 6th, 1755 lead to much ice on the Seine River; on the 8th the ice surrounding the Isle Louvier in Paris, *France* was firm. The ice held until the 20th of January. The

Seine River froze a second time beginning on the 26th but on the 29th it thawed again. On February 5th it froze again but on the 7th the river thawed for the third time. On January the 7th, the temperature on the Garonne River was (5° F, -15° C). The Garonne River was passable on foot.⁶²

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 17th 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.⁷⁹

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, <i>Switzerland</i>	(-13.0° F, -25.0° C).
Frankfurt, <i>Germany</i>	(-5.8° F, -21.0° C)
Paris, <i>France</i>	(3.9° F, -15.6° C) on 6 January
London, <i>England</i>	(10.9° F, -11.7° C)

In southern *France* there was a lot of snow, and a number of olive trees froze in Languedoc.⁶²

1755 A.D. In the north of *England*, there were floods.^{40, 41, 43}

Thunderstorms or rainstorms and an earthquake desolated Provence, *France* in 1755.⁷⁹

On 17 May 1755 in *England*, there was a hailstorm in Huntingdonshire and Staffordshire.⁹³

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.⁹³

On 29 September 1755 in *England*, there was a great hailstorm in Devonshire, and in Kent and Sussex.⁹³

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, *France* (97.3° F, 36.3° C) on 20 June
 Paris, *France* (94.5° F, 34.7° C) on 6 July
 Mulhouse, *France* (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.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January – several snowfalls, and some sledding. January 21st – the ground almost bare. January 22nd – moderate; it hardly freezes a night. January 25th – the ground bare. February 11th – no snow this month yet. February 20th – some sledding, having had two or three inches (5 or 8 centimeters) of snow. February 30th – fine walking, and very good sledding. March 20th – very good sledding. March 29th – it snowed all day. May 8th – we have done gardening. May 25th – the creatures were put on the Neck [peninsula]. June 14th – it rained abundantly. June 28th – very hot until the afternoon, when there arose a severe hurricane, with rain; Captain Bennett's frame [house] was blown down. July 18th – the Indian corn (by heat and alternate showers) grows finely. August 26th – no hot weather this summer (except eight days) until today. September 12th – a wonderful growing season. September 19th – there was a frost. October 6th – warm. October 14th – digging potatoes. October 26th – cold. December 6th – a true winter's day. December 15th – a fine summer's day.⁷⁸

1756 A.D. In *England* and *Europe*, there were great floods.^{47, 92}

On 10 May 1756 in *England*, there was a hailstorm in Staffordshire.⁹³

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.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January – moderate and pleasant month, generally. January 28th – 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 19th – rainy and warm, like May. April 12th – the robin visited us several springs past. May 11th – our heart cherry trees and pear plums are blossoming. May 19th – they are all in the bloom. Hot and rainy. June 2nd – things were never so forward; plenty of rain this month. June 27th – a hot Sabbath. July 12th to 15th – foggy. July 20th – a fine growing season. July 22nd – 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 30th – a wet summer this! August 10th – I never saw such grass, so tall and thick. August 26th – very hot. September 11th – extremely hot, but come on very cold. September 24th – the frost has killed the brakes and leaves of Indian corn. November 12th – fine weather.⁷⁸

A storm struck Martinico (*Dominican Republic*) on September 12, 1756 and did great damage.^{40, 41}

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 1757.⁶²

On the first of January 1757, drifting ice began to appear on the Seine River in *France*. On the 6th of January, the river was completely frozen. On the morning of the 9th, individuals traveled on the ice between Pont Neuf and Pont Royal in Paris, along with many other locations. On the 20th the ice conditions ended.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1756 on November 30th – it snowed very fast. December 7th – severe cold. December 10th – a thaw. December 23rd – a severe snowstorm. December 29th – fine warm weather for three days past. In 1757 on January 4th – cold. A fall of snow three-inches (8 centimeters). January 14th – it can't be better sledding. January 18th – the harbor frozen over. January 31st – it rained all last night. February 6th – 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 5th – the snow is five-feet (1.5 meters) deep in the woods. March 22nd – a severe snowstorm. March 26th – more snow. March 29th – pleasant and warm. April 3rd – more snow.⁷⁸

In Philadelphia, Pennsylvania in the *United States* the winter of 1756 was very mild; the first snowstorm occurred on 18 March.¹

1757 A.D. Hurricane at *Malta* on October 29, 1757.⁴³

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).⁶²

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).⁶²

The maximum summer temperatures this year were:⁶²

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.⁶²

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.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 12th – rain. April 15th – more rain. April 25th – rainy. May 10th and 11th – the spring is very backward. April 25th – raw, cold. June 1st – a very dry time producing a severe drought. June 19th – though there were two or three small showers, the drought awfully increases. June 28th – it rained most of last night and this morning. The grain and grass are much cut short [limited growth]. August 16th – we have refreshing rains, and it is now a growing season. August 30th – it was constantly hot, and became dry again. September 17th – a refreshing rain. October – much fine weather this month. October 31st – cloudy and cold.⁷⁸

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:⁶²

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 29th – 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 26th – horses and sleighs go everywhere over the snow, which is as high as the fences. April – a cold month. April 30th – a very cold spring thus far. May – generally raw and cold.⁷⁸

1758 A.D. On July 17, a storm damaged Williamsburg, Virginia in the *United States*.⁴¹

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.⁹³

On August 23, a violent storm struck the island of *Barbados*, in the Lesser Antilles.^{40, 41, 56}

In southern *France* during the year 1758, it was wet, cold and variable.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: May 31st - people everywhere planting. June – some pleasant days, but mostly raw and cold. July – little or really no hot weather this month. Very wet. August 19th – fine weather, but not hot. August 31st – very cold all this week. September 28th – 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.⁷⁸

Winter of 1758 / 1759 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1758 on December 25th – the harbor froze over to the Islands. In 1759 on January 20th – incomparable sleighing. January 31st – a severe cold winter thus far. February – some comfortable pleasant weather this month. March – same; but there were snowstorms the 22nd and 26th.⁷⁸

1759 A.D. 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:⁶²

Denainvilliers, <i>France</i>	(92.8° F, 33.8° C) on 9 and 24 July
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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

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.⁶²

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.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 4th – 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 11th – a warm day; the first this spring. May 16th – the cherry trees are blooming. May 19th – the grass is forward. May 24th – a delightful warm day. May 31st – cold weather. There has been but one warm, and one hot day, all this spring. June 5th – charming hot. June 7th – May storm. June 14th – raw, cool. June 25th – a happy growing season. July 2nd – a frost. July 18th – a deluge of rain. Cherries begin to be ripe. July 31st – 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 1st – abundance of pigeons. September 18th – gale of wind that blew down the apples, etc. September 26th – wonder of a hot day. September 30th – no frost yet. October 18th – no frost yet. October 22nd – charming day. October 30th – cold weather. November – generally moderate this month. December – snows and cold weather, but not more than common for the season.⁷⁸

1760 A.D. During the winter, the River Thames in *England* was frozen below Gravesend.¹

The winter in *Germany* in 1760 was very severe.^{2, 40, 41, 43, 47, 93}

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.¹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January and February – no weather unusual in winter months. March 13th – pleasant. March 17th – cold and windy. March 23rd – snow. March 30th – 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 27th – severe thunder and lightning. May 1st – the trees shoot out their leaves. The heart-cherry trees begin to blossom (earlier than last year, and then earlier than usual.) May 31st – no hot weather this spring. Indian corn looks poorly. June 26th – there has been but 24 hours of hot weather this year. July 12th – hot weather for a week past. August 12th – hot and peerless growing season. September 1st – multitudes of grasshoppers. September 16th – extremely hot. September 17th – extremely cold. November 8th – a gay morning and a warm day.⁷⁸

On 28 June 1760 in *England* there was a great hailstorm in Cambridgeshire.⁹³

On 20 July 1760 in *France* in the neighborhood of Auseli and Comminges, hailstones 5 inches in diameter fell. Men and cattle were killed.⁹³

On 20 July 1760 a hailstorm struck Comminges, *France* with 5-inch (13 centimeter) hailstones. Men and sheep were killed.²⁸

[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:⁶²

Beijing (Peking), <i>China</i>	(109.6° F, 43.1° C) on 5 June
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Mulhouse, *France* (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.⁶²

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.⁶²

Winter of 1760 / 1761 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1760 on November 14th – snow. November 19th – exceeding cold. November 23rd – moderate weather. December 7th – pretty cold. December 20th – much colder. December 26th – calm mornings all this week and moderate through the days. In 1761 on January 11th – the harbor froze over yesterday and today. January 26th – a fine level [not drifted] snow, and enough of it. February – wonder of a month. The snow went away on the 7th. March – unusually moderate weather this month.⁷⁸

1761 A.D. In *England*, there were great rain and floods.^{47, 92}

In *Ireland*, there were great floods; especially in Cork and Dublin.^{47, 92}

There were great rains and floods in *Southern Europe*.^{47, 92}

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.⁷⁹

On 21 June 1761 in *England*, there was a hailstorm in Surrey.⁹³

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.⁹³

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.⁹³

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.⁹³

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.⁹³

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:⁶²

Denainvilliers, *France* (92.8° F, 33.8° C) on 24 June and 8 September

Mulhouse, *France* (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.⁶²

A violent storm struck Charleston, South Carolina in the *United States* on May 4, 1761. The storm caused the loss of ships worth 20,000*l*.^{40, 41, 56}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 1st – the season is uncommonly forward, warm and pleasant. April 22nd – fine weather continually. April 30th – cold. June 25th – it is as melancholy dry a time as ever I saw. July 5th – as great a drought as in 1749. July 11th – gentle showers. July 17th – plenty of peas. July 20th – raspberries. August 1st – the drought awfully continues. August 12th – no feed on the Neck [peninsula] a great while. August 16th – the drought increases. August 19th – a great storm of rain. August 31st – marvellous growing time; surprising change on the face of the earth. September 25th – the earth has a most beautiful green face. October 6th – the grass is better set than in the spring.⁷⁸

Winter of 1761 / 1762 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1761 on December 31st – 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 11th the snow is so deep that it is impossible to pass from the windmill to the meetinghouse. February 28th – the snow at Portland began falling as early as the 3rd 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 4th – 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 12th – the robin and spring birds visited us. April 28th – the last of the huge mountain of snow behind the garrison disappeared.⁷⁸

1762 A.D. In *England*, a London newspaper of 29 January 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.”¹

In *England*, it snowed for 11 days in 1762.^{40, 41, 43, 56}

In *England*, there was a great flood in the Thames Valley, and other parts of *England*.^{47, 92}

On 22 February 1762 in *France* at Valenciennes, there was a great storm of hail, snow, and rain, accompanied with thunder. The lightning set fire to St. Gray's church.⁹³

In Lisbon, *Spain*, there was great destruction from a flood.⁴⁷

In *Spain*, floods caused 3,000,000 livres damage at Bilboa, in April 1762.^{40, 41, 43}

On 28 April 1762 in *England*, there was a hailstorm in Middlesex.⁹³

In *France* in May, floods caused great damage.^{40, 41, 43}

On 21 July 1762 in *England*, there was a hailstorm in Yorkshire.⁹³

In Dublin, *Ireland* on the 21st of October, there was a serious flood and much damage.^{47, 92}

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.⁶²

In 1762 in Burhanpoor (Burhanpur, *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.^{47, 92}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

June 5th – melancholy dry time. All are now looking for an absolute famine. June 23rd – a dark day. July 5th – [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 13th, 16th, 18th, and 21st, 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.⁷⁸

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.¹

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*.¹

The frost in *Britain* lasted 94 days.^{41, 43}

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.”^{47, 93}

In *Germany*, the frost seems to have set in sooner. On the 18th 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”.^{47, 93}

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.^{47, 93}

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).⁶²

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.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1762 on December 26th – the Fore River froze over. December 31st – winter sets in. In 1763 on January 12th – incomparable sledding. January 26th – the harbor froze over all this week. January 31st – the harbor broke up. February 4th – the harbor is frozen over. February 6th – our people generally spent yesterday shovelling snow to the meetinghouse and elsewhere. February 9th – 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 12th – the harbor is frozen over. February 26th – the harbor is frozen over. February 28th – 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 1st – 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 8th – 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 28th – it has been a cold, tedious winter. April 15th – there has been no rain this spring. The snow goes away kindly. April 12th – the robin and spring birds begin to tune up. April 30th – the roads and ground as dry as summer. May 1st to May 18th – fine weather. May 20th – cold, which prevents the cherry trees from blossoming. May 24th – the freshets [floods waters caused by spring thaw] are raised higher than ever known.⁷⁸

1763 A.D. In *England*, there were great rains and floods.⁹² “A remarkable year for floods and high waters.”⁴⁷

In *Ireland*, there were floods. “Above 200 persons perished on the River Nore.”^{47,92}

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.”⁴⁷

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.⁹³

On 1 March 1763 in *England* at Harrow, there was hail and rain, accompanied with lightning and thunder, doing great damage.⁹³

On 23 June 1763 in *England*, there was a great hailstorm in Essex.⁹³

On 26 June 1763 in *France*, a hailstorm struck in the province of Macconnois, 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.⁹³

On 15 July 1763 in *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.⁹³

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, Peshurst, Tudely, Capel, Pcombury, part of Hadlow, Yalding, Hunton, Brenchley, Mereworth, East and West Peckham, Wateringbury, Nettlested, 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.⁹³

In August 1763 in *Ireland*, there was a great hailstorm in Kinnegad.⁹³

In *Europe*, there were great floods.^{47, 92}

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, <i>Belgium</i>	(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.⁶²

There was an excessive drought in 1763 in southern *France*.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 27th – warm weather is much wanted. July 1st – there is no summer yet. July 14th – not a hot night this summer; indeed, no hot weather at all, but constantly wet. July 21st – cold northeast storm. There has not been for two months past, 48 hours of fair weather at one time. August 9th – the weather continues foggy and wet. August 26th – fair weather; a great favor and rarity. August 27th – 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 10th – a frost last night. September 18th – plenty of rain, after a fortnight of dry seasonable weather. September 28th – we began to dig our potatoes. November 10th – a long storm.⁷⁸

Winter of 1763 / 1764 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1763 on November 14th – very cold. November 18th – a great northeast snowstorm. November 26th – there was a week of moderate, pleasant weather. December 2nd – moderate weather. December 8th – raw. December 13th – pleasant. December 18th – blustering. In 1764 on January 11th – harbor froze over. January 26th – there fell just as much snow as was wanted and desired. Much business done this month.⁷⁸

1764 A.D. In *Ireland* in January, there were great floods in Dublin, Cork, and other parts.^{47, 92}

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.

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.²⁷

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1764 on December 17th – about 15 inches (38 centimeters) of snow upon the ground. December 27th – there is between 2 and 3 feet (61 and 91 centimeters) [of snow]. December 31st – 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 14th – pleasant. January 22nd – the heart of the winter seems broken; incomparable sledding. January 23rd – a charming day. January 26th – very cold. January 31st – a great storm. February 5th – tempestuous and cold. February 12th – the ice lies over the harbor still. February 14th – a thaw. February 18th – fine, warm weather. February 25th – there has been no snow all this month. March 2nd – winter returns upon us. March 13th – a charming day. March 22nd – raw; cold. March 24th – dismal snowstorm.⁷⁸

The winter in 1765 [in *Europe*] was moderate and in *Italy* of extraordinary gentleness.⁶²

1765 A.D. In *England* and *Europe*, there were general rainstorms and floods.^{47, 92}

In *Ireland*, there were great floods throughout the south.^{47, 92}

In *Ireland* in 1765, there was great scarcity. Distilling and exportation of corn [grain] prohibited by Act of Parliament.^{57, 91}

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.⁹³

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.⁹³

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.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 31st – hot and pleasant, though it has been raw and cold for some time past. April 9th – the robin this morning first made his appearance. April 10th – the spring bird, with the robin, gave us a serenade. April 11th – the wind blew fresh and cold. April 19th – warm. April 22nd – raw; cold. April 30th – the dry time continues and increases. May 1st – plentiful rain. May 12th – the spring is uncommonly forward. May 14th – the cherry [trees] blows

[blossom]. May 25th – cold for 9 days past. May 27th – an extremely hot day. May 29th – a growing season. June – a growing season. June 30th – 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 2nd – plentiful rains: the earth has a new [green] face. September 15th – very cold. September 24th – a delightful day.⁷⁸

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.^{47, 93}

At Lisbon, *Portugal*, Reaumur's thermometer was 3½° below freezing point (-4° C, 24° F).^{47, 93}

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.^{47, 93}

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.⁹³

Gibraltar nearly destroyed by a storm on February 3, 1766.^{40, 41}

In 1766, the frost was most terrible from 25 December to 16 January and from 18 to 22 January.⁹⁰

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.^{47, 57}

In *England* on February 14th and 15th, 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.^{47, 93}

The Seine River in *France* was entirely frozen over.³⁸

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.⁶²

In *France* on the 20th 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.⁴⁷

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.⁶²

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.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1765 on December 16th – snow. December 31st – last night was as cold as (perhaps) it ever was, in this country, and continues so. In 1766 on January 6th – the harbor remains shut up [due to the ice]. January 9th – fine weather. January 17th – severely cold. January 21st – rain. January 30th – incomparably pleasant. February 4th – fine sledding. February 9th – this is the 14th day since there has been any falling weather. February 19th – pleasant day. February 26th – fair and pleasant. February 28th – very cold. March 14th – a great northeast snowstorm as ever was known, perhaps greater.⁷⁸

In Philadelphia, Pennsylvania in the *United States* the winter of 1765 was intensely cold. On the 19th of February, a whole ox was roasted on the frozen Delaware River.¹

1766 A.D. On 10 July 1766 in *England*, there was a great hailstorm in Greenwich. The hailstones were very large.⁹³

On 13 July 1766 in *England*, there was a hailstorm in Yorkshire.⁹³

On 17 July 1766 in *England*, there was a hailstorm in Suffolk.⁹³

On 21 July 1766 in *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.⁹³

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.⁶²

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 13th, 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 22nd. 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 14th to the 17th produced a total of 21.3 inches (541 millimeters).⁷⁹

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*.⁷⁹

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.”⁵⁷

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April – generally pleasant. April 27th – the spring comes on finely. May 5th – a long spell of raw, cold weather. May 16th – our cherry trees begin to blossom. May 26th – the cherry trees are in full blow [bloom]. May 31st – the spring it uncommonly forward, the Indian corn, in many places, has come up. June 14th – an uncommon growing season. July 30th – 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 18th – such a growing season through the whole summer never was known. September 1st – cabbages are beginning to head. September 10th – Michaelmas storms. September 30th – 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 31st – a surprising warm summer's day. November 1st and 2nd – two more similar days. November 9th and 13th – cold. November 14th – moderate again.⁷⁸

Winter of 1766 / 1767 A.D. The Seine River in *France* was entirely frozen over.³⁸

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.^{47, 93}

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.⁴⁷

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].^{47, 93}

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.⁴⁷

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.”^{47, 57}

In 1767, there was a severe frost [in *Great Britain*].¹²⁸

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).⁶²

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.⁶²

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.⁹³

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1766 on November 17th – a great snowstorm. November 29th – geese and chickens plentiful at 2s. a pound; turkeys 2s. 6d. Cold weather. December 5th – butter 5s. a pound. A moderate month for December. In 1767 on January 6th – a deluge of rain carried away most of the snow. January 11th – snow. January 13th – more rain. The last snow entirely carried away. January 17th – more snow. January 21st – the roads are all ice again. January 26th – more snow. January 30th – incomparable sledding. February – a cold month.⁷⁸

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.⁴⁷

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."⁴⁷

In *Wales*, "No man living ever saw such floods."⁴⁷

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.⁴⁷

In *Ireland*, the waters of the River Liffey overflowed, doing great damage.⁴⁷

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*.¹²⁸

In *France* on the 8th 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.⁵⁷

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*, causing great destruction in its progress. There were 19 villages being more or less destroyed.⁹³

In August 1767, a great Atlantic hurricane struck the island of *Martinique* causing approximately 1,600 deaths.¹⁰⁷

On 1 September 1767 in Genoa, *Italy*, there was great damage done to the city by hail and lightning.⁹³

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.⁷⁹

In 1767, a powerful cyclone struck Backerganj (Barisal), *Bangladesh* causing 30,000 deaths.⁹⁸

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

February 28th – warm and pleasant. March 3rd – a great rain. March 4th – storm. March 12th – cold. March 17th – charming day; good walking. March 24th – rainy. March 30th – we had smelts [fish] today; two coppers a dozen. March 31st – charming spring-like weather. April 6th – the robins came and began to sing. May 12th – strangely cold. May 15th – the heat breaks in upon us. May 22nd – the heart cherries are in the blow [bloom]. May 27th – cold. June 5th – 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 11th – a growing season, but poor prospect of grass. June 16th – cold. June 21st – extremely hot; shower in the evening. June 27th – no rain since June 21st. June 30th – showers. July 20th – people are concerned about the drought. July 23rd – great showers. July 31st – deluge of rain. [There appears that a tornado swept through Falmouth on the 31st 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 18th – the grass grows more than in the spring. August 23rd – extremely hot. August 26th and 28th – extremely hot. September 28th – we began to dig our potatoes; moderate fall.⁷⁸

The maximum temperature during the summer in Manila, *Philippines*, was 113.5° F (45.3° C) on 20 June.⁶²

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*.^{47, 93}

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.”^{47, 93}

In Selborne, *England*, in 1768, the year began with a fortnight's [14 days] frost and snow. On the 3rd 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 4th, it measured 18° F (-7.8° C). On the 7th, 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.⁷⁰

In 1768 in *Scotland* there was a very severe frost.^{47, 93}

The frost began on 21 December 1767. By the 23rd, the cold 19° F (-7.5° C) drove the Seine River in *France* to ice. The ice held on until 13 January 1768.⁶²

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.⁷⁹

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)
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.⁶²

On 5 January 1768, 30, 50 and 55 foot deep wells in Paris, *France* froze.⁸⁰

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1767 on October 13th – cold weather. October 28th – snowstorm. October 30th – charming pleasant since the storm. December 14th – snow. December 19th – snow. December 21st – exceeding cold; the thermometer down to 0° F (-18° C). In 1768 on January 20th – we rode to Windham and round Gorham in sleighs. February 1st – there was a great body of snow on the ground. February 10th – 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 27th – 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 20th – a terrible snowstorm. April 1st – a great snowstorm. April 9th – it continues cold and windy.⁷⁸

1768 A.D. On 9 May 1768 in *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."⁹³

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." ⁹³

On 6 June 1768 in *England*, there was a hailstorm in Hertfordshire and Kent. ⁹³

On 7 June 1768 in *England*, there was a hailstorm in Middlesex and Surrey. ⁹³

On 8 June 1768 in *England*, there was a hailstorm in Wiltshire. ⁹³

On 21 June 1768 in *England*, there was a great hailstorm in Devonshire and Yorkshire. ⁹³

On 9 July 1768 in *England*, there was a hailstorm in Northumberland. ⁹³

On 14 July 1768 in *England*, there was a hailstorm in Norfolk. ⁹³

On 18 July 1768 in *England*, there was a hailstorm in Kent. ⁹³

On 19 July 1768 in *England*, there was a hailstorm in Somersetshire. ⁹³

On 23 July 1768 in *England*, there was a hailstorm in Gloucestershire. ⁹³

On 30 July 1768 in *England*, there was a hailstorm in Norfolk, Suffolk, and Worcestershire. ⁹³

In July in *Scotland*, there was a great hailstorm in Selkirk. Cattle and crops were severely damaged; some persons injured. ⁹³

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. ⁹³

In *India*, there were heavy floods in Behar and the district Bengal, (*Bangladesh*) in August. ⁴⁷

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 21st – a backward spring. April 29th – thermometer rose to 64° F (18° C) then sunk to 47° F (8° C). May 13th – cold still, and the spring unusually backward. May 20th – the thermometer up to 72° F (22° C). May 21st – now 76° F (24° C), but in the afternoon it dropped 20 degrees. The cherry and damson [plum] trees begin to blow [blossom]. May 28th – the face of the earth is renewed and beautifully green. June 1st to 12th – frequent showers. June 14th – a great storm, as ever we knew; wind S.S. E. that did a great deal of damage. June 20th – warm; here we may reckon summer begins. July 16th – it rains almost every day. July 22nd – a happy season for Indian corn. July 25th – very hot. July 26th – the cherries are a good deal colored. July 31st – hot weather continues. September 16th – seasonable weather all the week. September 29th – a great frost last night spoiled the unripe corn. November 6th – pleasant. November 20th – a great rainstorm. ⁷⁸

In Havannah (Havana, *Cuba*) on the 25th of October, there was a dreadful hurricane; 4,048 houses and many public edifices destroyed. About 1,000 inhabitants perished. ^{57, 90}

Winter of 1768 / 1769 A.D. In *England* in April 1769, there was a severe frost. ^{47, 93}

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.” ⁵⁷

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.⁷⁰

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1768 on November 27th – snow. November 30th – it has been an uncommon cold, cloudy, rainy fall, as well as summer. December 31st – the snow is all gone and the ground bare. January 1769 – very moderate weather most of the month. February – cold weather came on. February 17th – the harbor and whole bay frozen up. February 18th – warm, like summer. February 21st – still warmer. February 28th – here the weather changes to winter again. March 31st – a spell of true winter weather.⁷⁸

1769 A.D. – 1770 A.D. Bangladesh and India.

During the famine of 1769-70, it is estimated that a fully 15,000,000 souls, a full third of the population of Bengal [*Bangladesh*], perished. Like all the famines, it resulted from a failure of rain, supplemented by bad administration by the East India Company.⁸⁴

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.⁵⁴

In 1770 in Bengal [*Bangladesh*], the area was devastated by famine; “one-third of the population reported as perished.”⁹¹

The maximum temperature during the summer in Puducherry, *India* was 109.0° F (42.8° C) in June.⁶²

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.⁵⁷

In *India* (Hindustan) during 1769-70, “Alarming want of rain was also reported throughout all the upper parts of Bengal [*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 [*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].⁵⁷

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.⁹³

On 16 July 1769 in *England*, there was a hailstorm at the Isle of Ely. 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.⁹³

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.⁵⁶

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.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 15th – we set out our cabbage stumps. April 20th – very cold spring so far. April 29th – very dry and very cold weather. May – generally cold and rainy. June – generally cold. June 25th – fine hot weather. June 29th – cold again. July 5th – raw; cold. July 14th – very dry. July 22nd – 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 8th – dreadful northeast storm. September 12th – cold nights but pleasant days. September 16th – an extraordinary week of warm days. September 26th – delightful weather. September 29th – charming weather every day. October 12th – a deluge of water. October 17th – another cold day. October 27th to 31st – pleasant weather. November 7th – we had a cold fall.⁷⁸

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.

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 14th and 15th, all the snow melted and to the end of February mild hazy weather prevailed. March was frosty and bright.⁷⁰

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1769 on November 16th – very cold. November 29th – last night the thermometer was down to 12° F (-11° C). December 2nd – more moderate. December 8th – severe cold. December 13th – thermometer at 3 o'clock down to 3° F (-16.1° C). December 23rd – at 4° F (-15.6° C). December 31st – at 2° F (-16.7° C), but fair weather and good walking. In 1770 on January 5th – thermometer -2° F (-19° C). January 7th – storm of rain; thermometer 47° F (8° C). January 18th – thermometer -3° F (-19° C). January 23rd – the harbor remained shut up [due to the ice]. January 24th – John went over the Ferry in a sleigh, and back in six minutes. January 25th – colder still. The Dutch sleigh went over the Ferry four times and returned in thirty minutes. January 28th – a warm day. February 1st – thermometer -3° F (-19° C). February 15th – thaw. February 23rd – snowed all last night. February 27th – thermometer -3° F (-19° C). We had a closed [overcast] winter, as cold perhaps as ever was. March 9th – delightful fair morning. March 14th – very cold, and good sledding. March 18th – the last sleighing. March 31st – snow gone. Not much windy weather the month past.⁷⁸

1770 A.D. In *India*, there were heavy floods in the Eastern Provinces, Bengal, (*Bangladesh*) by which much of the benefit, which would have followed a two years' drought, was diverted.⁴⁷

In *Holland* in 1770-71, "there were terrible floods, combined with an infectious disease rife among the cattle." ^{47, 92}

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 20th 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.⁶²

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.⁷⁹

At Coventry, *England*, 70 persons drowned, and much damage done from floods, as well as in Cambridgeshire, Gloucestershire, etc. in November.^{41, 43}

In *Bohemia* in 1770, there was a famine and pestilence said to have killed 168,000 people.^{57, 91}

In *Russia* and *Poland* in 1770, famine and pestilence killed some 20,000 people.^{57, 91}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:
 April 8th – pleasant. April 19th – windy and cold. April 28th – very hot; thermometer up to 23° F (-5° C). May 5th – thermometer 74° F (23° C). May 16th – English cherries began to blow [blossom]. May 25th – rainy. May 29th – showery; the spring was unusually forward. June – some raw cold days. June 25th – hot growing season. June 29th – thermometer 90° F (32° C). July 11th – hot, dry weather since the 25th of June; after which, there were frequent rains. September 8th – dry again. September 14th – a deluge of rain. September 20th – Indian corn was thought to be out of danger. October 1st – a delightful day. October 3rd – stormy and cold. October 11th – a deluge of rain. October 20th – an exceeding great northeast storm. October 29th – pleasant; most of the month has been raw, cold, rainy and stormy. November – generally moderate and pleasant till the 27th.⁷⁸

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.

Winter of 1770 / 1771 A.D. In *England*, “Dreadful springs.” Frost and snow.^{47, 93}

On 11 January 1771, the River Thames froze at Fulham, *England*.¹²⁸

On 2 February 1771, there was a storm at Whitehaven, *England*, which undermined and destroyed nearly one half of the fort.¹²⁸

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.¹²⁸

In Selborne, *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.⁷⁰

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, *England* (6.0° F, -14.4° C) on 12 February

Paris, *France* (7.7° F, -13.5° C) on 13 February
 Denainvilliers, *France* (8.4° F, -13.1° C) on 13 February
 Brussels, *Belgium* (9.0° F, -12.8° C) on 13 January

In *Italy*, there was very abundant snow.⁶⁴

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1770 on November 18th – an exceedingly great northeast snowstorm, with a vast abundance of rain and very high tides. November 20th – 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 13th – the frost seemed to be getting out of the ground. January 17th – a vast deal of rain. January 31st – it began to snow; thus far an unusually moderate winter; but February has paid us off. February 21st – thermometer down to 0° F (-18° C). February 27th – 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.⁷⁸

1771 A.D. The inundation in the north of *England* (Northumberland) causing the Newcastle Bridge to be carried away.^{40, 43, 47}

The maximum temperature during the summer in Lyon, *France* was 94.3° F (34.6° C).⁶²

During the summer of 1771 Provence, *France*, felt very strong heat, due to the absence of breezes.⁷⁹

The year 1771 was among the dry years in southern *France*.⁷⁹

The years 1771 produced excessive rainfall and heat in southern *France*.⁷⁹

In *Italy* in 1771, failure of the harvest produced a famine.^{57, 91}

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.¹²⁸

On 1 August 1771, there was incredible damage done in the neighborhood of Hamburg [Hamburg, *Germany*] by an inundation.¹²⁸

In Bengal [*Bengladesh*] in 1771 there was a devastating famine.⁹⁰

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 6th – the spring was thought to be very forward. May 20th – the heart cherry trees were all in blossom. June 17th – unusual cold days hitherto. June 30th – a remarkable growing season for everything but Indian corn, which was exceeding backward. July 4th – thermometer up to 84° F (29° C). July 11th – cool day. July 18th – cool still. July 30th – very hot. August 14th – people admired the seasonableness of the weather through the summer, and the universal fruitfulness. October 19th – a delightful summer day. October 20 and 23 – the same.⁷⁸

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. 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).⁶²

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.⁷⁰

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.¹²⁸

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.^{12, 65}

December 6th, 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 Charlstown to fetch me. The snow is up to the peoples wast in some places in the street.”

December 24th – “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 13th, 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 21st – “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 22nd – “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 25th – “This is a very stormy day of snow, hail & rain.”

February 27th – “This day being too stormy for me to go to any school.”

March 4th – “We had the greatest fall of snow yesterday we have had this winter.”

March 6th – “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 9th – “This has been a very snowy day today.”

March 11th – “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 continued 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 14th – “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 shining 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 17th – “While I was out, a snow storm overtook me.”

March 21st – “Yesterday, we had by far the greatest 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 1st – “The snow is near gone in the streets before us, & mud supplies the place thereof.”

April 3rd – “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 24th – the thermometer was -4° F (-20° C). In 1772 on January 17th – peerless sledding. January 31st – though it has snowed very often this month, there has been no deep snows. February 12th – thermometer at 0° F (-18° C), and in the evening, -4° F (-20° C). February 13th – thermometer at -16° F (-27° C). February 14th and 15th – thermometer at -8° F (-22° C). February 16th – a moderate day. February 20th – a deluge of rain. February 25th – easterly storm. February 28th – 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 29th – 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 11th – we lived upon [a killed] moose several days. March 15th – (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 29th – (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 1st and 2nd – very hot. May 12th – frosts and ice.⁷⁸

In Philadelphia, Pennsylvania in the *United States* during the winter of 1772, the Delaware River was covered with ice for three months.¹

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.¹²⁸

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.⁹³

A hailstorm struck Girgenti (Agrigento), *Italy* on April 18th; the hailstones weighed twenty ounces.^{41, 43}

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 cannon, but fresh lightning issued from it and killed several of the gunners."⁹³

In Leeds, (Yorkshire) *England* on the 20th of June, there were hailstones as large as nutmegs.^{40, 41, 43, 57}

On 20 June 1772 in *England*, there was a hailstorm in Northumberland and Yorkshire. "Hailstones as large as nutmegs" at Leeds.⁹³

On 16 July 1772 in *Cuba*, there was a hailstorm at St. Jago. The "hailstones as large as oranges."⁹³

In St. Jago, *Cuba* on the 16th of July, there were hailstones as large as oranges. The hailstorm did great damage.^{40, 41, 43, 56, 57}

On 17 July 1772 in *France*, there was a hailstorm at Belford. 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, and 29 neighboring villages of Lorraine; extending also into the principality of Nassau (Rhine).⁹³

On 18 July 1772 in *Saxony*, there was a violent hailstorm in district of Zittau (Upper Lusatia), 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.⁹³

In July in *Holland*, there was a hailstorm at Brome, in the district of the Zell. 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."⁹³

The town of St. Johns in *Antigua* was destroyed by a storm, August 17 and 31, 1772.^{40, 56}

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*.¹²⁸ [A devastating hurricane struck St. Kitts on 31 August 1772. Another followed three days later.]

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.¹²⁸

A terrible storm struck *St. Kitts* and did immense damage in that island and the adjoining islands on August 30.^{40, 41}

On 7 September 1772, there was a terrible flood at Inveraray in *Scotland*, which carried away trees of vast magnitude, and all the Duke of Argyle's cascades, bulwarks, and bridges at his seat there.¹²⁸

On 25 September 1772, there was great damage done on the Thames, and in and near London, *England*, by a storm of wind.¹²⁸

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.⁶²

During the summer of 1772 Provence, *France*, felt very strong heat, due to the absence of breezes.⁷⁹

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.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

May 20th – growing time, the plum and cherry trees are blooming. May 25 to 30th – raw, cold and rainy. May 31st – a summer day. June – several cold days, yet a growing season. July 28th – extremely hot. The thermometer at the highest. July 29th – there was a prodigious tempest, with thunder and lightning in all the neighboring towns. August 12th – the grass uncommonly well grown and good. August 26th – a deluge of rain. August 30th – hot weather, and a growing time as ever was. September 30th – it has been a remarkable fruitful summer. October 8th – there is a famine of bread in town, no Indian and no flour; no pork in town or country. October 30th – 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.⁷⁸

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:⁶²

Paris, <i>France</i>	(12.9° F, -10.6° C) on 5 February
Denainvilliers, <i>France</i>	(15.6° F, -9.1° C)

Brussels, *Belgium*

(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.⁷⁰

On 4 February 1773, in that neighborhood [Flintshire, *Wales?*], there was a fall of snow that was so great that it buried cottages, men and cattle, and some have perished.¹²⁸

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 1st – very moderate. March 14th – pretty cold.⁷⁸

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 10th of March.¹

1773 A.D. In *England* on the 22nd 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.⁵⁷

In *England* on the 26th 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.⁵⁷

In February 1773, a famine prevailed in *Moravia* and *Bohemia*.¹²⁸

A storm struck *France* and *England* in March 1773.^{40, 41}

In *Ireland*, there were great mountain torrents of water.^{47, 92}

In Calcutta, *India*, there was great destruction from rain and floods.^{40, 41, 43, 47}

In *Cuba*, there was a terrible storm in July 1773.^{40, 41, 56}

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.¹²⁸

In Boston, Massachusetts in the *United States* in August, there was a most terrible storm.^{40, 41, 56}

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.¹²⁸

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.¹²⁸

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as: March 31st – 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 3rd – raw; cold. April 8th – spring-like weather. April 15th – raw; cold. April 21st – some warm days. April 25th – rainy. April 30th – raw, cold easterly weather. May 1st – the spring is thought to be a month forwarder than usual. May 10th – wonderful hot summer weather. May 12th – the heart

cherry and pear trees in blow [blossom], and the common cherry and plum trees are just upon it. May 22nd to 26th – rainy. June 3rd – a hot day. June 7th – cooler. June 11th – cold. June 15th – strawberries plentiful. June 23rd – wonderful weather. June 28th – extremely hot, thermometer at 92° F (33° C). July 7th – a melancholy dry time. July 8th – the thermometer was up to 100° F (38° C). July 12th – a smart thundershower. July 20th – a great rain. September 9th – Damsons [plums] begin to be ripe. September 12th – very cold. September 18th – very hot. September 27th – the wells fail [the wells went dry]. September 28th – extremely hot. September 29th – a storm of rain. September 30th – there has been no frost to do any damage. October 31st – this month has been a wonderful moderate, pleasant season. December 10th – a storm of rain. December 11th – surprising pleasant day.⁷⁸

In Venice, *Italy*, a flood caused a village to be carried away.⁴⁷

In Naples, *Italy*, there was great damage from the sea.⁴⁷

At Venice and at Naples, *Italy* on the 10th of November an inundation carried away a whole village and drowned 200 of the inhabitants.^{40, 41, 43, 56}

On 10 November 1773, there was an inundation at Venice and Naples, *Italy*. Many lives were lost.¹²⁸

A storm struck Oxford, *England* on November 15.^{40, 41}

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.⁶²

During the summer of 1773 Provence, *France*, felt very strong heat, due to the absence of breezes.⁷⁹

The years 1773 produced excessive rainfall and heat in southern *France*.⁷⁹

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 1774.⁷⁰

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1773 on December 19th – it snowed all last night and most of today. In 1774 on January 10th – the thermometer in the study was down to 0° F (-18° C), and in the wood house, -8° F (-22° C). January 11th – it was 6° F colder. January 22nd – the thermometer was down to the bottom of the plate. January 31st – more moderate. February 11th – moderate. February 14th – the snow is about a foot (0.3 meters) deep in the woods.⁷⁸

1774 A.D. In *England*, there were great floods at Battersea and Chelsea on March 9, 1774.^{40, 41, 43, 47}

The high temperatures observed during the summer were:⁶²

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.¹²⁸

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.¹²⁸

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."⁹³

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.⁹³

On 3 August 1774 in *France*, a hailstorm at Alençon 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.⁹³

On 3 August 1774, it was reported that there was a hailstorm at Alençon, *France*. The hailstones measured eighteen inches round.¹²⁸

In Alençon, *France* on the 3rd of August, there was a hailstorm; stones measured 18 inches round.^{40, 41, 43, 56, 57}

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.⁷⁹

In *England*, there were great storms at London on September 30 and on December 5th-7th, which did great damage to the shipping.^{40, 41, 56}

On 28 September 1774, it was reported that a great part of the Russian fleet was destroyed by a storm in the *Mediterranean Sea*.¹²⁸

On 25 November 1774, in a storm more than forty ships were driven on shore between Yarmouth and Leith in *England*.¹²⁸

On 5-7 December 1774, there was a storm at London, *England*, which did considerable damage to the shipping in the River Thames.¹²⁸

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 31st – this month has been very moderate. The robins came and tuned up. April 8th – it has not frozen in the house since the beginning of February. April 13th – the spring is very forward; we began to dig our garden. April 21st – a surprising hot summer day. April 29th – rainstorm. May – a raw cold month; the spring backward. May 31st – a hot day. June 6th – cold. June 10th – summer breaks in upon us. June 17th – set out cabbage plants July 10th – not a cherry or plum this year. July 12th – a memorable growing season. July 20th – we have had an abundance of peas. July 29th – very hot; a fine hay season. August 11th – a melancholy dry time. August 29th – the flies are vastly troublesome. September 1st – very hot and dry. September 16th – it is an exceeding dry time. September 29th – cold. September 30th – very hot. October 10th – everyday is unusually warm and constantly dry. October 14th – thundershower, with a deluge of rain. October 23rd – warm. November 3rd – it was almost as dry as before. November 5th – it rained plentifully. November 11th – a calm and pleasant day. November 16th – a deluge of rain fell. November 20th – very cold. November 22nd – snowstorm. November 25th – rainstorm. November 28th – warm and pleasant. December 8th – there is no frost in the ground. December 14th – cold. December 19th – rain all day, and at night a prodigious tempest; the rest of the month, snow and cold.⁷⁸

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).⁶²

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.⁷⁰

1775 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

January 2nd – there is a great scarcity of corn in this part of the country. January 6th – very cold days. January 23rd – very moderate weather. January 27th – a summer's day. January 28th – wonderful, moderate. February 7th – there has been no snow, and but little rain since the 29th of December; wonderful weather; we saw two robins. February 11th – warm day. February 18th – cold. February 20th – snow, incomparable sledding. February 21st – a summer's day. February 23rd – a great snowstorm. March 7th – the frost seems out of the ground in the street. March 15th – we have wonderful moderate weather. March 28th – it has been a wonder of a winter, so moderate and unfreezing. April 4th – cold days. April 5th – a very stormy, snowy day. April 12th – cold northeast storm. May 6th – the spring has to this time been cold, wet and backward, except the grass. May 19th – hot summer's day. May 31st – the cherry and plum trees are out of, and the apples in the midst of blossoms. June 7th – a hot and dry season. June 16th – there was a small frost. June 22nd – cold for several days. June 29th – a great rainstorm. July 2nd – the face of the earth is renewed, but no grass on the Neck [peninsula]. July 11th – it rained plentifully. July 12th – an extreme hot day. July 21st – a fine shower. August 12th – we had plentiful rains. August 20th – a wonderful year for fruit of all sorts. August 29th – it rained abundantly.⁷⁸

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.¹²⁸

On 3 February 1775 there was incredible damage done by floods in *Germany* and *Hungary*.¹²⁸

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.⁹³

On 13 May 1775 in *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.⁹³

On 3 June 1775 in *England*, there was a great hailstorm in Buckinghamshire.⁹³

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.⁶²

In 1775, a real scarcity of corn [grain] prevailed in *France*.¹²⁸

In July 1775 a famine at the *Cape de Verde Islands* carried off over 16,000 people.¹²⁸

At Cape de Verde [*Cape Verde Island*] in 1775, there was a great famine – 16,000 people perished.^{57, 90, 91}

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.⁷⁹

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.⁴⁹

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.¹

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.¹²⁸

During 9-12 September 1775, a great Atlantic hurricane struck the Newfoundland Banks in *Canada* causing approximately 4,000 deaths.¹⁰⁷

On 20 September 1775 in *England*, there was a hailstorm in Oxfordshire and Wiltshire, which caused much damage by hail and lightning.⁹³

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.”⁴⁷

In *England* on the 29th of October, there was an awful storm in the north of *England*; many vessels destroyed; four Dublin packets lost.^{57, 90} (Other references gives the date as 19 October.^{40, 41})

In *England* on the South coast a storm struck in November 1775.^{40, 41}

In Rotterdam, *Holland*, the Meuse River overflowed, doing considerable damage.^{47, 92}

On 11 November 1775, there was a dreadful storm and inundation in *Holland*.¹²⁸

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.⁷⁰

On 7 January 1776, there was a fall of snow, the greatest ever remembered in this country [*Great Britain*].¹²⁸

In England on 14 January 1776 after a week of frost, sleet and snow, which after the 12th 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 14th 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 18th passed over, leaving the company in very uncomfortable circumstances, at the Castle and other inns.”⁷⁰

On the 21st 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 22nd 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.”⁷⁰

The worst had not yet, however been reached. On the 27th 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 31st, 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.”⁷⁰

The snow in *England* was remarkably deep in 1776.⁴⁰

The winter of 1776 was recorded as being intensely cold throughout *Europe*.¹

In the year 1776, the Danube River was frozen in excess of five feet (1.5 meters) thick below Vienna, *Austria*.³⁰

In 1776, the Seine River in *France* was entirely frozen over.³⁸

In 1776 in Paris, *France*, there were 25 days of frost.^{58, 80}

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 20th and 21st of January. The river froze during night of the 24th and 25th. 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.⁷⁹

In Lyon, *France*, the cold of 1776 surpassed that of 1709. The frosts lasted 17 days. It began on January 16th. Between the 16th and the 27th, the thermometer varied between 16.3° and 18.5° F (-7.5° and -8.7° C). Then on the 31st 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.⁷⁹

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 16th, 17th, 18th, 19th and 25th of January. The coldest temperature observed was 20.8° F (-6.2° C) on January 19th.⁷⁹

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 18th. At Perpignan the temperature fell to 30.9° F (-0.6° C) on January 18th. 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.⁷⁹

In the winter of 1776, many bells in Paris, *France* cracked when they were rung rigorously [cold induced metal brittleness].⁵⁸

In 1776, the vines and fruit trees in *France* were killed [by the extreme cold].^{58, 80}

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.^{58, 80}

On 19 January 1776, the Seine River in *France* experienced drift ice; on the 25th the river was frozen beyond the bridges (in Paris); on the 29th 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 31st. The thaw came on February 2nd, and the ice held on until the 6th. 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.⁶²

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.⁶²

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).⁸⁰

The lowest temperature observed during the winter in different cities is as follows:⁶²

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, *France* (23.0° F, -5.0° C)
 Saint-Jean-de-Luz, *France* (30.1° F, -0.6° C)
 Perpignan, *France* (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.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1775 on September 30th – a great frost. October 11th – very hot. October 21st – 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 24th – severely cold. In 1776 on January 29th – 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 29th – the past winter has been the coldest, in the whole, that has been known. The ground has been constantly covered with snow. March 19th – it seems as if the summer was breaking upon us. April 22nd – it was a very cold, wet and backward spring. May 8th – the ground was frozen for the past three nights.⁷⁸

1776 A.D. In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.¹

In Kent, *England*, there were great floods.^{40, 41, 43, 47}

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.⁹³

On 6 April 1776, the village of Bois-le-Duc, *France* (now in *the Netherlands*) was destroyed by rain.¹²⁸ [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 *France* on the 25th of April, the village of Bar le Duc was destroyed by floods and other village's damaged.^{47, 92}

The rains in Languedoc, *France*, destroyed the village of Bar le Duc on April 26, 1776.^{40, 41, 43, 56}

In *Holland* 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.^{40, 41, 43, 56, 57}

On 17 June 1776 in *Flanders* 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."⁹³

In June 1776 in *Ireland* in Clonegal (Carlow County), there was a great thundershower with lightning and amazing flakes of ice.⁹³

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.⁶²

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.⁶²

On 4 September 1776, a hurricane visited St. Christopher (now Saint Kitts), Antigua, Martinico (Dominican Republic), Guadeloupe Island and other adjacent regions. On 6 September there was a storm in the *West Indies*, the severest ever known.¹²⁸

At *St. Kitts* on 5 September 1776, a storm greatly damaged the island and the damage was immense.⁵⁶

In the *West Indies*, the severest storm ever known struck on 6 September.^{40, 41, 56}

On 6 September 1776, a great Atlantic hurricane struck Pointe-a-Pitre Bay in *Guatemala* causing approximately 6,000 deaths.¹⁰⁷

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:
 May 10th – a hot day and night. May 12th – hot. May 17th – the heat continues. May 26th – cold weather all the week. May 31st – very cold still. June 12th – hot summer. June 19th – a drought seems to be coming on, with worms. June 22nd – a small shower. June 28th – hot for several days past. June 29th – showers. July – plentiful rain through this month and the next. September 20th – remarkable warm weather. September 30th – 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 6th – it was constantly moderate. December 18th – signs of snow, but none.⁷⁸

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 20th. 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.⁷⁰

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:
 In 1776 on December 20th – very cold. December 27th – extreme cold. December 31st – cold; very poor sledding. In 1777 on January 18th – pretty good sledding. February 11th – it snowed all day. February 15th – very cold. February 21st – snowstorm. February 28th – continual snowstorms.⁷⁸

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.^{13, 14}

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.”²⁷

1777 A.D. In Dublin, *Ireland*, there was a great flood; 6 feet of water in St. Patrick’s cathedral.^{47, 92}

In *England*, there was a great flood of the River Tyne.⁴⁷

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.⁶²

On September 23, Petersburg, *Russia*, suffered damage to the amount of 1,000,000 rubles from an inundation and storm.⁴¹

On 17 September 1777, there was an inundation at Petersburg [St. Petersburg, *Russia*], which did considerable damage.¹²⁸

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.⁹³

A storm struck Florence, *Italy* and its neighborhood on October 16, doing immense damage.^{40, 41}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 17th – it has been surprisingly warm weather for some time. April 6th – bad walking. April 12th – a wonderful week of warm weather. May 15th – it is agreed to be the coldest weather, and the most backward spring there ever was. May 20th – raw; cold. May 25th – a hot summer day. May 26th – raw, cold, with a deluge of rain. June 30th – cold, very cold; nothing ever like it through the whole spring, and yet everything is flourishing, perhaps never more so, except Indian corn. July 9th – a great cold storm, with much rain. July 13th – dismal cold. July 15th – a hot summer's day. July 17th – everything is flourishing. July 29th – a marvellous fruitful season as to everything. August 18th – 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 2nd – the earth produced an abundance of its fruits. September 8th – there was a frost in several of the back towns that killed the corn leaves. September 13th – another great frost. The corn not hurt. September 23rd – northeast storm. September 27th – fair. September 30th – comfortable. October 9th – hitherto, this month, very pleasant weather. October 10th – deluge of rain, and very high wind. October 11th – very cold. October 21st – it snowed all day. October 25th – the week past, raw, cold winter weather. November – a cold stormy month.⁷⁸

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.⁷⁰

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 31st – the whole month past has been a tedious spell of severely cold, stormy, snowy weather.⁷⁸

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 22nd. 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.⁷⁹

In 1778 in *Ireland*, there were great thunderstorms at Tralee, Abbeyfeale, and Clonmel. “The hailstones were as large as musket-balls.”⁹³

In 1778 in *France*, there was a great hailstorm in the vicinity of Paris.⁹³

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:⁶²

Chennai (Madras), <i>India</i>	(104.0° F, 40.0° C) in May
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)
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 1719.⁶²

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 10th and later gave up large clusters of grapes. The same heat was observed in Montpellier and Salon. 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.⁷⁹

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.⁶²

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.⁶²

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].⁷⁹

The weather [in *France*] also produced a number of storms, some reaching the level of hurricane strength and considerable floods.⁶²

On 23 July 1778, much damage was done by lightning in the neighborhood of London, *England*.¹²⁸

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.⁶²

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.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 25th - it has been almost constantly cold, and very windy. April 28th - we sowed our garden five weeks sooner than last spring. April 30th - the spring is forward, the ground is dry, but the weather cold. May 8th - rainy. May 15th - a summer's day. May 31st - there has been a great frost two nights past. June 14th - cold weather a few days. June 27th - 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 2nd - it is a dry time. July 18th - the drought awfully continues. July 27th - it is as grievous a drought as ever was known. July 31st - 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 6th - plentiful rains. August 9th - uncommonly hot. It has been, through the whole, a fine, seasonable, hot summer. August 16th - rain. August 20th - extremely hot. August 21st - a shower, short but plentiful. August 26th - a shower. September 17th - no frost to do any damage. September 30th - potatoes have grown to the wonder of all. October 1st to 8th - wonderful fine weather. October 19th to 22nd - same, and hot. October 28th - wonderfully moderate.⁷⁸

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.⁷⁰

A storm struck all over *England* in January 1779.^{40, 41}

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.¹²⁸

In *England*, the frost in the winter of 1778-79 lasted eighty-four days.¹²⁸

The winter of 1779 was very mild in [northern] *France* and the barometer was very high during this season.⁶²

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.⁷⁹

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.¹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

November and December 1778 - generally very cold and stormy. November 12th - there was a great southerly rainstorm. It blew down fences, Mr. Butler's house and other buildings. December 31st - 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 4th - 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 8th - 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 10th - it rained hard in the morning. January 21st - the harbor and whole bay froze over. January 23rd - good sledding; wood has fallen to eight dollars. January 26th - the harbor and the whole bay continues to remain frozen over. February 1st - pleasant. February 4th - hot, thawy [thawing of snow and ice] day. February 7th - fair and moderate. February 10th - thawy. February 13th - windy and cold. February 22nd - moderate. March 2nd to 3rd - delightful days. March 9th - snow. March 12th - snowstorm. March 19th - snow. March 22nd - southerly snowstorm. April 1st - a grievous cry for bread in all seaport towns, and there is but little meat and no fish yet. April 7th - Indian corn is sold at 30 dollars a bushel.⁷⁸

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:⁶²

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 1719.⁶²

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.⁶²

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.⁷⁹

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.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 10th – four days past pleasant and warm. April 19th – flounders plentiful. April 24th – pleasant. April 26th – began to dig our garden. April 27th – 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 18th – the cherries and plums begin to blow [blossom], but no grass yet. June 23rd – strawberries at their best. June 25th – several days of hot weather. Everything flourishes vastly. July 5th – the Indian corn was never so forward and flourishing. July 14th – a fine hot rain. July 25th – steady rain. A wonder of a season. August 31st – cut our corn stalks; never was the corn so forward; poor hay season, by reason of

the almost daily rains. September 4th – a great tempest of rain. September 12th – rainy. September 18th – very hot. September 24th – a wonder of a potato year, so many, so large, and so good. October 1st – no frost yet, though very cold for three days past. October 4th – warm. October 10th – very hot. October 23rd – hot summer day. October 29th – wonderful fine weather; never such a fine season. November 30th – a moderate fall.⁷⁸

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.¹

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 week.” 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.²⁷

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.³³

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.³⁸

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.³⁸

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 1780.³⁸

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.⁴²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:
In 1779 on December 31st – the past month has been a true winter month, very cold and stormy, with repeated snows. January 1780 – a cold, stormy month. January 31st – 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 15th, then to the 24th moderate. February 1st – the country is blocked up with snow, and they suffer for want of wood and water. February 25th – very cold. February 29th – a most delightful day; a weather breeder. March 2nd – blustery day, lion-like March. March 7th – pleasant. March 12th – tempestuous. March 18th – moderate and pleasant since the 12th. March 26th – windy and cold. March 31st – the street to the meetinghouse remains full of snow.⁷⁸

In 1779, the frost in *Britain* lasted 84 days.^{41, 43, 47, 93}

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.⁷⁰

1780 A.D. – 1784 A.D. Bangladesh, Pakistan and India.

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 [*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.)”⁸⁸

[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 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.”⁵⁷]

In *India* during the years 1782-83, there was no rainfall for two years in the Province of Sind [now *Pakistan*].⁴⁷

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.”⁵⁷

In *India* during 1783-84, there was no rainfall for two years in the northwest Provinces of the Punjaub [Punjab].⁴⁷

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.⁵⁷

In *India* in December 1784, some of the northwest provinces of the Punjaub [Punjab] suffered very severely from floods after a great drought.⁴⁷

1780 A.D. 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.⁹³

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:⁶²

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, *the Netherlands* (83.3° F, 28.5° C)

Agde, *France* (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.⁶²

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*.⁷⁹

The year 1780 in *France* was variable and wet.⁷⁹

A storm struck Roehampton (Wandsworth) near London, *England* on October 17.^{40, 41}

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 lightning.¹²⁸

On 31 October 1780, reports were received of a hurricane at *Barbados* that did great damage.¹²⁸ [The hurricane struck the Caribbean between 10-16 October.]

During a major hurricane in the *West Indies*, on 10 October 1780, the whole town of Bridgetown was destroyed, and many thousand persons perished. St. Lucien, 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 was also blown down, and many thousands perished. At St. Eustatia, at least five thousand persons lost their lives. Many vessels with their crews were dashed to pieces in the above ports.¹

On 10-16 October 1780, a Great Hurricane struck *Barbados, Saint Vincent, Granada, Saint Lucia, Martinique, Hispaniola, Dominica, Guadeloupe, Antigua, Saint Kitts, Sint Eustatius, 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*.⁴⁸

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.^{40, 41, 56}

In 1780, a powerful cyclone struck *Lesser Antilles Islands* causing 22,000 deaths.⁹⁸

During 10-16 October 1780, a great Atlantic hurricane struck the Caribbean islands of *Martinique, Barbados* and *St. Eustatius* causing approximately 22,000 deaths.¹⁰⁷

During 17-21 October 1780, a great Atlantic hurricane struck eastern *Gulf of Mexico* causing approximately 2,000 deaths.¹⁰⁷

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 15th – moderate spring-like weather. May 1st – no warm weather yet. May 10th – morning summer-like weather, quite reviving. May 11th – cold and windy. May 18th – a cold, backward spring. May 24th – a little taste of

summer. May 27th – thundershowers, quite needful, it being a dry time. May 30th – no grass yet. June 30th – a wonder of a winter the past, and a spring, and a summer thus far, so cold and till now dry. July 1st – the grass grows to the admiration of all. July 4th – very hot. July 18th – plenty of rain. July 28th – extremely hot. August 2nd – a blessed rain. August 7th to 16th – sultry hot. August 18th – a wonderful change from very hot to very cold. August 22nd – a fine season for vegetation. August 24th – a memorable hot night. August 27th – extremely hot. August 29th – intensely hot day and night. August 31st – a great rain; very cold. September 1st – cold still. September 3rd – heavy showers. September 21st – calm hot summer's day.⁷⁸

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.

Winter of 1780 / 1781 A.D. In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1780 on November 1st – a great snowstorm. November 30th – the whole month generally cold and stormy. December 1st and 2nd – severely cold. December 9th – moderate all the week. December 18th – no snow on the ground. December 23rd – snowed about five-inches (13 centimeters). December 26th – snow knee deep. December 28th – the roads all blocked up [impassable]. In 1781 on January 6 – fine sledding. January 9th – extreme cold. January 23rd – a great snowstorm. January 28th – rain and a thaw. February 1st – snow again, but turned to rain. February 5th – severely cold snowstorm. February 9th – extreme cold. February 17th – great snowstorm. February 20th – blustering and very cold. February 22nd and 24th – the street is brim full of snow; we are buried. March 10th – cold month thus far; fine sledding. March 15th – a beautiful spring. March 18th – rain and snow. March 23rd – it snowed all day. March 28th – very cold and windy. April 3rd – a great snowstorm. April 11th – a heavy rain. April 19th – snow again.⁷⁸

1781 A.D. In August, a hurricane struck *Jamaica*.^{40, 41, 42}

In 1781, a great Atlantic hurricane struck off the coast of Florida causing approximately 2,000 deaths.¹⁰⁷

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:⁶²

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.⁷⁹

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] 150.⁷⁹

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*.⁷⁹

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*.⁶²

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 22nd – cold and windy. April 29th – moderate. May 1st – pleasant day, quite reviving. May 9th – cold and windy. May 15th – warm. May 20th and 21st – summer days. May 30th – hot summer weather. June 11th – a fine growing season. June 19th – heavy shower, with thunder and lightning, and great hail. June 27th – a deluge of rain. June 30th – no summer except for three days. July 5th – a hot day and night. July 8th – extremely hot. July 15th – very hot. July 24th – small showers; a very dry time. July 30th – a merciful shower. August 6th – a grievous drought. August 13th – a plentiful rain. August 20th – a deluge of rain. September 12th – hot weather. September 20th – fine weather. September 24th – a summer's day. October 8th – horrid cold. October 10th – a very hot summer's day. October 11th – hotter (like this day 59 years.) October 22nd – it froze last night. October 31st – a moderate fall, thus far. November 2nd – a great storm, and a deluge of rain. November 11th – a moderate day. November 18th – rainy.⁷⁸

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.

Winter of 1781 / 1782 A.D. In Plymouth 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.”^{47, 93}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1781 on November 23rd – blustering and cold. November 25th – snowstorm. November 30th – a tedious, cold, stormy month. December 7th – snow. December 11th – good sledding. December 28th – storm of fine snow. December 31st – another great snowstorm. In 1782 on January 1st to 7th – thaws. January 11th – snow. January 13th – a great snowstorm. January 16th and 17th – severe cold. January 28th – colder. January 29th – very blustery and cold dismal winter. January 30th – the harbor has been frozen up a fortnight [for 14 days]. January 31st – cold still. February 3rd – still cold and snowy. February 12th – colder than any day yet. February 26th – the harbor down to the islands remains shut up. February 28th – a long, close [overcast], stormy and severe winter as perhaps ever was known.⁷⁸

The winter of 1781 in Philadelphia, Pennsylvania in the *United States* was very mild but spring was cold and backwards.¹

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.⁷⁰

On 1 May 1782, the severity of winter continued longer that year in all parts of *Europe* than was ever known.¹²⁸

1782 A.D. In *England*, there were great floods in Northumberland; Hexham and other bridges thrown down.⁴⁷

Inundations in the north of *England* in March 1782, caused the Hexham Bridge and Ridley-Hall Bridge and others to be thrown down.^{40, 41, 43}

On 3 April 1782, reports were received of an inundation in the north of *England*. The bridges of Hexham and Ridley Hall were destroyed.¹²⁸

On 22 April 1782, a storm at Surat, *India* destroyed 7,000 of the inhabitants.¹²⁸

In *India* on the 22nd of April, there was a great storm at Surat; about 7,000 inhabitants destroyed.^{41, 43, 57, 90}

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.”⁵⁷

A storm struck Dieupole, Moravia (*Czech Republic*) on May 30, 1782; which totally destroyed the place.⁴¹

In *France* on the 17th of June, hailstorm; stones weighed 8 ounces.^{41, 43, 56, 57, 93}

On 17 July 1782, a storm of hail in *France*; some of the hailstones weighed eight ounces.¹²⁸

On 22 July 1782, a hailstorm at Madrid, *Spain* destroyed glass to the value of 6,000*l*.¹²⁸

In Madrid, *Spain*, a violent hailstorm struck on July 26. “Some of the stones weighed a pound.” £6,000 damage to glass windows.^{40, 41, 43, 56, 57, 93}

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.⁷⁹

The summer of 1782 produced many rainfalls in northern *France*. Nevertheless, very high temperatures were observed in various places.⁶²

Hagenau, <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, *Switzerland* (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.⁶²

On 16-17 September 1782, a great Atlantic hurricane struck the *central Atlantic* causing approximately 3,000 deaths.¹⁰⁷

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.¹²⁸

On 23 September 1782 in *England*, there was a hailstorm in Middlesex.⁹³

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.⁷⁹

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.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

March 1st – moderate. March 6th – rainy. March 14th – a fine day. March 18th – a deluge of rain. March 23rd – lion-like March. March 26th – high winds and cold. April 2nd – a delightful day. April 7th – a heavy rain. April 14th – a pleasant day. April 16th – the spring is moderate and forward. April 28th and 29th – pleasant. April 30th – the spring is thought to be remarkably forward. May – a cloudy, wet month containing a few fair days, but not any hot ones. June 30th – a wonder of a season; the Indian corn, that was backward, revived and flourishes. August 31st – a memorable summer, with but few hot days. September 4th – a horrid cold day. September 16th – very cold. September 17th – pleasant summer's day; a wonder! September 24th – plentiful rain. September 30th – a delightful day. October 5th – a week of pleasant weather. October 14th – a dry time. October 17th – a grand rain. October 23rd – a delightfully warm day. October 25th – another. October 31st – it snowed most of the day. November 2nd – very cold. November 9th – moderate. November 28th – horrid cold and windy. December – a cold month.⁷⁸

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.

Winter of 1782 / 1783 A.D. In *France*, “On the night of the 11th November 1882, it froze so hard at St. Pons, a district in *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.”^{47, 93}

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.⁸¹

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.⁷⁰

The winter of 1782 was very cold in the *United States*. The Delaware River in Philadelphia, Pennsylvania froze over in one night.¹

1783 A.D. On 11 April 1783, a violent hurricane struck Venice, *Italy*. The sea overflowed the city and did immense damage.¹²⁸

The Laki or Lakagíggar 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. 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 Laki eruption has been estimated to have killed over two million people globally, making it the deadliest volcanic eruption in historical times. The drop in temperatures, due to the sulfuric dioxide gases spewed into the northern hemisphere, caused crop failures in *Europe*, droughts in *India*, and *Japan's* worst famine.⁵²

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:⁶²

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

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.⁶²

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.⁷⁹

On 5 February 1783, a horrible earthquake struck Calabria and Sicily, *Italy*. This was followed by repeated hurricanes and thunderstorms.⁷⁹

In *England* on the 25th of November, there were great storm of thunder and lightning in Hants and Wilts; also about this period, great storms of wind and rain of “remarkable violence.”⁵⁷

In *Spain* on the 23rd 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. Great number of shipwrecks on coast.⁵⁷

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April - generally a pleasant month. May 9th - after an unusual dry spring up to this time, a deluge of water fell last night. May 10th - another great rain. May 20th - very cold. May 21st - very warm. May 22nd - a deluge of rain. May 29th - a hot day. May 30th - very hot. June - the first part of the month, cold, cloudy and wet; the latter part, very hot. July 6th - it rained plentifully. July 11th - a grand rain. July 19th - hardly any hot weather this month. July 25th and 26th - very hot; our gardens are surprisingly flourishing. July 30th - a deluge of rain. August 7th - extremely hot. August 8th and 9th - very cold, raw and windy. August 12th - cold. August 16th - extremely hot. August 19th - a surprising growing season. August 21st - a very hot day. August 24th - extremely hot. August 28th - more rain. August 31st - 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 12th - a strange warm day.⁷⁸

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.

Winter of 1783 / 1784 A.D. In the *United States*, the winter of 1783 was long and severe. The Delaware River closed as early as the 28th of November, and continued ice-bound until the 18th of March. The mercury was several times below zero (0.0° F, -17.8° C).¹

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.²⁷

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.³⁸

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1783 on November 13th – a deep snow. November 28th – a great storm. December – the first half of the month moderate, the latter cold and stormy. In 1784 on January 31st – 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 6th – it snowed yesterday and went away today. April 17th – this is the third day of cold, rainy, snowy weather.⁷⁸

In 1783, the Seine River in *France* was entirely frozen over.³⁸

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 29th, 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 30th 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.⁷⁹

During the winter of 1783-84, the Loire, Oise, Marne and Aisne rivers in *France* were frozen.⁶²

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.⁵⁸

[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.]

In 1783 in Paris, *France*, there were 69 days of frost.^{58, 80}

The *French* historians cite great mortality of animals due to cold during the winter of 1783-84.^{58, 80}

In *Europe* in 1784, storms and excessive cold were reported from Smyrna, Vienna, Nimeguen, Cologne, Naples (great flood), Leghorn, Rome, Lisbon and Amsterdam.^{47, 57}

In *Italy*, there was severe frost in Venice, Genoa, and Rome.^{47, 93}

During the winter, the River Thames in London, *England* was frozen below Gravesend. The winter was recorded as being intensely cold throughout *Europe*.¹

In *England*, the frost during the winter of 1783-84 lasted eighty-nine days.¹²⁸

The frost in *Britain* lasted 89 days.^{41, 43}

In *England* during the winter of 1783-84 the frost lasted 89 days. The weather in November was unusually mild. In Montrose on the 4th of November “the cattle seek shade at noon from the heat.” On the 17th of November the thermometer stood at 56° F (13° C) indoors and out. On the 23rd and 24th there was frost and ice. On 30th November, “very hard frost.” On 6th 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 *Germany*, Rome in *Italy*, and *Hungary*. The frost was especially severe from the 10th to the 20th 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 3rd April. Thames frozen and traffic crossed at many places.^{47, 93}

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.^{47, 57}

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.*”^{47, 93}

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.⁷⁰

In *Scotland*, daily heavy snowfalls extended over nearly a month.^{47, 57}

In *France* on the 17th of January, there was a violent storm at 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.⁵⁷

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:⁶²

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

The frost in Laon, *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° F (-18.6° 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.⁶²

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.⁶²

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].⁷¹

In *Sweden, Denmark, Germany, Holland, 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.⁶²

1784 A.D. On 18 July 1784 in *France*, there was a hailstorm in the Pyrenees. Some of the hailstones weighed 18 ounces.⁹³

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.^{41, 43, 57}

A hurricane struck *Jamaica* on July 30, 1784.^{41, 42}

Port-Royal in *Jamaica* destroyed by a terrible storm on July 30, 1784.^{41, 43, 56}

On 20 July 1784, a storm did great damage at Port Royal, *Jamaica*.¹²⁸

In *England*, there were great floods in Yorkshire; Tadcaster bridge thrown down and several lives lost.⁴⁷

The high temperatures observed during the summer were:⁶²

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.⁷⁹

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.⁸⁷

Great damage done in America (*United States*) from a storm, particularly in the New England area in 1784.^{41, 56}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 29th – raw, cold; the spring is very backward. May 9th – a pleasant day. May 15th – a hot summer day. May 25th – a deluge of rain. June 3rd – a hot morning. June 5th – a hot day; thus summer breaks in upon us. June 12th – cold. June 18th – hot. June 20th – very hot. June 27th – (Sunday). A terrible tempest, which obliged me to break off in [the middle of] my sermon. June 30th – as growing a season as we could wish; strawberries are very plenty, large and good. July – frequent rains this month. July 18th – there came suddenly as great a tempest as ever I knew, preceded by some hideous darkness, and accompanied by a vast shower. July 20th – extremely hot. July 31st – fair, and good hay season, but not before. August 4th – heavy rain. August 14th – we have had a week of very hot weather. August 18th – a wonderful growing season. August 23rd – great rains frequently. September 2nd – a deluge of rain. September 14th – uncommonly cold. September 19th – cold. September 29th – a warm, delightful day. September 30th – no frost yet to hurt the corn or do much damage.⁷⁸

A dreadful storm struck the north coast of *England* on December 5, 1784.⁴¹

A dreadful storm struck *Italy* in December 1784.^{41, 43}

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.

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.⁷⁰

In 1785, the frost in *Britain* lasted 115 days.^{41, 43}

In *England*, the frost during the winter of 1784-85 lasted 115 days.¹²⁸

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 9th “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 9th, 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 10th, 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).⁷⁰

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.^{47, 93}

In 1785, the frost was severe throughout *Europe*; particularly in *Holland*.^{47, 93}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1784 on November 30th – a wonderful month; so moderate, and no hard frost until last night. December 9th – it has not frozen in the house yet. December 11th – perhaps there never was so moderate a season. December 13th – cold and windy; winter seems to be setting in. December 19th – a terrible windy, cold day. December 20th – snow. December 22nd – another terrible snowstorm. In 1785 on February 3rd – very cold—the harbor is frozen up. February 12th – a cold, stormy day. February 13th – very cold and stormy. February 20th – moderate for several days. February 25th – an exceeding great driving snowstorm. March 1st – very cold. March 9th – more snow, but level [not drifted]. March 15th – very cold and windy. March 24th – blustering cold. March 31st – true winter weather. April 3rd – more snow. April 7th – Middle-street is all water and mire. April 10th – Back-street, the snow is as high as the fences; no sleighs can pass. April 13th and 14th – very cold. April 24th – the snow melts surprisingly, but it is still 2 or 3 feet (0.6 or 0.9 meters) deep in the woods.⁷⁸

The winter of 1784 was tolerably mild in Philadelphia, Pennsylvania in the *United States* but significant snow fell.¹

1785 A.D. On 20 January 1785, an inundation in *Germany* caused the destruction of thousands of houses.¹²⁸

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.¹²⁸

On 12 June 1785 in *England*, there was a great storm in Cambridgeshire and Suffolk.⁹³

On 16 June 1785 in *England*, there was a hailstorm in Yorkshire.⁹³

On 25 June 1785 in *England*, there was a hailstorm in Sussex.⁹³

On 1 July 1785 in *France*, there was a severe hailstorm in Paris.⁹³

In Paris, *France* on the 1st of July, there was a severe hailstorm.⁵⁷ Hailstones as large as cherries.^{41, 43}

A storm struck the *West Indies* on July 6, 1785.⁴¹

In *France*, storms laid waste to one hundred and thirty-one villages and farms.^{57, 90} Storm occurred on August 5, 1785.^{41, 43}

On 12 September 1785 in *England*, there was a great hailstorm in Cumberland, in Hampshire, and in Warwickshire.⁹³

The high temperatures observed during the summer were:⁶²

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.⁷⁹

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.⁸⁷

There were great floods in different parts of *England* in September and October.^{41, 43, 47}

In *Germany*, there were extended floods and vast destruction of property.⁴⁷

In different parts of *Germany* in 1785, thousands had their houses and property destroyed by inundations.^{41, 43}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 28th and 29th – wonderfully warm, spring-like days. May 5th – cloudy and dull for five days past. May 8th – rainy. May 14th – a deluge of rain. May 19th – the country people are but now beginning to plant, the spring is so backward, cold and wet. May 23rd – the May storm. May 27th – deluge of rain, fatal, it is feared, to the Indian corn, just planted. May 30th – a hot day, which causes the cherry and plum trees to begin to blossom. May 31st – another hot day, which occasions great joy. June 2nd – a very hot day. June 7th – cold. June 18th – very hot weather. June 21st – cold and rainy. June 22nd – very hot. June 23rd – raw; cold. June 25th and 26th – hot. June 27th – piercing cold. June 29th – hot day. June 30th – perhaps there never was a more seasonable year for grass. July 31st – we had marvellous seasonable weather up to this time; everything is flourishing; never a better prospect. August 8th – a deluge of rain. August 9th – remarkably cold. August 18th – third day of hot weather. August 20th – the heat continues; happy season! August 22nd – a seventh hot day. August 27th – 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 21st – 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 6th – cold Sabbath. December 2nd – cold.⁷⁸

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.⁷⁰ [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 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. Of five shepherds who drove eight hundred sheep; three died with almost the entire herd.⁷⁹

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1785 on December 4th – a snowstorm. December 7th – snow again. December 8th – horrid cold. December 17th – a deluge of rain, and a thorough thaw. December 18th – a summer's day. December 19th – another; the snow is all gone, and the frost out of the ground. December 25th – cold. December 30th – severely cold snowstorm. January 1786 – a cold month, though it ends moderately. February 18th – a warm day, but the rest of the month was cold weather and good sledding. March 7th and 9th – pleasant and moderate. March 10th – windy and cold. March 14th – moderate. March 19th – a most beautiful day. March 26th – a surprising warm summer's day. April comes in raw and cold. April 2nd – a severe snowstorm.⁷⁸

The winter of 1785 was tolerably mild in Philadelphia, Pennsylvania in the *United States* but significant snow fell.¹

1786 A.D. There was a great storm in the *English Channel* in January 1786, which caused the loss of the *Halswell* Indiaman along with other ships.^{41, 56}

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."⁹³

In Ferrara, *Italy* on the 17th of July, hailstones as big as hen's eggs.^{41, 43, 56, 57}

On 17 July 1786 in *Italy*, there was a hailstorm with "stones as big as hens' eggs."⁹³

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.^{41, 43, 56}

There was a storm at the island of *Barbados* on August 11.^{43, 56}

On 5 October 1786, news was received of a dreadful hurricane in the *West Indies*. It greatly damaged Barbados and Grenada.¹²⁸

On 16 August 1786 in *England*, there was a hailstorm at North Shields.⁹³

In North Shields, *England* on the 16th of August, great hailstorm. The hailstones were as large as pigeons' eggs.^{41, 43, 56, 57}

The high temperatures observed during the summer were:⁶²

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.⁷⁹

On 12 September 1786 in *England*, there was a great hailstorm in Hampshire.⁹³

In *Sussex, England*, there was an irruption of the sea; blockhouse at Brighthelmstone washed down on October 9, 1786.^{41, 43, 47}

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

April 9th to 14th – cold and windy. April 22nd – the whole week, except Friday, has been heavy, raw, rainy weather. May 31st – the spring a thought to be forward; most people have planted. June 1st – summer commences with a hot day. June 4th – extremely hot. June 5th – cold. June 7th – very hot. June 13th – growing season. June 30th – never was more seasonable weather, and never a greater prospect as to all the fruits of the earth. July 2nd – extremely hot. July 9th and 11th – extremely hot. July 12th – rain; happy season. July 18th – cold. July 22nd – only a few hot days thus far. July 30th – hot morning, but dismal sea wind in the afternoon. August 31st – very little hot weather this month. September – the whole of this month has been wonderfully moderate. October 30th – 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 12th – raw and cold.⁷⁸

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.²⁷

In Falmouth [now Portland, Maine] in the *United States*, the weather was recorded as:

In 1786 on November 17th – it snowed, and came up windy and cold. November 20th – cold. November 25th – fine sledding; true winter since the 17th. November 30th – so dry a fall was never known. The wells went dry, and the prospect for water is dark. December 1st to 3rd – very cold. December 5th – a snowstorm. December 8th – another snowstorm but greater. December 14th – moderate. December 20th – the roads are all blocked up with snow. December 24th – cold and stormy; a vast deal of damage done by the late storms. December 31st – the weather moderated. January 1787 – it has been severely cold for most of this month. February 3rd – cold weather. February 12th – a little more moderate. February 19th and 20th – cold. February 28th – 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 1st – the heavy, dull weather still continues. March 4th – last night there was a great storm of snow, near a foot (0.3 meters) of snow fell. March 12th – pleasant. March 13th – the snow is 5 feet (1.5 meters) deep in the woods. March 15th – the closest [overcast] winter remembered. March 17th – we have had the longest and coldest winter remembered.⁷⁸

The winter of 1786 was tolerably mild in Philadelphia, Pennsylvania in the *United States*. There were some cold days of course.¹

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.⁷⁰

1787 A.D. In Manchester, *England*, a great flood did much damage.^{47, 92}

There was a great storm in the *West Indies*, where great damage was done, particularly in the French islands in July 1787.^{41, 56}

In December 1787, reports were received of a dreadful hurricane in the *West Indies* that caused great damage.¹²⁸

The high temperatures observed during the summer were: ⁶²

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. ⁴¹

On 4 August 1787 in *Normandy*, there was a hailstorm with "stones as big as hens' eggs." ^{41, 43, 56, 57, 93}

On 19 August 1787 in *Italy*, there was a hailstorm in the city of Como and its district. The hailstones weighed 9 ounces. ⁹³

In 1787 in Dublin, *Ireland*, there was a most violent hailstorm. ⁹³

In Navarre, *Spain*, there were great torrents of water from the mountains; over 2,000 persons lost their lives. ^{47, 92}

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. ^{41, 43, 56, 90}

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. ^{47, 92}

A terrible inundation by the River Liffey, in *Ireland*, which did very considerable damage in Dublin and its environs, 12 November 1787. ^{41, 43, 56, 90}

In Portland, Maine in the *United States*, the weather was recorded as:

March 19th – wonderful warm, pleasant day. March 21st – winter seems to be over. April 4th – a hot summer's day. April 5th – cold again. April 8th to 17th – moderate and pleasant. April 19th – five days of very blustering and tempestuous cold weather, night and day. April 30th – from the 17th, 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 8th – a hot summer's day. May 10th – a rainstorm. May 16th – the dreadful eastern weather continues. May 25th – a deluge of rain. May 26th – horrid cold, and frosts. May 31st – a cold spring. June 2nd – dismal raw and cold. June 18th – the week past was hot weather. June 24th – a hot but windy Sabbath. June 25th – heavy rain. June 30th – Indian corn is backward, but there is a good prospect of English grass. July 1st to 3rd – raw, cold, easterly weather. July 7th – the four days past were very hot. July 17th – a fine rain. July 19th – very cold. July 28th – there has not been a hot night this summer. July 31st – nothing like summer yet. Alas, for the Indian corn! August 1st and 2nd – raw; cold. August 3rd – summer breezes. August 13th – foggy. August 21st – no hot weather yet. August 27th – cold. August 30th – warmer. September – some warm and some cold weather. October 2nd and 3rd – hot summer days. October 8th – cold. October 13th – a week of warm weather. October 20th – a week of uncommon cold, windy weather. October 24th – three surprising hot days. October 31st – the raw, heavy, cold weather returns. November 30th – this month has been favorably moderate. The ground has hardly froze, and no snow. December – the weather this month, has been quite moderate. ⁷⁸

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

(*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 [*Bangladesh*]. About 1st 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.”⁴⁷

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.⁹²

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.⁵⁷

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:^{104, 108}

* 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), 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.

Winter of 1787 / 1788 A.D. In Selborne, *England*, in November the weather was mild until the 23rd, 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.⁷⁰

The winter of 1787-88 in northern *France* was a very mild winter followed by a hot dry spring.⁷⁹

The winter of 1787 was tolerably mild in Philadelphia, Pennsylvania in the *United States*. There were some cold days of course.¹

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.¹²⁸

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 20th.^{41, 56}

On 26 June 1788, the rain fell so heavy as to flood the streets of London, *England* and blow up one of the sewers.¹²⁸

On 11 July 1788, there was a great inundation in *Scotland* and the north of *England*.¹²⁸

On 13 July 1788 in *England*, there was a great hailstorm in Cheshire.⁹³

On 13 July 1788 in *France*, there was a storm.⁹³

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."⁹³

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.⁹³

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 Vallence to Lisle were torn up or destroyed."⁹³

The estimated damage from this storm was estimated at 5,000,000 francs.⁹³

On 13 July 1788 at St. Germain, in *France*, hail fell as large as pint-bottles, and did immense damage. All the trees from Vallance to Lisle were destroyed.^{43, 47}

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.^{41, 56}

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.⁴³ [The hailstones at St. Germain weighed more than 3 pounds.]

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. 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.⁷⁹

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:⁶²

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.⁶²

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.¹²⁸

It was reported on 27 December 1788, that the greatest scarcity of water prevailed during the year in *Scotland*, as ever was known.¹²⁸

In *Scotland*, the bursting in of the dam-dykes at Kirkwaid caused great destruction.⁴⁷

At Kirkwaid in *Scotland*, an inundation by breaking the Dam-dykes on October 4th, nearly destroyed the town.^{41, 43, 56}

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.^{2, 41, 42, 43}

In *England*, the frost was long and severe.^{47, 93}

In *England*, there were fairs on the frozen River Thames during the winter of 1788-89.⁹⁰

On 14 January 1789, a most severe frost in *England*, which began on the 25th 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.¹²⁸

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*].⁷⁰

“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 25th 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.”²⁹

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.⁹⁰

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 26th of December to the 10th of March.¹

The winter of 1789 in *France* was very severe.⁷⁹

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 27th 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 11th, 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.⁶²

In northern *France*, the memorable winter of 1788-89, one of the toughest, was followed suddenly by stubborn heat.⁷⁹

The *Baltic Sea* froze.³⁷

During the winter of 1788-89, the *Baltic Sea* was completely covered with ice.⁶⁸

The winter was intensely cold throughout *Europe*, particularly *Holland*.^{41, 42, 43}

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.^{62, 70}

The following are the lowest temperatures observed in different cities:⁶²

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 (*Eastern Europe*). 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.⁶²

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.⁷⁹

1789 A.D. – 1791 A.D. **Australia.**

During 1789-91, there was a drought in New South Wales, *Australia*.¹⁰¹

No rain is said to have fallen at Sydney, *Australia* between June to November 1790 and all the grass was dried up.¹⁰³

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.¹⁰³

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.¹⁰³

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.¹⁰³

1789 A.D. In *England* and *Wales*, the land was so inundated with continuous rains that scarcely an article of food was raised.¹

A storm struck Liverpool, *England* on June 29, 1789.⁴¹

On 29 June 1789, Liverpool, *England* was much damaged by a storm.¹²⁸

In *Scotland* and the north of *England*, inundations in July 1789.^{41, 43}

On 16 July 1789, there were great inundations in *Scotland* and the north of *England*.¹²⁸

On 22 July 1789 in *England*, there was a great hailstorm in Cambridgeshire.⁹³

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.⁹³

On 16 August 1789, a famine was felt at Paris, *France*.¹²⁸

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.⁹³

In *England*, there were great rainstorms in the north.^{47, 92}

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.⁶²

In *France* in 1789, there was a grievous famine in the province of Rouen.^{57, 90, 91}

In 1789, a powerful cyclone struck Coringa, *India* causing 20,000 deaths.⁹⁸

Also refer to the section 1789 A.D. – 1791 A.D. for information on the drought in Australia during that timeframe.

Winter of 1789 / 1790 A.D. The winter of 1789-90 in Selborne, *England* was very mild. In November to the 17th, 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.⁷⁰

The winter of 1790 was unusually mild in *France*. However, spring and summer were severely cold, which often kept them constantly below normal temperature.⁷⁹

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.¹

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.⁴⁷

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].”⁵⁷

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 [*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*.]⁵⁷

A hurricane struck *Jamaica*.^{41, 42}

On 30 July 1790 in *Scotland*, there was a hailstorm at Monymuch. 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.⁹³

On 21 November 1790 in *England*, there was a great hailstorm in the neighborhood of London, and in Hampshire and Wiltshire.⁹³

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.⁶²

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.⁷⁹

The high temperatures observed during the summer were:

Verona, <i>Italy</i>	(95.7° F, 35.4° C)	in August
Paris, <i>France</i>	(93.4° F, 34.1° C)	on 15 August
London, <i>England</i>	(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.⁶²

On 3 August 1791 in *England*, there was a hailstorm in Leicestershire.⁹³

In Thornton, (Leicestershire) *England* on the 3rd of August, there was a hailstorm that did great damage.⁵⁷

In September 1791 in Naples, *Italy*, there was a hailstorm in Calabria. The hailstones weighed a pound. Vines were destroyed.⁹³

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.^{41, 43, 56, 57}

On 22 October 1791 in *England*, there was a hailstorm in Kent and Sussex.⁹³

In Sussex, *England* in October, there was a severe hailstorm.⁵⁷

A hailstorm struck Sussex, *England* in October, the hailstones were four inches in circumference.^{41, 43, 56}

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.^{41, 43, 56}

On 26 October 1791 in *England*, there was a hailstorm in Cornwall.⁹³

In *England*, the river Don, near Doncaster, and the rivers Derwent, and Trent all greatly overflowed on November 20, 1791.^{41, 43, 47}

In *Italy*, there were floods of great extent at Placentia in November.^{41, 43, 47}

[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.⁵⁷]

Also refer to the section 1789 A.D. – 1791 A.D. for information on the drought in Australia during that timeframe.

Winter of 1791 / 1792 A.D. In *England* in December 1791, very cold weather and snow hit *Italy* and *Spain*.^{2, 41, 43}

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.⁷⁰

The winter of 1792 was unusually mild in *France*. However, spring and summer were severely cold, which often kept them constantly below normal temperature.⁷⁹

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.¹²⁸

1792 A.D. In 1792, there were several good crops of wheat at Parramatta in New South Wales, *Australia* in spite of the drought.¹⁰³

In Worcestershire, *England*, there were extended floods near Bromsgrove on 13 April.⁴⁷

In Waterford, *Ireland*, there was a great storm on April 4th.^{41, 56}

On 12 April 1792 in *England*, there was a great hailstorm between Gravesend and Chatham, extending over a district of 2 miles only.⁹³

In different parts of Kent, *England* on April 13, there was a great storm.^{41, 56}

On 18 April 1792, the city Bromsgrove in *England* was much injured by a waterspout.¹²⁸

On 23 June 1792 in *England*, there was a hailstorm in Northumberland.⁹³

There was a storm in the north of *England* on July 16th.^{41, 56}

On 17 July 1792 in *England* there was a hailstorm in Lancashire.⁹³

In 1792 in *Ireland*, there was a hailstorm in the neighborhood of Dublin. Hailstones of uncommon dimensions fell, accompanied by awful claps of thunder.⁹³

The maximum temperature during the summer in Bordeaux, *France* was 99.3° F (37.4° C).⁶²

The weather of 1792 in southern *France* produced excessive rains, cold, stinking fogs, storms and late frosts.⁷⁹

In 1792 in southern *France*, there were excessive rains, foul mists, storms, early frost and late frost along with great agitation of the atmosphere.⁷⁹

In Lancashire, *England*, there were great floods in August.^{43, 47}

On 10 September 1792, reports were received that a hurricane at *Antigua* destroyed many estates.¹²⁸

Winter of 1792 / 1793 A.D. The winter of 1792-93 produced excessive moisture in *France*.⁷⁹

The night of 6 December 1792 will long be remembered as one of the stormiest nights in *England*.¹²⁸

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.¹

In Whitehaven, *England* in March, there was a storm, which did great damage, when the tide rose six feet above its usual height.^{41, 43, 56}

A great storm struck *England* in the night of the 2nd of March 1793. It destroyed one of the towers at Sheffield manor.⁵⁹

A violent storm of hailstones, which measured 3½ inches in circumference, struck *Jamaica* on April 25, 1793.⁴¹

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.⁷⁹

The summer of 1793, despite its dryness, spawned five or six disastrous storms in *France*. A thunderstorm with hail prematurely appeared on the 1st and 2nd of May. A series of thunderstorms succeeded each other in July on the 8th, 9th, 10th, 13th and 17th. Thunder, wind, hail and floods ravaged the land, destroyed the crops, toppled buildings, and damaged the herds of livestock. On July 8th 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 10th produced hail and rain in the suburbs Ablon and Corbeil [of Paris]. The storm of July 17th headed to the north and destroyed the crops from Saint Denis to Saint-Germain-en-Laye.⁷⁹

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:⁶²

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*.⁶²

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.⁶²

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.⁶²

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.⁶²

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].⁶²

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). 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.⁶²

In *Jamaica* on 2nd of July, hailstones as large as pigeon's eggs.⁵⁷

On 2 July 1793 in *Jamaica*, there was a hailstorm. Hailstones were as large as pigeons' eggs.⁹³

At Savannah la Mar, in *Jamaica*, hailstones as large as pigeons' eggs fell on June 2.^{41, 43, 56}

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.^{41, 43, 56}

On 7 August 1793 in *England*, there was a hailstorm in Leicestershire.⁹³

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.⁶²

In 1793, the rains in New South Wales, *Australia* came too late to save the corn. August wheat was quite yellow.¹⁰³

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.⁷⁹

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 8th 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.⁷⁹

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 7th. 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 8th. The high temperature of this summer ended during the evening of August 17 by the arrival of a terrible storm that lasted all day.⁷⁹

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.⁶²

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*.⁶²

Winter of 1793 / 1794 A.D. The winter of 1793-94 in *France* was almost as rigorous as the winter of 1788-89.⁷⁹

Almost universally throughout *Great Britain* on January 16, storms struck and did great damage.^{41, 43, 56}

1794 A.D. On 3 June 1794 in *England*, there was a great hailstorm in Berkshire.⁹³

On 11 & 12 June 1794 in *England*, there was a hailstorm in Middlesex.⁹³

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.⁹³

On 6 July 1794, a violent storm of thunder and lightning did great damage in the country [*England*].¹²⁸

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).⁶²

On 7 August 1794 in London, *England*, there was a great storm of rain and hail, causing much damage.⁹³

In *Great Britain* on the 6th of October, there was a great storm, which prevailed throughout; several hundred sail of shipping destroyed.^{57, 90}

A most violent storm occurred on the eastern coast of *England*, when much damage was done to the shipping on October 6th.^{41, 56}

A most violent storm of rain in Norfolk, *England* in November, inundated many towns, particularly Norwich.^{41, 43, 56}

A most violent storm struck Cumberland, *England* on December 2, 1794.⁴¹

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.³⁰

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.¹

In 1795 in Paris, *France*, there were 42 days of frost.^{58, 80}

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 17th 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.⁷⁹

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.⁶²

[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.^{47, 93}

[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 1795.⁹⁰

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.^{41, 43, 56}

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 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.^{62, 70}

It is said that in the year 1795, that the King of Denmark came to Venice, *Italy* and froze the Lagoons.⁸¹

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.^{47, 92}

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.¹⁰³

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 1794.¹⁰³

On 18 May 1795 in *England*, there was a great hailstorm in Essex.⁹³

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, Middlesex, and Monmouthshire.⁹³

On 12 June 1795 in *England*, there was a hailstorm in Essex and Herts, which suffered severely.⁹³

In Essex and Herts, *England* on 12th of June, there was a storm of hail, which did great damage.^{41, 57}

On 5 August 1795 in *England*, there was a hailstorm in Lancashire.⁹³

On 21 August 1795 in *England*, there was a hailstorm in Surrey.⁹³

In *England* in 1795, the scarcity of food was severely felt.^{57, 91}

In 1795, there was a very severe famine felt in *England*.⁹⁰

A storm struck different parts of *England*, particularly in the Channel and in London on November 4, 1795.⁴¹

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.¹²⁸ [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].

1796 A.D. On June 7, a storm at Petersburg, *England*, destroyed upwards of 90 vessels and a large magazine of naval stores.^{41, 43, 56}

On 16 June 1796 in *England*, there was a hailstorm in Lancashire.⁹³

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.⁶²

In October, the *Bahama* Isle received immense damage among the shipping by a storm.^{41, 56}

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."⁹³

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.¹⁰³

Winter of 1796 / 1797 A.D. 25 December 1796 was remembered as the most severe (coldest) day in the memory of man.^{2, 41, 42}

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*].⁹⁰

On 3 January 1797, Bois-le-Duc, in *Holland* was inundated.¹²⁸

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.¹⁰³

In London, *England* on the 6th of May, hailstorm; did great damage to the gardens round Metropolis.⁵⁷ The stones measured 1½ inches in circumference.^{41, 43, 56}

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).⁹³

On 5 June 1797 in *England*, there was a severe hailstorm.⁹³

In Lewes, (Sussex) *England* on the 5th of June, there was another hailstorm; stones weighed from 4 to 7 ounces.⁵⁷ The hailstones measured 3 inches in circumference and some weighed three ounces.^{43, 56}

On 5 August in *England*, there was a hailstorm in Sussex.⁹³

Major storms reigned in *France* in 1797.⁷⁹

1798 A.D. In Halifax, Nova Scotia, *Canada*, on September 25, a storm did 100,000*l.* damage.^{41, 56}

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).⁶²

In 1798-99, there was a severe drought in *Australia*. The drought destroyed the wheat and maize crops.¹⁰¹

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.¹⁰³

Winter of 1798 / 1799 A.D. The Delaware River near Philadelphia, Pennsylvania in the *United States* was closed by ice from 22 January until past the middle of March.¹

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.²⁷

In 1798 in Paris, *France*, there were 32 days of frost.^{58, 80}

The *Baltic Sea* froze.³⁷

During the winter of 1798-99, the *Baltic Sea* was completely covered with ice.⁶⁸

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.⁶²

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."^{62, 70}

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].⁷¹

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.¹⁰¹

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.^{99, 109}

On 18 March 1799, the river, by great land floods, overflowed at Bath, *England*.¹²⁸

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).⁶²

On 16 August 1799 in *England*, there was a great hailstorm in Gloucestershire and Somersetshire.⁹³

In 1799 in Hindostan, there was a famine in the district of Midnapore [*India*].⁹¹

In 1799 in New South Wales, *Australia*, there were bushfires; drought; the grass burnt up and cattle were in great distress.¹⁰³

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.¹

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.¹⁵

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 1800.⁶²

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, *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.⁶²

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).⁷⁹

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.¹²⁸

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.^{99, 109}

In *China*, there were great floods.^{41, 43, 47}

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:⁶²

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.⁷⁹

In *Germany* during the month of April, the weather was very hot. But in July in Dusseldorf, *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*.⁶²

A very rigorous and wet winter of 1800 was followed by a wet spring that was quite cold. Hot dry weather suddenly began May 2nd, and stopped almost as abruptly on May 9th, and resumed again on June 5th. 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*.⁷⁹

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.⁶²

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.¹²⁸

On 14 August 1800, Newberg [Neuburg, *Germany*], in the Palatinate, totally burned; 10,000 acres of forest of Salzburg, *Austria* destroyed by fire.¹²⁸

In *England*, there was no rainfall for seventy-four days, when on Tuesday morning, 19th August, “a glorious rain came down.”⁴⁷

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.⁹³

In Oxfordshire and Bedfordshire, *England* on the 19th of August, there was a hailstorm at Heyford (Oxen); 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.^{56, 57}

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.^{41, 43}

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.⁹³

On 10 September 1800 in *England*, there was a hailstorm in Lincolnshire and Rutland.⁹³

On 15 September 1800, there was a great storm of thunder and lightning throughout *England*.¹²⁸

In the *West Indies* in October, there was great destruction from flooding at St. Domingo; 1,400 lives lost.^{41, 43, 47, 56}

In *England* on the 3rd of November, a great storm inflicted serious damage in various parts, and especially in London.^{41, 57} [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*.^{43, 90}

1801 A.D. The maximum temperature during the summer in Mons, *Belgium* was 97.3° F (36.3° C) on 15 July.⁶²

On 16 July 1801 in *England*, there was a hailstorm in Oxfordshire.⁹³

On 22 July 1801, the *Bahama* Isle received immense damage from a storm and inundation.^{41, 56, 128}

In December 1801, the Rhône River produced floods at Lyon, *France*. Docks and adjacent streets, the neighborhood of Brotteaux and the suburb of Guillotièrè 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.⁷⁹

In *Holland* and *Germany* in November, there was great damage on the seacoast from flooding.^{41, 43, 47, 56}

On 21 November 1801, there were inundations on the coast of *Holland* and *Germany*.¹²⁸

On 21 November 1801, there was a great storm in Devonshire, *England* and in the *Baltic*.¹²⁸

A storm struck Devonshire, *England* and the *Baltic* in November.⁴¹

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.^{57, 91}

In 1801, there was a famine felt throughout the kingdom [*Great Britain*].⁹⁰

Winter of 1801 / 1802 A.D. The Meuse River, the Rhine River in *Germany*, and the Saône River in *France* froze.⁶²

In January 1802, southern *France* experienced cold temperatures that dropped down to 13.5° F (-10.3° C).⁷⁹

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.⁶²

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].⁷¹

On 21 January 1802, there was a great storm at Liverpool, Manchester, Chester, and Whitehaven, *England*.¹²⁸

1802 A.D. – 1807 A.D. India.

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."⁵⁷

In *India*, there was a total failure of rain in the "ceded districts" of Allahabad. "Not a shower fell after the 12th 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."⁴⁷

In 1803 in Khandesh (Hindustan, now called *India*), a famine carried off a large number of the population.⁹¹

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."⁵⁷

1802 A.D. In *England*, there were great floods; much damage to shipping.^{47, 92}

In Dublin, *Ireland* during January and February, there was a great overflow of the River Liffey causing immense damage.^{47, 56, 92}

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.^{47, 90, 92}

On 18 July 1802, there was a violent storm, which did considerable injury in the North of *England*.¹²⁸

On 10 August 1802 in *England*, there was a hailstorm in Leicestershire and Warwickshire.⁹³

A storm struck the north of *England* on August 18, 1802.⁴¹

On 24 August 1802 in *England*, there was a great storm in Durham and Northumberland.⁹³

On 28 August 1802 in *England*, there was a hailstorm in Northumberland.⁹³

On 2-3 December 1802, there was an inundation in Dublin, *Ireland*, and parts adjacent.⁴³

On 2-3 December 1802, an inundation of the River Liffey, did immense damage in Dublin, Ireland.^{90, 128}

In 1802 in *Southern Europe*, there were great rainstorms.^{47, 92}

The summer was in *the North, the East*, and a portion of *the South of Europe* very hot and very dry. In *Holland* and a part of *Jutland*, the heat was extremely abnormal. The highest observed temperatures during the summer were: ⁶²

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. ⁶²

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. ⁶²

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. ¹

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. ¹

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. ⁶²

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. ¹²⁸

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* 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: ⁶²

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 30th, and on May 14th, 15th, and 18th. Cold rains followed this cold dry spell and lasted from May 20th to June 3rd, except 28th and 29th, where the air is suddenly softened to cool soon after to June 8th. 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 21st.⁷⁹

1803 A.D. The River Thames went dry in London, *England* and people were able to cross the river on foot.¹

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).⁶²

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 1802.¹⁰³

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.⁹³

On 21 July 1803 in *England*, there was a hailstorm in Leicestershire.⁹³

In 1803 in *France* after the long winter and cold spring, the weather suddenly turned warm. On the 28th 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 5th, August 1st 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.⁷⁹

[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.⁶²

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.⁷⁹

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.⁷⁹

The highest observed temperatures during the summer were:⁶²

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 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.⁶²

Major storms reigned in *France* in 1803.⁷⁹

In 1803 in *Australia*, there was a severe drought in New South Wales.¹⁰¹

Also refer to the section 1802 A.D. – 1807 A.D. for information on the famine in India during that timeframe.

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.¹²⁸

On January 19th 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.^{41, 56}

On 4 May 1804 in *England*, there was a great hailstorm in Cheshire and Lancashire.⁹³

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.¹²⁸

On May 11, there was a great storm at Newfoundland, *Canada* and eighty vessels were lost.¹

On 8 May 1804 in *England*, there was a hailstorm in Lancashire and in Wales at Montgomeryshire.⁹³

In 1804, there was unprecedented exceedingly severe drought in the Midwest of the *United States*.¹¹¹

In early 1804 in *India*, there were several hailstorms in Allahabad.^{57, 93}

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, 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.¹

On 5 November 1804, reports were received of a hurricane in the *West Indies* resulted in 244 ships lost in the English islands.¹²⁸

On 1 November 1804 in *England*, there was a great hailstorm in Cornwall.⁹³

During the summer of 1804, the temperature in Provence, *France* rose to 98.6° F (37° C).⁷⁹

Also refer to the section 1802 A.D. – 1807 A.D. for information on the famine in India during that timeframe.

Winter of 1804 / 1805 A.D. 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° F (-35° C) or lower. These occurred in 1804 on December 12 (-38° F, -39° C), December 17 (-45° F, -48° C), December 18 (-32° F, -36° C), in 1805 on January 10 (-40° F, -40° C), January 11 (-38° F, -39° C), and January 13 (-34° F, -37° 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° F (-34° C). On January 15, 2009, the temperature fell to -44° F, (-42° C).^{16,17}

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.¹²⁸

1805 A.D. On 28 June 1805 in *England*, there was a hailstorm in Middlesex.⁹³

On July 6, a dreadful storm struck Kingston upon the River Thames in *England*.^{41,56}

On 6 July 1805, there was a dreadful storm at Kingston-upon-Thames, *England*.¹²⁸

The maximum temperature during the summer in Stockholm, *Sweden* was 99.5° F (37.5° C) on 12 July.⁶²

On 30 July 1805 in *England*, there was a hailstorm in Northumberland.⁹³

On 8 and 9 November an awful destructive storm struck the *British Channel*. Many vessels and several hundred lives were lost.¹

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.¹

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.¹⁸

Also refer to the section 1802 A.D. – 1807 A.D. for information on the famine in India during that timeframe.

1806 A.D. On 17 January 1806, a lunar rainbow appeared near Wakefield, *England*.¹²⁸

In March 1806 in *Australia*, the Hawkesbury River flooded. Five people were drowned. Animals and stacks of wheat were swept away.¹⁰¹

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 when overtaken by a storm while returning to Port Dalrymple, Tasmania, from the Bass Strait islands with a seal gang and seal skins.^{99, 109}

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. On 24 September 1806, wheat rose to £4 a bushel, and the 2 pound loaf of bread to 5s.¹⁰³

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.¹⁰³

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 20th 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.¹¹⁰

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.¹¹⁰

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.¹¹⁰

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.¹¹⁰

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.¹¹⁰

On 6 June 1806 in *England*, there was a hailstorm in Worcestershire and Herefordshire.⁹³

On 7 July 1806 in *England*, there was a hailstorm in Rutlandshire.⁹³

On 22 July 1806 in *England*, there was a hailstorm in Suffolk.⁹³

On 24 July 1806 in *England*, there was a hailstorm in Middlesex.⁹³

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.¹²⁸

On 9 and 21 August 1806 in Dublin, *Ireland*, there were great hail showers.⁹³

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.^{99, 109}

The maximum temperature during the summer in Arles, *France* was 99.5° F (37.5° C) on 20 August.⁶²

On 29 August 1806 in *England*, there was a hailstorm in Somersetshire.⁹³

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.⁷⁹

On 9 September 1806, reports were received of a tremendous hurricane that struck *Dominica*. Many persons died.¹²⁸

On 24 September 1806, there was a heavy hailstorm that did much damage to crops at the Hawkesbury River, in New South Wales, *Australia*.¹⁰³

Also refer to the section 1802 A.D. – 1807 A.D. for information on the famine in India during that timeframe.

Winter of 1806 / 1807 A.D. 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”.²⁷

On 26 December 1806, one of the highest tides ever remembered happened. Boats rowed in Palace Yard in London, *England*.¹²⁸

1807 A.D. In Dublin, *Ireland*, there were great floods in the neighborhood.^{47, 92}

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].⁷¹

On 2 May 1807 in *England*, there was a great hailstorm in Suffolk, also in Cumberland, Lancashire, and Leicestershire.⁹³

On 10 May 1807 in *England*, there was a hailstorm in Staffordshire.⁹³

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.⁹³

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:⁶²

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 *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).⁶²

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.⁶²

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.⁷⁹

On 10 November 1807, Honiton Bridge [Devon, *England*] carried away by a flood.¹²⁸

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, *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.¹²⁸

On 2 February 1808, the breakwater at Cherbourg [*France*] injured by a storm.¹²⁸

On 16 February 1808, a snowstorm halted travelling in the north [of *England*].¹²⁸

1808 A.D. In *England*, there were floods in various parts.^{41, 43, 47, 56}

On 25 June 1808, there was a violent hurricane, attended by an earthquake at Montaldo, *Italy*.¹²⁸

On 13 July 1808 in *England*, there was a hailstorm in Somersetshire, and in Gloucestershire.⁹³

In July 1808, the temperature [in London, *England*] rose to 93.5° F (34.2° C).¹²⁸

On 15 July 1808, there was a thunderstorm in Somersetshire, *England*, when the hailstones measured from six to seven inches.¹²⁸

On 15 July 1808 in *England*, there was a hailstorm in Oxfordshire, and in Somersetshire. Hailstones measured 6 or 7 inches in circumference.⁹³

In Somersetshire, *England* on the 15th of July, there was a great thunderstorm, accompanied by hailstones, measured 6 and 7 inches in circumference.^{41, 43, 56, 57}

On 16 July 1808 in *England*, there was a great hailstorm in Gloucestershire and Somersetshire.⁹³

On 16 August 1808 in *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.⁹³

The vineyards of Tokaj, *Hungary* were destroyed by a hailstorm.⁴¹

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.¹²⁸

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:⁶²

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.⁶²

Winter of 1808 / 1809 A.D. On 18 December 1808, a sheep, one year old, buried in the snow [in *Great Britain*] since the 19th of November was found alive.¹²⁸

On 9 December 1808, great damage done to the adjoining warehouses and cellars by the overflowing of the River Thames in *England*.¹²⁸

During the Finnish War, 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 24.³⁶

The *Baltic Sea* froze.³⁷

During the winter of 1808-09, the *Baltic Sea* was completely covered with ice.⁶⁸

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.⁶² [The mercury in mercury thermometers solidifies (freezes) at -37.89 °F (-38.83 °C).]

1809 A.D. – 1811 A.D. Australia.

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 1789-1791.¹⁰¹

In January 1809 in New South Wales, *Australia*, there was a drought. In April there was a long period of dry weather.¹⁰³

On 11 February 1810 in New South Wales, *Australia*, town gangs cleaned out [water] tanks.¹⁰³

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.¹⁰³

1809 A.D. On 28 March 1809 in *England*, there was a hailstorm in Sussex.⁹³

In April 1809, there was a major flood when the Derwent River overflowed its banks in Tasmania, *Australia*.⁹⁹

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.^{99, 109}

On 18 May 1809 in *England*, there was a great hailstorm in Essex and Middlesex.⁹³

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*.⁶²

In 1809 in Tasmania, *Australia*, the Derwent River overflowed its banks.¹⁰¹

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.^{99, 109}

In 1809 in *Australia*, the Hawkesbury River flooded.¹⁰¹

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. 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).]¹

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, *France* (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.⁶²

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.¹

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.⁴³

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.⁸⁴

In Lincolnshire, *England*, an inundation broke down the seabanks.⁴⁷

From the 6th to the 8th of March in 1810, there was a violent tempest at Cadiz, *Spain*, which caused great destruction among the shipping.⁴³

On 6 March 1810, a storm at Cadiz, *Spain* destroyed thirty-six ships.¹²⁸

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.⁹¹

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.]¹²⁸

On 1 July 1810, there was a violent storm in London, *England*. The effects of which were felt in most parts of *England*.⁴³

On 15 July 1810 in *England*, there was a great hailstorm in Berkshire and Middlesex.⁹³

On 4 August 1810 in *England*, there was a hailstorm in Cumberland.⁹³

On 14 August 1810 in London, *England*, there was a great hailstorm and much damage in the northwest districts.⁹³

On 14 & 15 August 1810, the thunder and lightning [in *England*] of these two days did immense damage. Many persons were killed.¹²⁸

On 15 August 1810 in *England*, there was a hailstorm at Windsor. There was great destruction by unusually large hailstones.⁹³

On 28 August 1810, it was reported that there was a great hurricane at *Barbados*.¹²⁸

On September 7 1810, a very destructive hurricane struck South Carolina and Georgia in the *United States* and many lives were lost.¹

On 3 November 1810, it was reported that at Boston [*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.¹²⁸

On 10 November 1810, there was an inundation at Boston [*England*], caused by the tide breaking down the sea banks.⁴³

Also refer to the section 1809 A.D. – 1811 A.D. for information on the drought in Australia during that timeframe.

Winter of 1810 / 1811 A.D. The Meuse River froze. For several days, individuals crossed the ice on foot on the Saône River at Lyon, *France*.⁶²

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 1st of December the thermometer at Avignon sank to 23° F (-5° C). On the 3rd 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 27th with a reading of 18.5° F (-7.5° C). At Montpellier, the temperature dropped to 18.5° F (-7.5° C) on January 6th 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 2nd.⁷⁹

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:⁶²

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.¹²⁸

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.^{43, 47, 92}

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.⁹⁰

In 1811, ninety-four communities in northern *France* were ravaged by storms in April, May and June.⁷⁹

In Shropshire, *England* in May, there was a cloudburst near Salop; many persons and cattle drowned.^{47, 92}

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.¹²⁸

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.^{43, 90}

On 28 May 1811 at Worcester, *England* was struck by a storm, which raised the River Severn 20 feet in 24 hours.⁴³

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.⁹³

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.¹²⁸

On 5 June 1811 in *England*, there was a hailstorm in Yorkshire and in Suffolk.⁹³

On 8 June 1811 in *England*, there was a hailstorm in Worcestershire.⁹³

On 3 August 1811 in Leitrim, *Ireland*, there was a great storm of rain and hail, which destroyed the crops.⁹³

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:⁶²

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 6th 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.⁶²

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.⁶²

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.⁷⁹

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 10th to 20th, and the grape harvest began on September 8th. 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.⁷⁹

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.⁷⁹

On September 8, a terrible tornado struck Charleston, South Carolina in the *United States*. Many lives were lost and there was great destruction.¹

In Lüneburg, *Germany* in October, the village of Wurgen was swept away by overflowing of the River Elbe.^{43, 47}

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.¹²⁸

There was an inundation on 29 November 1811 caused by the bursting of the Driggle reservoir, nine miles west of Huddersfield, *England*, by which a cottage was swept away, and four children with their father and mother perished in the flood.⁴³

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.⁸⁴

Also refer to the section 1809 A.D. – 1811 A.D. for information on the drought in Australia during that timeframe.

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).¹

Another dense fog occurred in London, *England* on 10 January 1812 similar to the one of 1 January 1729.²

On 10 January 1812, there was a remarkable fog in London, *England*.¹²⁸

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.¹⁰³

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.⁶²

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.⁷⁹

In 1812 in the *United Kingdom*, there was great scarcity in *England* and *Ireland*.^{57, 91}

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*.⁴³

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.¹²⁸

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 [Gujerat] 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.”⁵⁷

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.”⁵⁷

Winter of 1812 / 1813 A.D. In 1812, the frost in *Russia* was very severe.^{47, 90, 93}

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 17th and 18th.⁶²

On 20- 27 December 1812, there were remarkable thick fogs in London, *England*.¹²⁸

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.^{58, 80}

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 *Spain* were all covered with ice. The *Baltic Sea* froze for many miles from land, and the Ikagerack and the Cattagat 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.⁶³ [The mercury in mercury thermometers solidifies (freezes) at -37.89 °F (-38.83 °C).]

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° R. (-13° F, -25° C). On 30 November it continued to decline to -24° R. (-22° F, -30° C). On 3 and 6 December at Molodechno (now Maladzyechna, *Belarus*) the temperature read -30° R. (-35.5° F, -37.5° 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.^{62, 70}

The severe frost was very destructive to the French army in its retreat from Moscow, *Russia*. Napoleon commence his retreat on the 9th 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.⁹⁰

In the rest of *Europe* during December 1812, the weather was extremely severe. In Paris, *France*, the lowest observed temperatures fell to 12.9° F (-10.6° C) on 9 December 1812, and 19.4° F (-7° C) on 21 January 1813. The lowest temperatures observed at different locations were as follows:⁶²

Liège, <i>Belgium</i>	(0.5° F, -17.5° C)
Maastricht, <i>the Netherlands</i>	(2.1° F, -16.6° C) on 14 December 1812
<i>Ibid.</i>	(16.0° F, -8.9° C) on 25 January 1813
Strasbourg, <i>France</i>	(3.9° F, -15.6° C)
Moens, <i>France</i>	(5.0° F, -15.0° C) on 14 December 1812
Poitiers, <i>France</i>	(9.7° F, -12.4° C) on 26 January 1813
Paris, <i>France</i>	(12.9° F, -10.6° C) on 9 December 1812
Avignon, <i>France</i>	(23.0° F, -5.0° C) on 25 January 1813
London, <i>England</i>	(25.0° F, -3.9° C) on 9 December 1812 and 29 January 1813
Hyères, <i>France</i>	(32.0° F, 0.0° 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.⁶²

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.¹²⁸

1813 A.D. – 1815 A.D. Australia.

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.¹⁰¹

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.¹⁰³

In 1814 in New South Wales, *Australia*, there was a drought.¹⁰³

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*.¹⁰³

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.^{47, 92}

In 1813, there was a dreadful inundation in *Hungary*, *Austria*, *Silesia*, and *Poland* in the summer.^{43, 90}

Major storms reigned in *France* in 1813.⁷⁹

On 17 May 1813 in *England*, there was a great hailstorm in Cheshire.⁹³

On 9 June 1813 in *Wales*, there was a great hailstorm in Glamorganshire.⁹³

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.^{47, 92} These floods occurred in June and July.⁴³

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.”⁷⁴

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.⁹⁰

In the *United States*, there was a great overflow of the Mississippi River; immense damage.⁴⁷

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.⁴³

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.¹²⁸

[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).⁶²

Poland in 1813 suffered from a famine caused by an inundation.^{57, 91} Drontheim, *Norway* suffered from a famine as a result of the interception of supplies by the Sweden.^{57, 90} This caused 5,000 to perish.⁵⁷

“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.⁷⁴

On 20 July 1813, it was reported that a hurricane at *Bermuda* destroyed one third of the houses.¹²⁸

On 26 July 1813 in *England*, there was a storm the struck Bielby, near Pocklington. Several persons making hay were knocked down, and a young woman killed.⁴³

In August 1813, a great Atlantic hurricane struck the island of *Martinique* causing approximately 3,000 deaths.¹⁰⁷

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.⁴³

“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.”⁷⁴

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.⁴³

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.¹²⁸

In *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.⁵⁷

In Goojerat, Hindostan [now *India*] in 1813-14, the province suffered from severe famine.⁹¹

The River Waag, 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, *Slovakia* about thirty houses were overturned. One half of the extensive district of Trentschin was laid waste.⁷⁴

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.^{47, 92}

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.^{43, 90}

“Letters from Belgrade mention that there had been an inundation of the Danube in the neighbourhood of Widden, during the night of the 14th 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.”⁷⁴

On 28 September 1813, accounts were received of dreadful inundations in *Hungary, Austria, Silesia* and *Poland*.¹²⁸

On 28 September 1813, two thousand Turks encamped on a small island near Viddin [Vidin, *Bulgaria*] drowned by the overflowing of the Danube River.¹²⁸

On 28 September 1813, six villages destroyed by the overflowing of the Drava River in south central *Europe*.¹²⁸

In October in *England*, there was a great storm of hail in Bedfordshire.⁹³

In Bedfordshire, *England* in October, there was a great storm of thunder, lightning and hail, with fireball [lightning strikes], which set fire to buildings.⁵⁷

Also refer to the section 1813 A.D. – 1815 A.D. for information on the drought in Australia during that timeframe.

Winter of 1813 / 1814 A.D. 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.¹

Another dense fog occurred in London, *England* from December 20-27, 1813 similar to the fog of 1 January 1729.²

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.¹²⁸

On 10 January 1814, seven boys drowned in the River Trent in *England* by the breaking of the ice.¹²⁸

On 10 January 1814, in a sudden storm and swell near Belfast, *Ireland*, many fishing boats lost and above one hundred people perished.¹²⁸

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.¹²⁸

“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.”²⁹

“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.”²⁹

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).^{2, 42, 43}

“When Louis XVIII (of *England*) 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.^{47, 93}

In January 1814, there was a great fall of snow in every part of *England*.⁴³

In *England*, there were fairs on the frozen River Thames during the winter of 1813-14.⁹⁰

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*.⁹⁰

In 1814 in *Ireland*, the winter was very severe.^{47, 93}

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.¹²⁸

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 24th of May.¹²⁸

1814 A.D. In *Ireland*, the River Shannon overflowed and did great damage.^{47, 92}

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.⁹⁰

In Bengal [*Bangladesh*], there was a great overflow of the Narbudda River, sweeping away villages, inhabitants, and cattle.⁴⁷

On 12 February 1814, there was an flood caused by the overflowing of the Narbudda River, in the provinces of Bengal [*Bangladesh*], which swept away 15 villages, with the houses, inhabitants, and cattle.⁴³

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.⁹³

On 1 September 1814 in *England*, there was a hailstorm in Warwickshire.⁹³

On 19 October 1814, it was reported that the vintage [wine] on the Rhine River in *Western Europe* failed.¹²⁸

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.¹²⁸

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*.¹²⁸

On 16-17 December 1814, a tremendous storm throughout *Great Britain* and *Ireland* did immense damage and caused many ships to wreck.^{57, 90}

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.⁷⁹

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.⁷⁹

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.¹⁰³

Also refer to the section 1813 A.D. – 1815 A.D. for information on the drought in Australia during that timeframe.

1815 A.D. It was reported that the season was so backward this year in *Canada* that snow fell on the 20th of May 1815 and the trees were not in leaf before the 4th of June.¹²⁸

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:⁶²

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.¹²⁸

On 6 August 1815 in *England*, there was a great hailstorm in Berkshire.⁹³

A severe frost occurred in Quebec, *Canada* in 7 August 1815.^{2, 42, 43, 47}

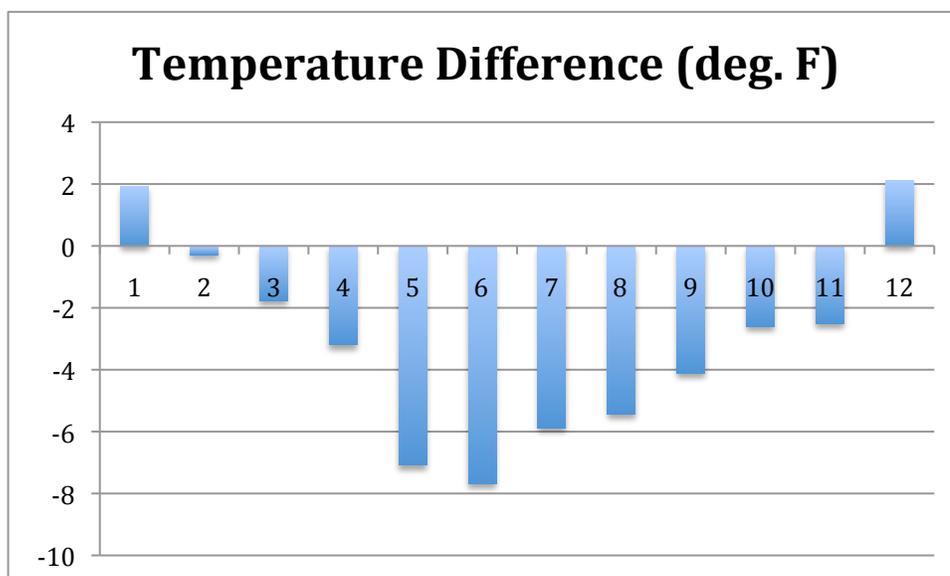
In September 1815, “The Great September Gale,” the worst storm to hit New England in almost 200 years, devastated parts of Connecticut, Rhode Island and Massachusetts in the *United States*.¹⁹

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.¹²⁸

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.”^{42, 43}

Also refer to the section 1813 A.D. – 1815 A.D. for information on the drought in Australia during that timeframe.

1816 A.D. The Tambora eruption occurred on 10 April 1815 on Sumbawa Islands in *Indonesia*. It was rated as a 7 on the Volcanic Explosivity Index (VEI).²⁰ 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 1816.¹ 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:⁶²

	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.^{1, 21}

In northern *France* in 1816, the weather was unusually cold, with strong winds, cloudy skies, barometric changes and excessive moisture, without intermission.⁷⁹

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* that caused the failure of crops. In Sorèze, *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 that 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.⁶²

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 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.⁷⁹

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.^{47, 90, 92}

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.^{43, 128}

In *England* in February, great floods occurred in Northumberland and Durham.⁴⁷ This was the greatest flood ever remembered for this location.⁴³

On 12 February 1816, the greatest flood ever remembered occurred in Northumberland and Durham, *England*.¹²⁸

On 27 February 1816, considerable damage was done at Birmingham, Liverpool, Manchester, and other northern towns in *England*, by tremendous gales of wind.¹²⁸

In March 1816, fifty-three villages in the great Werder, *Germany*; forty-nine villages in the districts of Siegenhoff [Siegenhof, *Germany*]; and seventeen Elbing [Elbląg, *Poland*] villages were under water.⁴³

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.^{47, 90, 92}

In *Ireland* on April 21/22, there were great floods at Londonderry.^{47, 92}

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.^{99, 109}

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).⁹³

On 28 June 1816 in *Germany*, there was a dreadful hurricane near Vibbel (Frankfort). 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."⁹³

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.¹

On 2 July 1816, a dreadful storm fell upon the town of Worschetz, [Vršac, *Serbia*] in the county of Timeswar, that of 2,600 buildings, none escaped without damage.⁴³

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.⁹³

In *Germany* during June and July, the harvest greatly endangered from continued rains.⁴⁷

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.⁹³

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.⁴³

In Cumberland and Westmoreland, *England* in August, there was a great storm of wind and hail which desolated these counties.⁵⁷ Some of the pieces of ice were an inch in diameter.⁴³

In August 1816 in *England*, there were severe hailstorms in the counties of Cumberland and Westmoreland.⁹³

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.⁹²

In *England* on the 31st of August, there was an awful gale, by which a great number of vessels were lost, and much damage done on the coasts.⁵⁷ And much damage was done to the shipping in general on the English coast.^{43, 90}

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.¹²⁸

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 1816.⁴³

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.¹²⁸

In 1816 red snow fell on the mountains of *Italy*.¹²⁸

1817 A.D. 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.¹

On 21 January 1817, there was a dreadful storm at Plymouth, *England*. Damage done to the new Breakwater to a great amount.¹²⁸

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."¹⁸

On 27 February 1817, a tremendous gale of wind, which did considerable damage at Birmingham, Liverpool, Manchester, and other northern towns in *England*.⁴³

On 27 February 1817 in *Ireland*, there was a hurricane with heavy hail.⁹³

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.^{99, 109}

On 20 March 1817, the floods were so great round Oxford, *England*, that the city appeared like an island.¹²⁸

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.⁷⁹

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].⁷¹

On 21 June 1817 in *England*, there was a great hailstorm in Gloucestershire and Wiltshire.⁹³

On 23 June 1817 in *England*, there was a hailstorm in Somersetshire.⁹³

On 8 July 1817, it was reported that there were great inundations in *Switzerland*.¹²⁸

On 28 July 1817 in *England*, there was a hailstorm in Middlesex.⁹³

Germany and *France* suffered famines in 1817.⁹⁶

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 1719.⁷⁹

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*.¹²⁸

1818 A.D. 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.¹²⁸

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*.¹²⁸

On 4 March 1818, a tremendous hurricane throughout *England*, which did considerable damage to the shipping at the ports.⁴³

On 7 April 1818, there was a storm in *Sweden*, which threw down several churches, many houses and greatly injured the forests.¹²⁸

On 26 April 1818 in *England*, there was a great hailstorm in Bedfordshire and Middlesex.⁹³

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*].¹²⁸

In *Ireland*, there were great floods; waterspout in Clare.^{47, 92}

On 19 July 1818 in *England*, there was a great hailstorm in Cumberland.⁹³

On 27 July 1818 in *England*, there was a hailstorm in Norfolk.⁹³

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.⁶²

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.⁷⁹

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:⁶²

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.¹²⁸

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*].¹²⁸

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 (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.⁶²

In *England* in August, great quantities of rain fell; harvest much delayed. Also on the continent.⁴⁷

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.⁶²

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.¹²⁸

Winter of 1818 / 1819 A.D. The Meuse River was frozen in December 1818.⁶²

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.¹²⁸

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:⁶²

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

1819 A.D. In *Ireland*, great floods in the north.^{47, 92}

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.^{99, 109}

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.¹²⁸

In *England* in June, large tracts of land flooded in the Fen Country.^{47, 92}

In June 1819 in *England*, an inundation caused 5,000 acres to be deluged in the Fen countries.⁹⁰

On 4 July 1819 in *England*, there was a hailstorm in Yorkshire and Norfolk.⁹³

On 7 July 1819 in *France*, there was a terrific hailstorm in the arrondissement of Montagis. 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.⁹³

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.¹²⁸

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.⁹³

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.¹²⁸

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.¹²⁸

On 24 July 1819 in *England*, there was a hailstorm in Lincolnshire.⁹³

On 17 August 1819, a whirlwind at Aldborough, Suffolk, *England*, carried up a quantity of barley from a field to a great height.¹²⁸

In September 1819 in *Ireland*, there were great thunder and hailstorm in County Kilkenny. There was extensive injury to potatoes and corn.⁹³

On 21 and 22 September 1819, there was a destructive hurricane in the *West Indies*, which did considerable damage in the Leeward Islands.¹²⁸

From 20-22 September 1819, a dreadful hurricane ravaged the Leeward Islands [in the *Lesser Antilles*]. At the island of St. Thomas alone, 104 vessels were lost.^{57, 90}

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, the kharif [autumn harvest] of 1819 failed extensively, and frost nipped the spring crops in the beginning of 1820."⁵⁷

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.⁷⁹

The year 1819 produced heavy rainfalls and a greater number of rainy days in southern *France*.⁷⁹

In 1819, three rainbows were seen distinctly in Boston, in the *United States*.¹²⁸

In 1819, a shower of red and rose colored snow fell in Carniola [now *Slovenia*], and the neighboring counties. The red matter consisted of silex [pure form of silica or silicate], alumina, and oxide of iron.¹²⁸

Winter of 1819 / 1820 A.D. 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.⁶²

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 18th. The cold winter killed all the orange [trees] and damaged the vineyards and olive groves.⁷⁹

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:^{62, 70}

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.⁶²

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.⁶²

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*.⁶²

In *Holland*, 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.⁶²

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.⁶²

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.^{62, 70}

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.⁶²

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.⁶²

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, *France*, and on the banks of the Durance River and around Bordeaux.⁶²

On 5 January 1820, there was a hurricane in Newfoundland, *Canada*.¹²⁸

On 6 January 1820, there was an intense frost at Glasgow, *Scotland*.¹²⁸

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.¹²⁸

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 produce."⁵⁷

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.⁴³

On 30 July 1820 in *England*, there was a great hailstorm in Essex.⁹³

On 31 July 1820 in *England*, there was a hailstorm in Norfolk, Suffolk, Shropshire, and Sussex.⁹³

On 20 September 1820, a destructive gale was reported in the *West Indies*.¹²⁸

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.¹⁰³

Winter of 1820 / 1821 A.D. 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:¹

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.¹

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.³⁸

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.²⁷

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 3rd of January, wagons rode on the ice.⁶²

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:⁶²

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, <i>France</i>	(23.0° F, -5.0° C) on 2 January

1821 A.D. In *England*, disastrous rains and floods.^{47, 92}

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.⁷⁹

The high temperatures observed during the summer were:⁶²

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.^{47, 92}

In New South Wales, *Australia*, there was a drought from September 1821 to February 1822.¹⁰³

On November 1821 a great storm struck along the coast from Durham to Cornwall in *England*. Many vessels were lost.^{57, 90}

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, *Russia* and points further north; warm winds prevailed. There was an absence of snow everywhere. From Berezov (Beryozovo), *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.⁶²

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).⁶²

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.⁶²

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.⁷⁹

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.⁷⁹

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).⁶²

Southern *France* experienced a very harsh winter in 1821-22. The winter destroyed a large quantity of olives trees.⁷⁹

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.⁶²

Towards the end of 1821, the winter climate in *Canada* was severe cold. The Lawrence River was frozen from Montreal.⁶²

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 Igloolik [Igloolik Island, *Canada*] in December, January, February and March 1822.⁸⁰

1822 A.D. In *Great Britain* in January, there were great storms and floods through the British Islands generally.^{47, 92}

In Geneva, *Switzerland*, there were great floods; serious damage.^{47, 92}

Russia suffered from a major famine in 1822.⁹⁶

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."¹²³

On 7 May 1822 in *Germany*, there was a hailstorm at Bonn. The hailstones weighed from 12 to 13 ounces (340 to 369 grams).⁹³

On 25 May 1822 in *England*, there was a hailstorm in Middlesex.⁹³

On 30 May 1822 in *England*, there was a hailstorm in Worcestershire.⁹³

On 6 June 1822, a great cyclone struck Bombay, *India*. As many as 100,000 of the inhabitants destroyed by the tidal wave (storm surge), and probably an equal number of cattle.^{47, 57}

In 1822, a powerful cyclone struck Barisal, *Bangladesh* causing 50,000 deaths.⁹⁸

The great gale of 1822, caused the loss of 200 lives in Georgetown County, South Carolina in the *United States*.¹¹⁸

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:⁶²

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.⁶²

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.⁶²

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 and a number of municipalities in the canton of Vaud, *Switzerland*.⁶²

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).⁷⁹

Major storms reigned in *France* in 1822.⁷⁹

In Havana, *Cuba*, there was a great deluge.^{47, 92}

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.”⁵⁷

In 1822 in *Ireland*, there was a dreadful famine, produced by failure of the potato crop.⁹¹

In *Ireland*, there were great storms and inundations at Wexford and Cork.^{47, 92}

In *Ireland* on the 12th of December, there was a great storm and considerable destruction of property, particularly in the neighborhood of Dublin.⁵⁷

On 12 December 1822, a storm struck *Ireland*, particularly in the vicinity of Dublin, many houses were thrown down, and vast numbers unroofed.⁹⁰

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 30th of January 1823.⁶²

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 *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* 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, *Italy* and the Roman States [*Italy*] there was much snow. At Domo d'Ossola (Domodossolain), *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:⁶⁵

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.¹¹³

1823 A.D. On 17 February 1823, there was a terrific hailstorm in New South Wales, *Australia*.¹⁰³

The maximum temperature during the summer in Ambikūl, *Sudan* was 116.4° F (46.9° C) on 31 May.⁶²

On 5 June 1823 in *England*, there was a great hailstorm in Buckinghamshire.⁹³

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).⁶²

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.⁶²

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).⁶²

A fall of snow occurred in *Jamaica* at Annotobay on 15 December 1823.⁴³

1824 A.D. In *India*, there was a severe drought in the Delhi, and some other districts.⁴⁷

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.⁵⁷

In 1824 in *Australia*, due to a severe drought, the crops failed in New South Wales.¹⁰¹

In *Ireland*, there were great floods at Belfast.^{47, 92}

On 22 May 1824 in *England*, there was a hailstorm in Somersetshire.⁹³

On 20 June 1824 in *England*, there was a great hailstorm in Cheshire.⁹³

On 14 July 1824 in London, *England* and vicinity, there was a great thunder and hailstorm. This storm also struck Essex and Hertfordshire.⁹³

On 3 August 1824 in *England*, there was a hailstorm in Suffolk.⁹³

In August 1824 in *Ireland*, there was a great hailstorm in the counties of Carlow, Kilkenny, and Wexford. A numbers of small birds were found dead.⁹³

In 1824 in southern *France*, there were some very hot days. On 8 July, Sorèze, *France* experienced thunderstorms, rainy weather, and a rare east wind. On 11 July excessive heat materialized. The temperatures continued to rise on the 12th when it reached 99.5° F (37.5° C). During this time many people died in the fields from the heat; at Revel, Toulouse and in other areas. The next day the sun was very hot, although the atmosphere was gloomy. This intense heat lasted until the nights of 18 to 19 July. This area had an abundant grain harvest, but corn and potatoes were mediocre.⁶²

Northern *France* experienced long rain and moderate temperatures during the summer. In Burgundy, the weather was unstable, marked by alternations of heat and cold. The grape harvest began on 19 September. The quantity and quality of the wine was very mediocre. In the region of Bordeaux, the yield was abundant, but the wine seemed hard and bad. The corn harvest in *France* was satisfactory.⁶²

The summer of 1824 produced many thunderstorms in northern *France*. In September, soon after these thunderstorms, great gusts of wind and diluvial [flood] rains struck.⁷⁹

The summer of 1824 in Paris, *France* was characterized by:

Hot days	26 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 high temperatures observed during the summer were:⁶²

Mechelen, <i>Belgium</i>	(101.8° F, 38.8° C) in July
Avignon, <i>France</i>	(100.4° F, 38.0° C) on 13 July
Sorèze, <i>France</i>	(99.5° F, 37.5° C) on 12 July
Pavia, <i>Italy</i>	(99.5° F, 37.5° C)
Paris, <i>France</i>	(95.5° F, 35.3° C) on 14 July
Maastricht, <i>the Netherlands</i>	(94.3° F, 34.6° C) on 14 July
Liège, <i>Belgium</i>	(91.6° F, 33.1° C)
La Chapelle, <i>France</i>	(91.2° F, 32.9° C) on 14 July
Strasbourg, <i>France</i>	(90.0° F, 32.2° C)
Marseille, <i>France</i>	(86.9° F, 30.5° C)
Arras, <i>France</i>	(86.0° F, 30.0° C) on 14 July
Brussels, <i>Belgium</i>	(86.0° F, 30.0° C) on 14 July
London, <i>England</i>	(80.1° F, 26.7° C) on 13 July and 1 September

In 1824 long rains reigned in northern *France*. They were mentioned in Strasbourg, Paris, Rouen and Metz. They did not extend to the southern *France*.⁷⁹

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.^{47, 92}

On 23 November 1824, a tremendous hurricane throughout *England*.⁴³

In New South Wales, *Australia*, turnips failed through the extreme drought of 1824.¹⁰³

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.¹⁰³

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.^{47, 92}

In Rotterdam, *Holland*, the Meuse River overflowed, doing considerable damage.^{47, 92}

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.⁵⁷

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.⁴³

On 10 July 1825 in *Ireland*, there was a dreadful hailstorm in Londonderry.⁹³

On 26 July 1825, a great Atlantic hurricane struck the islands of *Guadeloupe* and *Puerto Rico* causing approximately 1,300 deaths.¹⁰⁷

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.⁷⁹

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).⁷⁹

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:⁶²

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.⁶²

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.⁸⁰

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.¹¹³

1826 A.D. – 1829 A.D. Australia.

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.¹⁰¹

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.¹⁰³

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.”¹⁰³

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.”¹⁰³

On March 1829, during Sturt’s Expedition in *Australia*, it was written, “I saw rivers cease to flow and sheets of water disappear.”¹⁰³

1826 A.D. 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: ⁶²

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.⁷⁹

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.⁷⁹

On 12 June 1826 in *England*, there was a hailstorm in Sussex.⁹³

On 18 June 1826 in *England*, there was a great hailstorm in Buckinghamshire.⁹³

On 27 June 1826 in *England*, there was a hailstorm in Hertfordshire.⁹³

On 28 June 1826 in *England*, there was a great hailstorm in Berkshire, Essex, Middlesex, Shropshire, and Surrey.⁹³

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."⁶²

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.⁶²

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.⁶²

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 25th 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. The lowest temperatures recorded in different cities this winter:⁶²

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.⁶²

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.³⁸

1827 A.D. In Naples, *Italy*, there were a destructive inundations.^{47, 92}

On 1 May 1827 in *England*, there was a hailstorm in Surrey.⁹³

In July 1827 in *France*, there was a great hailstorm; injured vines and grain.⁹³

The maximum temperature during the summer in Geneva, *Switzerland* was 97.2° F (36.2° C) on 30 July.⁶²

On 17 August 1827 in *England*, there was a hailstorm in Suffolk.⁹³

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.⁷⁹

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 22nd 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.”⁵⁷

Also refer to the section 1826 A.D. – 1829 A.D. for information on the drought in Australia during that timeframe.

1828 A.D. In *England* on the 12th and 13th of January, there was an awful storm on the English coast; many vessels lost.⁵⁷

On 13 January 1828, a powerful storm struck Plymouth, *England*, casting 13 vessels ashore.⁴³

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.⁹⁰

In *Gibraltar* on the 18th of February, there was a great storm; more than 100 vessels destroyed.^{57, 90}

On 18 February 1828, a storm struck on the coast of *Spain*. Between 160 and 180 sail of merchantmen were lost at *Gibraltar*.⁴³

The high temperatures observed during the summer were:⁶²

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

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.⁷⁹

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*.⁷⁹

In 1828, thunderstorms and rainstorms filled southern *France*. These occurred during spring, summer and autumn. Most of these storms were accompanied by hail.⁷⁹

A dry heat fills the spring and summer of 1828. The heat was localized to southern *France*.⁷⁹

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.⁷⁹

On 12 September 1828 in *England*, there was a hailstorm in Kent.⁹³

In *Ireland*, there was a great rise of the River Shannon; Cork also flooded.^{47, 92}

In 1828, a powerful cyclone struck Nagasaki, *Japan* causing 15,000 deaths.⁹⁸

Also refer to the section 1826 A.D. – 1829 A.D. for information on the drought in Australia during that timeframe.

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*.⁶²

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, *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*.⁶²

The lowest temperatures recorded in different cities this winter: ⁶²

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.⁶²

1829 A.D. On 11 January 1829, there was the most violent storm of wind and hail ever known in New South Wales, *Australia*.¹⁰³

In Dantzic (Gdańsk, *Poland*) on April 9th, the Vistula River broke through its dykes, by which some 4,000 houses were destroyed and many of their occupants drowned. About 10,000 head of cattle were lost.^{47, 92}

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.⁹⁰

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.⁷⁹

Major storms reigned in *France* in 1829.⁷⁹

In June 1829 in *Spain*, there was a great hailstorm in Cazorta. Blocks of ice weighing nearly 5 pounds (2.3 kilograms) fell during a hailstorm.⁹³

On 14 July 1829 in *England*, there was a hailstorm in Kent.⁹³

On 31 July 1829 in *England*, there was a hailstorm in Lincolnshire and Sussex.⁹³

In *Scotland* on August 9th, 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.^{47, 92}

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.⁹⁰

There was an inundation in Moray, *Scotland* in 1829, when over 5,000 square miles [12,950 square kilometers] were flooded.⁴³

In *Ireland*, there were great floods in the south.^{47, 92}

Also refer to the section 1826 A.D. – 1829 A.D. for information on the drought in Australia during that timeframe.

Winter of 1829 / 1830 A.D. The *Baltic Sea* froze.³⁷

During the winter of 1829-30, the *Baltic Sea* was completely covered with ice.⁶⁸

In 1829, the Seine River in *France* was entirely frozen over.³⁸

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.⁶²

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.⁷⁹

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:⁶²

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 (now *Romania*) 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).⁶²

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.⁶²

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.⁶²

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.⁶²

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°F 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).⁶²

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.⁶²

In the south of *France* at Alais 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.⁶²

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."⁶²

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.⁶²

In *Switzerland*, the winter at high elevations was very severe. At Freiburg, *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, *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).⁶²

The following summarizes the lowest observed temperatures in various cities during the winter of 1829-1830:⁶²

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.⁷⁰ 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.⁶²

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, *the 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, *Germany*. The Inn River was frozen until Hall, *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, *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.⁶²

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, 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.⁶²

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, 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.⁶²

In Vienna, *Austria* in February, the dwellings of 50,000 inhabitants were under water.^{47, 90, 92}

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.^{47, 92}

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 24th. 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 9th and 10th 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.⁷⁹

In May 1830 in *Western Australia*, the city of Perth flooded.¹⁰¹

In May 1830, unexpected severe flooding caused heavy damage to the fledgling Swan River settlement in *Western Australia*.⁹⁹

On 25 June 1830 in *England*, there was a hailstorm in Norfolk and Suffolk.⁹³

In July 1830 in *Ireland*, the month was exceedingly unnatural, with hail, rain, and storm.⁹³

On 17 August 1830 in *England*, there was a hailstorm in Suffolk.⁹³

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.]⁹³

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.⁷⁹

During the summer of 1830 in Paris, *France*, there were a small number of very hot days. These came in late July and early August. The summer in Paris, *France* was characterized by:

Hot days	19 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 temperature in Paris was: 79.2° F (26.2° C) on 23 July; 79.3° F (26.3° C) on 24 July; 74.7° F (23.7° C) on 25 July; 78.8° F (26.0° C) on 26 July; 81.9° F (27.7° C) on 27 July;

87.4° F (30.8° C) on 28 July; 87.8° F (31.0° C) on 29 July; 85.1° F (29.5° C) on 30 July; 76.1° F (24.5° C) on 31 July; 81.5° F (27.5° C) on 1 August; 77.0° F (25.0° C) on 2 August; 76.5° F (24.7° C) on 3 August; 82.4° F (28.0° C) on 4 August; and 79.2° F (26.2° C) on 5 August
The heat was quite high in some southern towns. The high temperatures observed during the summer were:⁶²

Orange, <i>France</i>	(104.4° F, 40.2° C) in July
Avignon, <i>France</i>	(97.7° F, 36.5° C) on 16 July
Geneva, <i>Switzerland</i>	(90.9° F, 32.7° C) on 5 August
Maastricht, <i>the Netherlands</i>	(88.5° F, 31.4° C) on 30 July
Strasbourg, <i>France</i>	(88.2° F, 31.2° C)
Marseille, <i>France</i>	(88.2° F, 31.2° C)
Paris, <i>France</i>	(87.8° F, 31.0° C) on 29 July
Metz, <i>France</i>	(87.8° F, 31.0° C) on 28 July
Liège, <i>Belgium</i>	(85.8° F, 29.9° C) on 30 July
London, <i>England</i>	(85.8° F, 29.9° C) on 30 July
La Chapelle, <i>France</i>	(82.9° F, 28.3° C) on 28 July

In Burgundy, *France*, the summer was rainy, particularly in June when the grapes flowered. The grape harvest only began on 28 September. The yield was quite insignificant, but of fairly good quality. The harvest of grain was poor.⁶²

Winter of 1830 / 1831 A.D. 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.¹

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.¹

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 16th. 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).²⁷

A snowstorm began on 31 January 1831, continued for four days, and extended over the north of *England* and the whole of *Scotland*.⁴³

1831 A.D. In *Ireland* in February, there were great floods in the River Liffey; and waterspouts in various parts of the country.^{47, 92}

In *Ireland* in 1831, there was a famine. Parliament granted 40,000*l.* for relief; 74,410*l.* subscriptions in *England*.^{57, 91}

In *India* during 1831-32, there was scarcity in Poona and the southern Mahratta country, producing considerable distress, but hardly a famine.⁵⁷

In 1831, a powerful cyclone struck Barisal, *Bangladesh* causing 22,000 deaths.⁹⁸

On 28 May 1831 in *England*, there was a hailstorm in Hertfordshire.⁹³

On 16 July 1831, there was a dreadful storm at the Cape of Good Hope, *South Africa*, where immense property was lost.^{57, 90}

On 10-11 August 1831, a great Atlantic hurricane struck the island of *Barbados* causing approximately 2,500 deaths.¹⁰⁷

The high temperatures observed during the summer were:⁶²

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 1831.⁴³

Winter of 1831 / 1832 A.D. 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.¹

In the *United States* during the winter of 1831-32, the temperature at Huntsville, Alabama fell to -9° F in January.¹¹³

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.¹⁰³

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.”¹⁰³

In *India* during the years 1832-1833, there was a severe drought in some of the northwest provinces.⁴⁷

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.”⁵⁷

In Coringa, Hindustan (now *India*), there was a great and most destructive inundation.^{47, 92}

In 1832 in Madras, *India*, there was a famine in the district of Guntoor; about 200,000 people perished.⁹¹

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.⁷⁹

On 16 June 1832 in *England*, there was a great hailstorm in Essex and Staffordshire.⁹³

On 18 August 1832 in *Ireland*, there was heavy hail in County Londonderry that damaged crops and killed small birds.⁹³

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:⁶²

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.⁶²

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.¹²³

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:¹²³

“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.⁹³

In 1833, there were tremendous gales of wind, which occasioned great loss of shipping on the coasts of *England* and *France*.⁴³

On 2 June 1833, there was a violent hurricane in London and other parts of *England*.⁴³

In Canton (Guangzhou), *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*.^{47, 92}

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*.⁹⁰

On 29 August 1833, ten thousand houses destroyed by flood at Canton (Guangzhou), *China*.⁴³

In October 1833, eighteen thousand houses, carried away in the city of Chienchow (Chienchow), besides much other damage done throughout *China* by floods.⁴³

In Calcutta, *India*, a high tide in the Hooghly River committed great destruction.^{47, 92}

In 1833, a powerful cyclone struck *India* causing 50,000 deaths.⁹⁸

In *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”.⁵⁷

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.”⁵⁷

Russia suffered from a major famine in 1833.⁹⁶

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.⁴³

The winter of 1833-34 was very mild and very clear in northern *France*.⁷⁹

On 15 January 1834, whole villages swept away in floods along with many thousands of inhabitants, in the country around Canton (Guangzhou), *China*.⁴³

In the *United States*, the Chesapeake Bay was frozen over at the capes of Virginia in February.³⁸

In the *United States* during the winter of 1833-34, the temperature at Fort Leavenworth, Kansas fell to -30° F in January.¹¹³

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.]¹⁰³

In *Gibraltar*, there were waterspout and great damage from floods.^{47, 92}

In 1834, a major storm struck the island of *Dominica*.⁴³

On 31 May 1834 in *England*, there was a hailstorm in Lancashire.⁹³

On 21 June 1834 in *England*, there was a hailstorm in Sussex.⁹³

On 5 July 1834 in *England*, there was a hailstorm in Norfolk.⁹³

On 31 July 1834 in *England*, there was a hailstorm in Suffolk.⁹³

On 22 August 1834 in *England*, there was a hailstorm in Cambridgeshire.⁹³

In August 1834, pieces of ice of three foot in diameter fell at Padua in *Italy*.⁴³

On 18 October 1834, a storm struck the coast of *Great Britain* caused great destruction to the shipping.⁴³

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.⁷⁹

The average heat of 1834 rose considerably in Rouen, Strasbourg and Nantes, *France*.⁷⁹

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.⁷⁹

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.⁶²

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.⁷⁹

Winter of 1834 / 1835 A.D. 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:³⁸

Anson, Maine	(-42° F, -41° C)
Franconia, New Hampshire	(-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 Hampshire	(-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)
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, Massachusetts	(-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.¹¹³

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.¹

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)³⁸

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.³⁸

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.³⁸

In Northampton, Massachusetts in the *United States* many wells were frozen at the depth of fourteen feet (4.3 meters) from the surface.³⁸

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 °F (-38.83 °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° F, became stationary. It is mentioned, that in Parry’s second voyage to the *North Pole*, when the alcoholic thermometers stood at -58° F (-50° 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.³⁸

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.³⁸

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.³⁸

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.³⁸

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.³⁸

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.³⁸

In the *United States*, the thermometer at Charleston, South Carolina at daybreak on 8 February was at 0° F (-17.8° C).³⁸

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: ⁶²

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

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*.¹⁰³

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.⁷⁹

On 10 June 1835 in *England*, there was a great hailstorm in Cambridgeshire and Leicestershire.⁹³

On 10 July 1835 in *England*, there was a great hailstorm in Derbyshire.⁹³

On 11 July 1835 in *England*, there was a great hailstorm in Essex.⁹³

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, <i>Switzerland</i>	(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.⁶²

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: ⁶²

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.⁶²

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.¹¹³

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.¹

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.²⁷

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.”¹²³

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 1815.¹

In the *United States*, every night in March produced ice in Philadelphia except the last three days of the month.¹

1836 A.D. The River Thames went dry in London, *England* and people were able to cross the river on foot.¹

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.⁷⁹

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].⁷¹

On 28 June 1836, there was a heavy fall of snow in Sydney, *Australia* that lasted for a half hour.¹⁰³

On 4 July 1836 in *England*, there was a hailstorm in Hertfordshire and Wiltshire.⁹³

On 6 July 1836 in *England*, there was a hailstorm in Middlesex.⁹³

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:⁶²

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.⁶²

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.⁶²

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.⁴³

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 27th 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, *England*, an avalanch 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.⁴³

In *England*, there were floods caused by winter's thaw.^{47, 92}

1837 A.D. – 1838 A.D. India.

In *India* during the years 1837-1838, there was a severe drought in some of the northwest provinces.⁴⁷

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."⁵⁷

In 1837-38 in northwest *India*, there was a famine. Above 800,000 people perished.⁹⁰

1837 A.D. – 1839 A.D. Australia.

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.¹⁰¹

In 1837 in the Hunter Region of New South Wales, *Australia*, wheat sown in May had not germinated in September.¹⁰³

In 1838, there was a drought in *Western Australia*. Crops suffered in Northam and York.¹⁰¹

On 2 November 1838 was declared a Day of Humiliation in New South Wales, *Australia* on account of the drought.¹⁰³

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.¹⁰¹

In New South Wales, *Australia*, there was a great drought in 1839.¹⁰³

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.¹⁰³

1837 A.D. During May through September of 1837 in *South Australia*, there was intermittent flooding in Adelaide.¹⁰¹

On 28 June 1837, there was a great fall of snow near Sydney, *Australia*.¹⁰³

On 30 July 1837 in Dublin, *Ireland*, there was a violent shower of hail, accompanied by loud thunder.⁹³

The high temperatures observed during the summer were:⁶²

Basse-Terre, *Guadeloupe Island* (95.0° F, 35.0° C) on 21 August

Reykjavik, *Iceland* (68.9° F, 20.5° C) on 25 and 31 July

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.⁹⁹

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.

Winter of 1837 / 1838 A.D. 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 24.¹

In the *United States* during the winter of 1837-38, the temperature at Hillsborough (now Hillsboro, Ohio) fell to -22 F in February.¹¹³

In *England* on the 7th of January, a severe frost commenced this day – one of the most severe in modern times – and continued for a month.^{47, 93}

[In *England*] from 7 January to February 1838, there was a severe frost. The River Thames was blocked by the ice.⁹⁰

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 13th 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.⁷⁰

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 8th of February. The Saône and Rhône Rivers in *France* were also frozen.⁶²

The winter of 1838 was harsh in southern *France*. The thermometer at Ain 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.⁷⁹

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. 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:⁶²

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

1838 A.D. On 18 April 1838 in *Ireland*, there was a great hurricane on the north coast, with much hail and snow.⁹³

On 4 July 1838 in *England*, there was a hailstorm in Lancashire and Yorkshire.⁹³

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. 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.¹

The maximum temperature during the summer in Pau, *France* was 101.8° F (38.8° C) on 4 August.⁶²

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.¹

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.⁹⁰

In *England* on the 28th of October, a great hurricane visited London and neighborhood; considerable destruction of property; but very little loss of life.⁵⁷

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.⁵⁷

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.

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.¹

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.^{47, 57}

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.⁹⁰

On 18 June 1839 in *England*, there was a hailstorm in Middlesex.⁹³

On 20 June 1839 in *England*, there was a hailstorm in Lincolnshire, Northamptonshire, and Worcestershire.⁹³

On 7 July 1839 in *England*, there was a great hailstorm in Berkshire, Surrey, and Sussex.⁹³

In July and August 1839 in consequence of a great drought in New South Wales, *Australia*, the

In December 1839 in Victoria, *Australia*, there was a flood on the Yarra and Saltwater Rivers.¹⁰¹

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. In the *United States* in December 1839, snow fell in Baltimore, Maryland and Washington D.C. to a depth of 18 to 20 inches (46-51 centimeters). The snow was also very deep in New York State and in all western, northern and eastern states. A strong gale developed on 22 and 23 December, which destroyed many vessels in Maine, New York, Rhode Island, and Boston.¹

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.²⁷

In the *United States* on 16 January 1840, the temperature fell to -13° F (-25° C) at Gettysburg and several towns in the interior of Pennsylvania; -30° F (-34° C) at Albany, Saratoga and Buffalo, New York; -15° F (-26° C) at Hartford and New Haven, Connecticut; -30° F (-34° C) at Springfield, Massachusetts; -14° F (-26° C) at Boston, Massachusetts and Portsmouth, New Hampshire; -20° to -30° F (-29° to -34° C) at Portland, Augusta, and Eastport, Maine; and -37° to -39° F (-38° to -39° C) in Montreal and Quebec, *Canada*.¹

In the *United States* during the winter of 1839-40, the temperature at Salem, New York fell to -40° F in January.¹¹³

1840 A.D. 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:⁶²

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.⁶²

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 20th the waters still covered half of the ports of the city.⁷⁹

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 where the floods didn't come owing to late rains, until the end of November or in December.⁷⁹

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 at Vaise, Marseilles, and Nismes. Many villages almost swept away. The Saône River had not attained such a height for 238 years.^{47, 90, 92}

Germany, France and Russia suffered famines in 1840.⁹⁶

Winter of 1840 / 1841 A.D. 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.¹

In the *United States*, a snowstorm struck the Philadelphia area on April 10 dumping 6 inches (15 centimeters) of snow. Another struck on the 12th 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.¹

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.¹

The Seine River in *France* froze from 18 December 1840 to 5 January 1841 at the bridge "Pont Notre-Dame" in Paris.⁶²

The weather in December 1840 was so severe in *Sweden*, that it was computed that three thousand people perished.¹

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*.⁶²

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.^{62, 70}

In Alsace, *France*, the thermometer fell to 5.0° F (-15° C). After 15 December, three trains were stranded on the railway line from Mulhouse near Thann. 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.⁶²

The following are the lowest observed temperatures at different locations:⁶²

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

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.^{47, 90, 92}

In January 1841 in Queensland, *Australia*, there was a flood on the Brisbane River.¹⁰¹

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.”¹

On 28 May 1841 in *England*, there was a great hailstorm in Berkshire and in Suffolk.⁹³

On 15 July 1841 in *England*, there was a great hailstorm in Derbyshire, Middlesex, Sussex, Surrey, and Yorkshire.⁹³

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 23rd & 30th; May 3rd, 25th, 26th, 27th, 28th & 30th; June 23rd; July 4th & 18th; August 8th & 11th. 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. 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 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.⁷⁹

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 26th, 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 25th the temperature went to 88° F (31.1° C), May 26th to 92.8° F (33.8° C), and May 27th 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.⁷⁹

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.⁶²

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).⁶²

On 18 October 1841 in *England*, there was a great hailstorm in Essex.⁹³

In *France* in November, there were great floods at Mâcon and neighborhood; immense damage done.^{47, 92}

Winter of 1841 / 1842 A.D. 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.¹

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.¹

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.⁷⁹

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 15th, 17th and 19th. 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 Albi [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.⁷⁹

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 and the island bar. The Garonne River at Agen, 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:⁶²

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

1842 A.D. In *Ireland*, there were great floods at Limerick; waterspouts elsewhere.^{47, 92}

On 28 April 1842 in *England*, there was a great hailstorm in Hampshire.⁹³

On 27 May 1842 in *England*, there was a hailstorm in Nottinghamshire.⁹³

On 1 June 1842 in *England*, there was a hailstorm in Yorkshire.⁹³

On 2 June 1842 in *England*, there was a hailstorm in Nottinghamshire.⁹³

On 25 June 1842 in *Wales*, there was a great hailstorm in Glamorganshire.⁹³

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.¹

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.¹

On 20 July 1842 in *England*, there was a great hailstorm in Essex.⁹³

On 10 August 1842 in *England*, there was a hailstorm in Yorkshire.⁹³

On 29 August 1842 in *England*, there was a hailstorm in Middlesex.⁹³

On 31 August 1842 in *England*, there was a great hailstorm in Cornwall and Norfolk.⁹³

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.⁷⁹

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).⁷⁹

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:⁶²

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, *Spain*, 3 workers perished. A lady died from suffocation in an eilwagen [stagecoach]. In Cordova, *Spain*, several persons died from heat stroke, and several cases of insanity were also attributed to the high temperature.⁶²

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.⁶²

Winter of 1842 / 1843 A.D. In the *North America* in November 1842, the weather was very severe in Baltimore, Washington D.C., Kentucky, Ohio, Michigan, Indiana, New York, Vermont and *Canada*. The cold temperatures were so great that many newspapers said it was the coldest November ever recorded. In Illinois on the 29th of November, the temperature was -14° F (-26° C) and in Belfast, Maine temperatures dropped to -20° F (-29° C). Heavy snowfalls also occurred. Terrific gales struck the western and northern Great Lakes and many vessels were wrecked and many lives lost. Accounts from Detroit, Buffalo, Erie, Chicago and Dunkirk stated that in consequence of the wrecks of so many vessels, the shores were lined with barrels of flour, pork, corn, and wheat; and many dead bodies were washed ashore; and in several of those places the mercury was below zero. A very violent snowstorm struck the area from New York to the extreme part of Maine on November 30. Many vessels were destroyed. The number of lives lost between 10 November and the last day of the month were 578.¹

In the *United States*, in December 1842, the weather in many western, northern and eastern states was exceedingly cold, stormy and tempestuous. In several places beyond the Ohio River, snow fell to a depth of two feet (0.6 meters). And the same was true for the interior of Pennsylvania, New York, Connecticut, Massachusetts and all the New England states.¹

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!"¹

In the *United States*, on 7 January 1843, there was a great snowfall in Tennessee and intensely cold. The cold extended down into Louisiana and Mississippi. It was also intensely cold from *Canada* to Eastport, Maine. The Montreal and Quebec newspapers said the temperature was -36° F (-38° C).¹

In the *United States* in February 1843, in New York and in the northern and eastern States, it was intensely cold and boisterous, and a great deal of snow fell. The weather was also very cold in the south. Snow fell in South Carolina to the depth of 2 inches (5 centimeters); and there was both snow and ice in Alabama, Florida and Louisiana.¹

In the *United States*, the snowstorm of March 16 1843 was one of the most severe and violent snowstorms to hit Philadelphia. Twelve inches (30 centimeters) of snow fell that blew into snow banks four to five feet (1.2-1.5 meters) deep in many streets. New York City newspapers reported two feet (0.6 meters) of snow had fallen that blew into banks six feet (1.8 meters) high; that the country roads were so banked up, that no mail arrived from the north and east for two or three days. Similar accounts were received from Baltimore, Maryland and Washington D.C. and from the west, the north and the east as far as Massachusetts, New Hampshire and Maine.¹

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 1.¹

1843 A.D. – 1845 A.D. Australia.

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.¹⁰¹

In New South Wales, *Australia*, there was a drought from August 1842 to February 1843. The Patterson River ceased running in November.¹⁰³

In 1843, there was a severe drought in Hobart, *Tasmania*.¹⁰¹

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.¹⁰³

1843 A.D. On 28 May 1843 in *England*, there was a hailstorm in Middlesex.⁹³

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.¹²³

On 10 June 1843 in *England*, there was a hailstorm in Derbyshire.⁹³

On 5 July 1843 in *England*, there was a hailstorm in Derbyshire and Yorkshire.⁹³

On 6 July 1843 in *England*, there was a hailstorm in Gloucestershire.⁹³

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.¹

On 7 August 1843 in *England*, there was a hailstorm in Cambridgeshire.⁹³

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.⁹³

The maximum temperature during the summer in Calais, *France* was 86.0° F (30.0° C) on 10 August.⁶²

In the *United States*, on 1 November, there was ice in Georgia as thick as a window-glass. On the 10th 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.¹

In *England*, there was a terrific hailstorm in Norfolk, causing great devastation of the crops through the county.⁵⁷

Also refer to the section 1843 A.D. – 1845 A.D. for information on the drought in Australia during that timeframe.

1844 A.D. Accounts from *Africa* state that the weather was intensely hot and dry and many people had perished. Accounts from the *St. Helena* states that no rain has fallen in 15 months and great distress prevails.¹

First known Gundagai flood in New South Wales, *Australia* occurred on February 1844.¹⁰³

The high temperatures observed during the summer were:⁶²

Biscara, *Algeria* (111.2° F, 44.0° C) on 19 August

Nizhny Tagil, *Russia* (95.0° F, 35.0° C) on 9 June

In September 1844 in New South Wales, *Australia*, there was a heavy flood in the Tumut and Murrumbidgee Rivers in September.¹⁰³

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!] ⁹³

In *Ireland*, there were extensive floods in the east and south.^{47, 92}

In 1844, there was the greatest flood ever known in Port Phillip in Victoria, *Australia*.¹⁰³

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.¹

In the *United States* in November 1844, ten to twelve inches (25-30 centimeters) of snow fell in Indiana, Illinois, Michigan, New York, Vermont and some New England states. In *Canada* the weather was severely cold and in some places snow was two feet (0.6 meters) deep.¹

In the *United States* on 11 and 12 December 1844, a violent snowstorm struck 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. In Connecticut, the drifts were 15 feet (4.6 meters) high.¹

In the *United States* during the winter of 1844-45, the temperature at Savannah, Georgia fell to 18° F in January.¹¹³

The Saône River in *France* froze in December 1844.⁶²

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*. 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 16th. 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 21st 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:⁶²

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. 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. In Upper Silesia, the houses were buried under snow along with their residents. The coast of *Spain*, from Estepona to Tarifa was covered with snow. The mountains in Tetuan showed the same phenomenon.⁶²

Numerous accidents were reported during this winter. In Drôme, *France* in January, six men and twelve horses were buried under the snow. On the way from Le Puy after Nîmes, 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, *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.⁶²

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.⁷⁰

1845 A.D. – 1851 A.D. Ireland.

[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 1851.⁸⁴]

In *Ireland* in 1845 there was a famine. The government expended 850,000*l.* in relief of sufferers.^{57, 91}

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.¹⁰³

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.^{57, 91}

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.”^{47, 92}

In May 1845 in *Ireland*, there were hail showers of more than ordinary weight.

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.]⁹³

On 17 December 1845, there was a great flood in Ipswich in Queensland, *Australia*.¹⁰³

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). 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).¹

In the *United States* during the winter of 1845-46, the temperature at Washington D.C. fell to -6° F in December.¹²⁶

1846 A.D. On 18 March 1846 in *Ireland*, there was a great hailstorm in Waterford.⁹³

On 24 June 1846 in *Ireland*, there was a great hailstorm in the northwest districts.⁹³

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.”¹¹¹

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.⁹³

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:⁶²

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, <i>Poland</i>	(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.⁶²

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.⁶²

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 Loire River rose 20 feet [6.1 meters] in one night. The total destruction was estimated at 4,000,000*l.* Sterling.^{47, 90, 92}

In 1846 in *Belgium*, there was a severe famine. But the people were relieved with supplies from neighboring countries.^{57, 91}

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.¹

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.⁸⁴

Also refer to the section 1845 A.D. – 1851 A.D. for information on the famine in Ireland during that timeframe.

Winter of 1846 / 1847 A.D. 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 19th the temperature was 5.5° F (-14.7° C). The 19th 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, the river rose to 4.6 meters (15.1 feet) and flooded the low levels of Paris.⁶²

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:⁶²

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.

During this period 1847-59, a series of severe droughts took place in New South Wales, *Australia*.¹⁰¹

From 1854-59, the Adelaide area of *Australia*, suffered a long dry period according to rainfall records.¹⁰¹ By November 1857, there was a drought in the region of Longford and to its east in *Tasmania*. 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.⁹⁹

In New South Wales, *Australia*, there was a drought from July 1847 to January 1848. There was a dreadfully dry December.¹⁰³

In New South Wales, *Australia* in 1850, there was a drought from August to March.¹⁰³

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.¹⁰³

On 1 March 1853, there was a tremendous dust storm and hot wind at Melbourne, *Australia*.¹⁰³

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 1855.¹⁰³

In New South Wales, *Australia*, there was a drought from October 1857 to February, 1858.¹⁰³

In Queensland, *Australia* in 1858, there was a very serious drought. Lake Gracemere (Rockhampton) was dry.¹⁰³

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.¹⁰³

In 1856 in *Western Australia*, the drought conditions caused sheep farmers to lose half their lambs.¹⁰¹

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.¹⁰¹

In 1858 in Queensland, *Australia*, there was a drought in Richmond and Barcoo districts.¹⁰¹

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.¹⁰¹

In 1860 in *Western Australia*, there was a drought.¹⁰¹

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. 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.¹⁰¹

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.⁹⁹

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.⁹⁹

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.⁹⁹

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.⁹⁹

In 1851 [1854?] in *Australia*, there was a serious brushfire in Van Diemen's Land (now Tasmania).¹⁰¹

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:⁶²

Toulouse, *France* (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, <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.⁶²

Germany and *France* suffered famines in 1847.⁹⁶

In *France*, there was scarcity. This produced food riots. At Chateauroux, a wealthy corn [grain] merchant who defied the mob was set upon and beaten to death.⁵⁷

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. 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.¹¹³

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.^{47, 92}

On 7 April 1848, the vessels *Georgina* and *Spy* were driven ashore near Hobart, *Australia*, during a gale. Three people were drowned.⁹⁹

The maximum temperature during the summer in St. Bernard, *Switzerland* was 64.0° F (17.8° C) on 23 July.⁶²

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.^{47, 93}

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.⁶³

In *Ireland* in August, there were great floods in Limerick.^{47, 92}

On 13 August 1850 in *Ireland*, there was a violent storm with much hail and sleet in Limerick.⁹³

In *Belgium* in August, there was a calamitous flood.^{47, 92}

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.⁹⁹

In Khartoum, Egypt (now *Sudan*), “an inundation occurred.”^{47, 92}

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. In *Ireland*, there were great and destructive floods alike in spring and autumn.^{47, 92}

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.⁹⁹

In August 1851, there was a great flood in Adelaide, *Australia*. Bridges collapsed. The town of Noarlunga was completely inundated. Two people were killed.⁹⁹

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.⁹⁹

In *France*, the losses in 1851 from hailstorms were estimated at £600,000.⁹³

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 1851 / 1852 A.D. In the *United States* during the winter of 1851-52, the temperature at Shelbyville, Indiana fell to -28° F on December 17th, then -26° F on January 19th and then -28° F on January 20th. 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.^{113, 126}

1852 A.D. In Holmfirth, near Huddersfield (York) *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 600,000l., consisting of woolen mills, houses, etc. in the valley.^{47, 92}

On 4 February 1852, an inundation caused a lamentable catastrophe at Holmfirth, *England*.⁹⁰

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.¹²³

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.⁹⁹

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.⁹⁹

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.⁹⁹

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.¹⁰³

In New South Wales, *Australia*, the winter of 1852 was the wettest known, and then occurred the great flood at Gundagai on June 26, 1852.¹⁰³

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.¹⁰¹

The summer of 1852 was remarkably hot in *Russia, England, Holland, 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:⁶²

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, <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.⁶²

On 17-24 July 1852, there was a flood at Launceston, *Tasmania*. 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.⁹⁹

On 11 August 1852, there was a higher and more destructive flood than any previously known in Launceston, *Tasmania*. The Esk Rivers, Macquarie, Nile, and all other tributaries rose to unprecedented heights. Losses of livestock reported from drowning.⁹⁹

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.⁶²

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.^{47, 92}

On 5 September 1852, there was an inundation of the valleys of the Severn and Teme rivers in *Wales* after a violent thunderstorm.⁹⁰

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.⁹⁰

Switzerland and parts of *Belgium*, *France*, and *Germany*, suffered severely from floods.^{47, 92}

In *England* in December 1852 and January 1853, there were many storms of great severity, with much destruction of property.^{57, 90}

Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.

1853 A.D. In the *United States* in 1853, the Mississippi River froze solid enough to walk 200 miles from St Louis, Missouri to La Claire, Iowa.³³

The high temperatures observed during the summer were:⁶²

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.^{47, 92}

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.^{47, 92}

In *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."⁵⁷

Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.

Winter of 1853 / 1854 A.D. The Seine River in *France* was frozen from 28 December 1853 until 6 January 1854.⁶²

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.⁷⁰

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.⁶²

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.⁶²

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 8th the water rose to the 2.5 meter (8.2 feet) level; on the 9th to 3 meters (9.8 feet); and on the 10th to 3.5 meters (11.5 feet).⁶²

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 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.⁶²

The number of frost days during this winter:⁶²

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:⁶²

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.⁶²

From 15 December until the end of the cold, there was an unusual amount of snow in *Holland, 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*. The family of the King of Belgium had to travel by sleigh from Brussels in order to put a coating on the castle walls.⁶²

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.⁷⁷

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* 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.⁹⁹

On 27 February 1854, there was a great flood at Hobart Town, *Australia*.¹⁰³

The high temperatures observed during the summer were:⁶²

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

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.¹¹¹

On the *Black Sea* on the 13th through 16th of November, there was a great storm, causing much loss of life and destruction of shipping and stores sent for allied armies in *Crimea*.^{57, 90}

In 1854, a powerful cyclone struck *India* 1854 causing 50,000 deaths.⁹⁸

Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.

Winter of 1854 / 1855 A.D. In *Northern Europe* on the 31st of December, there was a great storm, which caused considerable damage.^{57, 90}

In *Hamburg, Germany* on January 1, an overflow of the Elbe River laid the greater part of the city under water.⁴⁷

The weather was so cold in the spring that a great frost froze the River Thames in *London, England*.²⁹

In *England*, the frost was very severe between the 14th of January 1855 and the 24th of February; and very cold up to the 26th 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*.^{47, 90, 93}

The winter of 1854-55 was severe. The frost commenced in the east of *France* in October and lasted till the 28th 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*.⁷⁰

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*:⁶²

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 Görsdorff 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.⁶²

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.⁶²

The lowest temperatures observed in various cities are listed below:⁶²

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:⁶²

In Hendecourt on 6 April the temperature was 26.6° F (-3.0° C) and on the 23rd it was 28.4° F (-2.0° C).

In Clermont on 6 April it was 24.8° F (-4.0° C), on the 23rd it was 28.0° F (-2.2° C), and on the 28th 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 23rd 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).

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.⁷⁷

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.¹¹³

Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.

1855 A.D. On 1 January 1855, Hamburg, *Germany* was half-flooded by the Elbe River.⁹⁰

On 1 January 1855 at Hamburg, *Germany*, an overflow of the Elbe laid the greater part of the city under water.⁹²

The maximum temperature during the summer in Algiers, *Algeria* was 99.5° F (37.5° C) on 8 September.⁶²

Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.

Winter of 1855 / 1856 A.D. 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 8th of January, the Potomac River froze from shore to shore. Many people crossed the river on foot with safety. On the 12th 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 3rd 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 24th 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 30th of May, there was a snowstorm on the Baltimore and Ohio Railroad.⁷⁷

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 Pittsburg, Pennsylvania) fell to -22° F in February.¹²⁶

1856 A.D. In May and June 1856, inundations in south of *France* caused immense damage.⁹⁰

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.*).^{47, 92}

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.⁷⁷

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.⁷⁷

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.⁷⁷

In Prome, Burmah (Pyay, *Burma*), a great overflow of the Irrawaddy River nearly destroyed this town.^{47, 92}

Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.

Winter of 1856 / 1857 A.D. 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).²⁷

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.^{113, 126}

1857 A.D. 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:⁶²

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.⁶²

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.⁶²

In the Bolwarra - Maitland region of New South Wales, *Australia*, 26 people were killed and there was great damage from severe floods in 1857.⁹⁹

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.⁹⁹

On 23 November 1857, there was a great storm on the northeast coast of *Scotland*; 42 fishermen lost.^{57, 90}

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 1858.⁷⁰

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*. 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, 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.⁶²

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:⁶²

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, *France* (25.0° F, -3.9° C) on 24 January
 Algiers, *Algeria* (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.⁶²

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.⁶²

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 was frozen to a certain extent. The Loire River was also frozen in several places as well as the Nièvre River. The Mayenne River 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.⁶²

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.⁶²

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, *Turkey*, the wolves strangled a horse. In Scutari, *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." ⁶²

In the *United States* during the winter of 1857-58, the temperature at Fort Jones, California fell to -17° F in December. ¹²⁶

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: ⁶²

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.⁶²

On 13 August 1858, there was severe flooding at Hobart, *Tasmania*. 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.⁹⁹

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.⁹⁹

Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.

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.⁸¹

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.¹¹³

1859 A.D. In 1859 a heat wave struck California in the *United States*. The following maximum temperatures were observed:¹¹²

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.

In *England*, a dreadful storm struck on the 25th and 26th of October. The “Royal Charter,” and many other vessels lost. Another great storm occurred on the 31st of October and the 1st of November.⁵⁷

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 1859.⁹⁰

Also refer to the section 1847 A.D. – 1860 A.D. for information on the drought in Australia during that timeframe.

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.¹¹³

1860 A.D. – 1862 A.D. India.

In *India* during the years 1860-61, there was a severe drought in parts of the Punjab [Punjab] and northwest provinces.⁴⁷

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.”⁵⁷

In 1860-61 in northwest *India*, there was a famine and thousands perished.⁹⁰

In 1861 in *India*, there was a famine in the northwest provinces; failure of crops; thousands starved.⁹¹
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 1862.⁵⁷

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.⁹⁹

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.⁹⁹

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.¹⁰³

On 24 April 1860, there was a great flood at Ballarat in Victoria, *Australia*.¹⁰³

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 26th-28th of February, on the 28th of May, and on the 2nd of June.^{57, 90}

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 during that timeframe.

Winter of 1860 / 1861 A.D. In *England*, there was a very severe frost from 20th December to 5th January; many of the less hardy shrubs destroyed.^{47, 90, 93}

In *England*, the frost of December 1860 and January 1861 were remarkable. Christmas eve was extremely cold. In the valley of the Rea, the temperature dropped to -5.0° to -7.0° F (-20.6° to -21.7° C).⁷⁰

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.^{113, 126}

1861 A.D. In *Holland*, there were great inundations. About 30,000 of the peasantry rendered destitute.^{47, 92}

In January 1861 in *Holland*, an inundation submerged nearly 40,000 acres [16,187 hectares].⁹⁰

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.^{47, 92}

In *England* on the 20th and 21st of February, there were great gales; part of the Crystal Palace blown down; Chichester Cathedral steeple fell.^{57, 90}

In May 1861, there was an inundation at Kiev, *Ukraine* and Moscow, *Russia*. 615 houses under water.⁹⁷

In *Britain* on 28 May, there were great storm on the British coast – 143 shipwrecks. And then on the 13th and 14th of November there was another storm on the north coast producing another 50 shipwrecks.^{57, 90}

Also refer to the section 1860 A.D. – 1862 A.D. for information on the drought in India during that timeframe.

Winter of 1861 / 1862 A.D. 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.¹¹³

1862 A.D. In Cape Colony, *South Africa*, there was a disastrous drought.⁴⁷

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.^{47,92}

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*.⁹⁰

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.⁹⁹

In *England* on the 2nd 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.⁵⁷

On 2 September 1862, a storm at Market Laverton [in *England*] caused much damage to crops by hail.⁹⁰

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.⁹³

On 4 October 1862, a marshland sluice [in *Great Britain*] bursts; many acres inundated.⁹⁰

In *England* on the 19th and 20th of October, there was a great storm on the British coasts; many shipwrecks.^{57,90}

In 1862, a powerful cyclone struck Canton, *China* causing 37,000 deaths.⁹⁸

Also refer to the section 1860 A.D. – 1862 A.D. for information on the drought in India during that timeframe.

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.¹⁰³

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.¹⁰¹

On 5 January 1863, the temperature at Sydney, *Australia* reached 106.9° F (41.6° C).¹⁰³

In *England* on the 19th of January, there were extensive gales, accompanied by numerous whipwrecks.⁵⁷

On 19 January 1863, there were severe gales [in *Great Britain*], doing much damage, and causing much loss of life.⁹⁰

In 1863, there was a prolonged drought in the Oatlands region of *Tasmania*, which caused crops to fail.⁹⁹

In 1863, the Yarra River in Victoria, *Australia*, overflowed its banks and caused heavy damage in the floodplain including the city of Melbourne.⁹⁹

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.⁹⁹

In 1863 there were heavy floods in Queensland, *Australia*.¹⁰³

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.⁹³

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/.^{47, 92}

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.⁶⁶

From 9 - 12 December 1863, a severe northeast gale, with heavy snowstorm struck St. John's *Newfoundland*.⁶⁶

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.⁶⁶

On 14-20 December 1863, severe floods struck eastern *Tasmania*. 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.⁹⁹

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* on the other, flowed southward. Everywhere in this wide band severe temperatures were experienced.⁶⁶

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.⁶³

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: ⁶⁶

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
Tishkilwa, Illinois	(-24° F, -31° C) on 1 January 1864
Waverly, 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 1st. 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° F. The temperature at Fort Laramie, Wyoming fell to -40° F. The temperature at Fort Ruby, Nevada fell to -23° F.^{113, 126}

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.”⁶⁶

*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.”⁶⁶

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 10th of January.”⁶⁶

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].”⁶⁶

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.”⁶⁶

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.”⁶⁶

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.”⁶⁶

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.”⁶⁶

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 3rd a sheet of ice covered the river and harbor. On the 4th 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 29th.⁶⁶

Skaneateles, New York in the *United States* reported on January 8, the Skaneateles Lake was nearly frozen over. On the 12th, ice cutting commenced [ice for underground ice houses – early form of refrigeration]. On the 23rd it was reported that great quantities of ice taken from the lake the week past.⁶⁶

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.⁶⁶

Fishkill Landing (Beacon), New York in the *United States* on 11 January reported the Hudson River was crossed with heavy teams.⁶⁶

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.”⁶⁶

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.⁶⁶

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.⁶⁶

In Shanghai, *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).⁶⁶

1864 A.D. – 1866 A.D. Australia.

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.¹⁰¹

In New South Wales, *Australia* in 1864, there was a drought.¹⁰³

In New South Wales, *Australia* in 1865, there was a very dry summer. January 12th was declared a day of fast on account of the drought.¹⁰³

In 1866 in New South Wales, *Australia* it was very dry from October to January.¹⁰³

On 8 January 1866, the temperature at Lochinvar, New South Wales, *Australia* was 108° F (42.2° C) in the shade.¹⁰³

1864 A.D. At Bradfield Reservoir (near Sheffield, *England*) on March 11, the embankment gave way at midnight; the water rushed in torrents through the neighboring villages. Great destruction of property, and 250 persons drowned.^{47, 92}

On 11 March 1864, The Bradfield reservoir in *England* burst drowning about 250 persons.⁹⁰

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.⁹⁹

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.^{99, 109}

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.^{47, 57}

On 5 October 1864, a dreadful hurricane in the Indian Ocean struck Calcutta, *India*.⁹⁰ [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.⁹⁰

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.⁹⁴

In 1864, a powerful cyclone struck Calcutta, *India* causing 60,000 deaths.⁹⁸

On 5 October 1864, a storm wave, 16 feet deep, caused the loss of 45,000 lives on the Ganges delta in *India*.¹²⁴

On 31 October 1864 at Arelas (Arles, *France*), the bridge of boats and much property destroyed by the sudden rising of the Rhône River.^{47, 92}

In Lisbon, *Portugal* on the 13th of December, there was a great hurricane; much damage.⁵⁷

On 13 December 1864, a hurricane struck at Lisbon, *Portugal* caused much damage. This was the worst storm in many years.⁹⁰

Also refer to the section 1864 A.D. – 1866 A.D. for information on the drought in Australia during that timeframe.

Winter of 1864 / 1865 A.D. 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.⁷⁰

1865 A.D. – 1866 A.D. Bangladesh and India.

In 1865-66 in Bengal and Orissa there was a severe famine and about 1,000,000 perished.⁹⁰

In *India*, there was a severe drought in Orissa and parts of Madras [Chennai].⁴⁷

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.⁹¹ "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.⁵⁷

1865 A.D. In *England* on the 14th of January, there were severe gales; great damage to shipping.⁵⁷

On 14 January 1865 in *Wales*, there were severe gales, doing much damage, and loss of life.⁹⁰

In 1865 in *England*, there were destructive hailstorms in Cambridge, Huntingdon, Norfolk, and Oxford; and severe ones in other counties.⁹³

On 9 May 1865 in *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.⁹³

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.

Winter of 1865 / 1866 A.D. 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.^{113, 126}

1866 A.D. In *England* on the 6th through the 11th of January, there were severe gales; many vessels and lives lost.⁵⁷

Severe gales; many vessels and lives lost on 6-11 January 1866, [especially off Torbay, *England*].⁹⁰

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.¹⁰⁵

On 12 July 1866, there was a great storm in New South Wales, *Australia*.¹⁰³

On 26 September 1866, there were great inundations in *France*.^{47, 90}

In September 1866 in *France*, there was most extensive damage from floods.⁹²

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.⁹⁰

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.^{47, 92}

In the *Bahamas* at Nassau, New Providence on the 1st and 2nd 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.^{57, 90}

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.

Winter of 1866 / 1867 A.D. The *Baltic Sea* froze.³⁷

During the winter of 1866-67, the *Baltic Sea* was completely covered with ice.⁶⁸

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.¹¹³

1867 A.D. In January 1867, the temperature at Adelaide, *Australia* was 113.5° F (45.3° C) in the shade.¹⁰³

On 3 March 1867, a cyclone struck Townsville and Bowen in Queensland, *Australia*. These towns were wrecked.⁹⁹

On 2-3 March 1867, a cyclone struck Queensland, *Australia*. Townsville and Bowen were wrecked.¹⁰¹

In May 1867, there were several destructive hailstorms in various parts of *England*.⁹³

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.^{99, 109}

In June 1867 in New South Wales, *Australia*, there was a flood, the highest flood in the memory of any of the white inhabitants.¹⁰³

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.¹⁰³

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 4th highest at Albury and 2nd highest at Echuca ever recorded.⁹⁹

On 29 July 1867, there was a terrific gale. Three pilot boats were upset and eight lives lost outside Sydney Heads, *Australia*.¹⁰³

In the *West Indies* on the 29th 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.⁵⁷

In Calcutta, *India* on the 1st of November, there was a cyclone. About 30,000 native huts swept away by the tidal wave; but only about 1,000 lives lost.⁵⁷

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 destroyed. About 90,000 persons drowned. About 75,000 died of cholera.⁹⁴

In *England* on the 2nd through the 4th of December, there was a destructive gale.⁵⁷

Severe gales [in *Great Britain*]; many vessels and lives lost on 2-4 December 1867.⁹⁰

Winter of 1867 / 1868 A.D. 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.¹¹³

1868 A.D. – 1870 A.D. India.

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 1867.⁵⁷

In 1868-69 in Rajpootana [Rājasthān, *India*], there was a famine. About 1,500,000 perished.⁹⁰

1868 A.D. In *England* on the 22nd and 31st of January and the 1st of February, there were severe gales and destruction of shipping.⁵⁷

Severe gales [in *Great Britain*]; many vessels and lives lost on 22 & 31 January and 1 February 1868.⁹⁰

On 27 April 1868 in *England*, there was a very severe hailstorm. There were 8 other hailstorms more or less severe during the year.⁹³

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).⁹⁷

In Baltimore, Maryland in the *United States* on 24 July, there was great damage to the city by flood. Many lives lost.^{47, 92}

In New South Wales, *Australia*, there was a severe drought was in 1868, which was most felt in the Lachlan and Murrumbidgee Rivers.¹⁰³

During 1868-69 in *Australia*, there was a drought in northern Victoria.¹⁰¹

Also refer to the section 1868 A.D. – 1870 A.D. for information on the famine in India during that timeframe.

Winter of 1868 / 1869 A.D. 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.¹¹³

1869 A.D. In *Ireland* on 30 January 1869, there were great floods in Cork, Dublin, and other places.^{47, 90, 92}

On 19 May 1869 in *England*, there was a hailstorm, the effects of which extended over parts of 8 counties.⁹³

On 15 June 1869 in *England*, there was a hailstorm, which extended over portions of 14 counties.⁹³

In *England* on the 11th and 12th of September, there were great storms and loss of shipping.⁵⁷

Severe gales [in *Great Britain*]; many vessels and lives lost on 11-12 September 1869.⁹⁰

In 1869 there were heavy floods in Queensland, *Australia*.¹⁰³

Also refer to the section 1868 A.D. – 1870 A.D. for information on the famine in India during that timeframe.

1870 A.D. – 1872 A.D. Persia.

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 [in *Iran*], the price of wheat rose to twenty times the normal price.⁸⁹

In *Persia* during 1871-72, there was a severe famine.^{57, 90, 91}

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.¹⁰¹

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.⁹⁹

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.⁹⁹

On 21 February 1870, there was a great cyclone at Townsville in Queensland, *Australia*.¹⁰³

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.¹⁰¹

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 cause heavy flooding in the region. Many houses were flooded and four at Gympie washed away. One person drowned.⁹⁹

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.^{99, 109}

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.¹⁰³

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.¹⁰³

On 16 and 17 June 1870 in *England*, there were severe storms of short duration, but great destructiveness, on each of these days.⁹³

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 3rd highest flood level ever recorded at Shepparton. The Campasope River produced the 3rd highest flood level ever recorded at Rochester and Echuca.⁹⁹

On 9 September 1870, there were great floods in Victoria, *Australia*.¹⁰³

In October 1870, there were great floods in *Western Australia*.¹⁰³

On 7-8 October 1870, a great Atlantic hurricane struck *Cuba* causing approximately 2,000 deaths.¹⁰⁷

On 6 November 1870, there was a great storm at Sydney, *Australia*; attended with loss of life.¹⁰³

In Rome, *Italy* in December, there were considerable floods, causing great distress.^{47, 92}

On 28-29 December 1870, inundation at Rome, *Italy* causing great distress, which was relieved by the king.⁹⁰

Also refer to the section 1868 A.D. – 1870 A.D. for information on the famine in India during that timeframe. Also refer to the section 1870 A.D. – 1872 A.D. for information on the drought and famine in Persia during that timeframe.

Winter of 1870 / 1871 A.D. The *Baltic Sea* froze.³⁷

During the winter of 1870-71, the *Baltic Sea* was completely covered with ice.⁶⁸

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 5th of December, there was a temperature of 5.0° F (-15° C) degrees and on the 8th, at Montpellier [*France*] the thermometer stood at 17.6° F (-8.0° C). A second period of cold set in on the 22nd of December, lasting until the 5th of January. In Paris, the Seine [River] was blocked with ice, and seemed likely to become frozen over. On the 24th [of December] there were 21.6 degrees of frost (10.4° F, -12° C); and at Montpellier on the 31st, 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 9th to the 15th 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, *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).⁷⁰

1871 A.D. In *England*, there were extensive floods.^{47, 92}

In Prome, *Burmah* (Pyay, *Burma*), there were great floods.^{47, 92}

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.⁹³

In July 1871, there was a great storm in *Tasmania*.¹⁰³

In the *West Indies* on the 21st of August, a hurricane desolated Antigua, St. Kitts, and other islands; many buildings destroyed.⁵⁷

A cyclone desolated Antigua, St. Kitts, and other isles; religious and manufacturing buildings destroyed, and thousands made homeless on 21 August 1871.⁹⁰

In September 1871, there were great floods in *New Zealand*.¹⁰³

Also refer to the section 1870 A.D. – 1872 A.D. for information on the drought and famine in Persia during that timeframe.

Winter of 1871 / 1872 A.D. 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.¹¹³

1872 A.D. In *England* on the 24th of January, the barometer very low, great storm; much damage.^{57, 90}

In *India* on the 1st of May, there was a destructive cyclone at Madras [Chennai]; ships lost.^{57, 90}
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.¹⁰⁵

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 24th – 26th of June. Other storms struck in July and August. Violent gales occurred on the 8th of December.⁵⁷

On 11 June 1872, there were great floods in *Tasmania*.¹⁰³

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.⁹⁰

Between April 18 and September 4, 1872, there were 54 hailstorms in *England*. Some of the storms were of a very destructive character.⁹³

The storms throughout *Europe* during summer were intense and violent.⁵⁷

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.⁹³

In July 1872 in *England*, the River Medlock overflowed its banks and caused great destruction of property.^{47, 92}

On 10 August 1872, there was a heavy snowstorm within 30 miles of Sydney, *Australia*.¹⁰³

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.^{47, 92}

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.^{47, 90}

On 8 December 1872, a violent gale [in *Great Britain*]; much destruction (wind, greatest velocity 57 miles an hour).⁹⁰

On 16 December 1872, near Bathurst in New South Wales, *Australia*, the town of Kelso was partly submerged during a flood.¹⁰³

On 21 December 1872, there were heavy floods at Inverell in New South Wales, *Australia*.¹⁰³

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.⁴⁷

Also refer to the section 1870 A.D. – 1872 A.D. for information on the drought and famine in Persia during that timeframe.

Winter of 1872 / 1873 A.D. 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.^{113, 126}

“The frost which scourged all the vineyards in *France* during the nights of 24th, 25th, and 26th 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.”⁴⁷

In *France* in 1873, there was a severe frost; great damage done to the vineyards.⁹³

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.¹⁰³

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.^{99, 109}

On 1 June 1873, there were heavy floods at Cooma in New South Wales, *Australia*.¹⁰³

In *Scotland* on the 22nd and 23rd of July, there was an awful storm; much loss of life and property.^{57, 90}

From April to September 1873, there were 14 more-or-less serious hailstorms in *England*, extending their damage into 16 different counties.⁹³

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.]⁹³

In *India*, there was a severe drought in Behar and parts of Northern Bengal (*Bangladesh*).⁴⁷

Russia suffered from a major famine in 1873.⁹⁶

In *England* on the 16th of December, there were great storms in Lancashire and Yorkshire.^{57, 90}

1874 A.D. – 1875 A.D. Bangladesh and Asia Minor

In *India* in 1874 in Bengal [now *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.⁹¹ “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. The famine reached its culminating point in April and May.”⁵⁷

In Bengal [now *Bangladesh*] in 1874, there was a famine caused by a drought.⁹⁰

In *Asia Minor* during 1874-75, there was a severe famine.^{57, 90} Great efforts made by *Turkey* to alleviate. Also subscriptions raised in *England*. Deaths up to July 1874 were 150,000.^{57, 91}

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.¹⁰³

On 8 February 1874, there was a destructive hurricane at Auckland, *New Zealand*.¹⁰³

In London, *England* in March, there was great damage on the banks of the River Thames from a very high tide.^{47, 92}

On 20 March 1874, floods on banks of the River Thames in England caused by a very high tide.⁹⁰

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.^{47, 92}

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.^{47, 90, 92}

On 30 May 1874, there was a great gale at Auckland, *New Zealand*.¹⁰³

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.⁹³

In London, *England* on the 11th of July, there was an awful storm; lightning set buildings on fire; lives lost, railways flooded.⁵⁷

On 11 July 1874, an awful storm struck northeastern London, *England*. Several persons were killed, churches and buildings were fired and, railways flooded.⁹⁰

In Nevada in the *United States* on July 24th, there was a great rainfall and waterspouts. About thirty lives lost.⁴⁷ [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.^{90, 92}

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.⁹⁰

In Pittsburg and Alleghany County, Pennsylvania in the *United States* on July 26th, there was a great rainstorm; and about 220 persons drowned.^{47, 92}

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.⁹³

In Hong Kong, *China* on the 22nd of September, there was a great typhoon at Macau.⁵⁷

On 22 September 1874, a typhoon caused much destruction at Macao [Macau], Hong Kong, and vicinity in *China*.⁹⁰

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.⁹³

In *England*, there were violent gales, with destruction of life and property on the 21st October; 29th November; 7th, 8th, 10th and 11th of December.^{57, 90}

In *France*, the losses from hailstorms were very serious in 1874.⁹³

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.]⁹³

Also refer to the section 1874 A.D. – 1875 A.D. for information on the drought and famine in Bangladesh and Asia Minor during that timeframe.

Winter of 1874 / 1875 A.D. In *England*, there was a very severe frost in December 1874.^{47, 90, 93}

On 1-3 January 1875, severe snowstorms struck *Scotland*. Several lives were lost.^{57, 90}

On 12 March 1875, a severe snowstorm struck southern *England*. There was destruction of life and property. Telegraph wires were broken.⁹⁰

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 3rd & 9th. The temperature dropped to 10° F at Vicksburg, Mississippi on January 6th. 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 10th. 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 9th. 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.^{113, 126}

1875 A.D. On 20 January 1875, the record setting temperature at Melbourne, *Australia*, reached 110.4° F (43.6° C).¹⁰³

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.⁹⁹

In February and March 1875, there were heavy floods in Queensland, *Australia*.¹⁰³

On 25 April 1875, there was a heavy flood of Fitzroy River in Queensland, *Australia*.¹⁰³

On 2 May 1875, there was a heavy gale in Sydney, *Australia* from the eastward, with rain.¹⁰³

On 6 May 1875, there was a remarkable waterspout observed near Inverell (an inland town of New South Wales, *Australia*).¹⁰³

On 10 May 1875, there were destructive floods in *South Australia*.¹⁰³

On 9 June 1875, there was a heavy flood of the Campaspe River in Victoria, *Australia*.¹⁰³

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*.^{47, 92}

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.⁹⁰

In *Hungary* in June, there were disastrous floods near Budapest; great loss of life and property.^{47, 92}

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.⁹³

In Budapest, *Hungary* on the 26th of June, there were destructive storms; about 200 persons killed.^{57, 90}

On 28 June 1875, there were heavy storms on the coast of New South Wales, *Australia*.¹⁰³

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, 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.⁹³

In *Hungary* in July, another storm broke over Budapest; great damage. Public subscription opened.^{47, 92}

In Geneva, *Switzerland* on the 7th and 8th of July, there was a violent hailstorm; great destruction of glass and crops.⁵⁷

In the *United Kingdom* in July, there were great floods in the midland and eastern counties, West of *England*, *Wales* and in Eastern *Scotland*.^{47, 92}

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.⁹⁰

In July 1875 in *Silesia*, torrents of rain caused great damage.⁹²

Between May 19 and August 16, 1875, there were many hailstorms in *England*. The most destructive

storms were in July.⁹³

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.]⁹³

In August 1875 in *Germany*, a waterspout burst near the town of Kirn; a number of persons drowned; much property destroyed.^{47, 92}

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.^{47, 92}

In August 1875 in *Burma*, there were heavy floods, exceeding those of 1871.^{47, 92}

In *India* in August, there were disastrous floods in the northwest provinces; great loss of life and destruction of property.^{47, 92}

In *France* in September, again there were great floods in the south of *France*, at Montpelier etc. Vineyards damaged.^{47, 92}

In *Switzerland* in September, there were great floods in Canton Glarus.^{47, 92}

In *Holland* in September, there were great floods.^{47, 92}

In the *West Indies* on 9 September, at the island of St. Vincent, 19 inches of rain fell in twelve hours.⁴⁷

In the *West Indies* on 9 September, the Isle of St. Vincent swept by a hurricane of unusual severity. Much damage.⁵⁷

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.^{47, 92} [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.⁹⁰

In Texas in the *United States* on the 15th – 18th of September, a great storm struck Galveston and Indianola, and other places; houses and villages washed away, and great loss of life.⁵⁷

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.¹²⁴ [In present currency, that would be equivalent to \$20 million in damages based on the Consumer Price Index (CPI) inflation rates.]

On 22-24 September 1875, a great storm struck in Ahmedabad, *India* inundating the area. About 20,000 were left homeless.⁹⁰

In *England* on September 28, there were whirlwinds in the Isle of Wight which caused great destruction; also hurricane in Oxfordshire.⁵⁷

In *England* in October, there were great floods in the Midland Counties, also in the northwestern counties at Dawlish.^{47, 92}

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.⁹⁰

In Venice, *Italy* in October, there was a considerable flood; the *Adriatic* driven in by a gale.^{47, 92}

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.⁹⁹

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.¹⁰¹

Also refer to the section 1874 A.D. – 1875 A.D. for information on the drought and famine in Bangladesh and Asia Minor during that timeframe.

Winter of 1875 / 1876 A.D. 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.^{113, 126}

1876 - 1879 A.D. 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*, the *Barbary Coast* (middle and western coastal regions of *North Africa*), *French Indo-China*, the *Dutch East Indies*, *Turkey*, the *United States* and, *Canada*.⁴⁷

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.⁵⁰

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.”⁵⁷

“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, 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, and in a less degree also along the coast as far north as Ningpo, 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.”⁵⁷

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, 18th 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.”⁵⁷

Six-million out of the population of 56 million in northern *China* starved to death in 1877.⁹⁶

In 1877-78, the famine was very severe in northern *China*. 9,500,000 said to have perished.⁹⁰

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.⁸⁴

Korea

In 1877, a famine continues in Corea [*Korea*].¹⁰⁶

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.⁵³

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.¹⁰⁶

In *Egypt* in 1877, the rainfall was short and the Nile River was low. There was great scarcity.⁵⁷

India

In 1877 in *India*, a severe drought was reported in Madras [Chennai], Mysore, and parts of Bombay.⁴⁷

In 1877 in Bombay, Madras, and Mysore, *India*, there was a famine and about 500,000 perished.⁹⁰

On 15 September 1877, the Tasmanian Mail 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 29th 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 3rd of November, they wrote that the famine in *India* has passed through the worst stage. On the 10th of November, they wrote that there had been 750,000 deaths by famine in *India*.¹⁰⁶

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 (*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.⁵⁴

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*.”⁵⁷

A famine in southern *India* in 1876-1878 resulted in 5,200,000 people starving to death in the British territory alone.⁸⁴

Kashmir

In 1879 in Cashmere [now *Kashmir*], there was severe famine.^{57, 90}

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.¹⁰⁶

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”.]¹⁰⁶

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.”⁴⁷

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).”⁴⁷

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.¹⁰¹

The temperature at Coonamble in New South Wales, *Australia* on 27 November 1877 was 112° F (44.4° C) in the shade.¹⁰⁶

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.¹⁰⁶

South Africa

In 1878 at Cape Colony, *South Africa*, intelligence from the interior of Cape Colony and the Orange Free State 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.⁴⁷

Barbary Coast – North Africa

In 1878, advices from the *Barbary Coast* 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 10th bullocks were being offered at \$4 and \$5 each and sheep at 8 rvn. and on the 15th 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.⁴⁷

Morocco

In *Morocco* in 1877, the drought from the preceding season produced a famine.⁵⁷

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*." ⁵⁷

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. ⁵⁷

In 1877, a scarcity of rain exposed 200,000 people in the northern provinces of *Brazil* to suffering. ⁸⁴

United States

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 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 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 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 on Thursday morning. ⁴⁷

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.¹⁰⁶

1876 A.D. On 28 January 1876, there was a destructive hailstorm in *Tasmania*.¹⁰³

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.⁹⁹

In *France* and *Holland* in March, there was severe inundations.^{47, 90, 92}

In *China*, there were great floods in the northern provinces.⁴⁷

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.⁹³

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.]⁹³
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 £50,000.¹⁰³

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.¹⁰³

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.⁹⁹

In *Wales* in October, there was great damage in South Wales from overflow of River Ebbw. Collieries [coal mines and associated buildings] damaged.^{47, 92}

In Bengal, India (now *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.⁵⁷

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.¹²⁴

Destructive cyclone, in southeast Bengal [now *Bangladesh*] on 31 October 1876. Calcutta, *India* barely escaped. About 215,000 persons perished.⁹⁰

In 1876, a powerful cyclone struck Backerganj, *Bangladesh* causing 200,000 deaths.⁹⁸

In October 1876 in Bengal (now *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.⁹²

In *India* on November 7, the district of Baharganj (the delta thrown out by the united waters of the Ganges) desolated by a cyclone.⁵⁷

In *Scotland* in November, there were great floods in Perth and Forfar. Caledonian Railway much injured.^{47, 92}

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 1877.⁹⁰

In December, there were floods generally throughout *England*.^{47, 92}

During 25-31 December 1876, severe floods struck *England* caused by heavy rains.⁹⁰

In *Turkey* in December, there was a deluge of rain round Adrianople; 1,000 houses said to be swept away; and other serious damage.^{47, 92}

In *Spain* and *Portugal* in December, there were great floods in Andalusia, and especially in Seville. Also in southern Portugal.^{47, 92}

Also refer to the section 1876 A.D. – 1879 A.D. for information on the worldwide drought and famine during that timeframe.

Winter of 1876 / 1877 A.D. During the winter of 1876-77, the *Baltic Sea* was completely covered with ice.⁶⁸

The following were the lowest temperatures observed in January 1877 in the *United States*:¹¹²

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)
Embarass, 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 9th. 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.^{113, 126}

The depth that rivers, streams, lakes and ponds froze in January 1877 in the *United States*:¹¹²

- * At Decatur, Alabama, ice on Tennessee River 2 inches thick on January 2nd – 4th; navigation suspended 3 days.
- * At Albemarle, North Carolina, the Pedee River had ice in eddies 4 inches thick on January 15th.
- * 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 31st, had been 15 to 18 inches thick.
- * At Philadelphia, Pennsylvania, ice on the Schuylkill River reported 34 inches thick on January 25th.
- * At Wappinger's Falls, New York, pond ice reported 30 inches thick on January 6th and 36 inches on 31st.
- * At Malone, New York, Pond ice 30 inches thick on January 13th.
- * At Morgantown, West Virginia, ice 8 to 15 inches thick on January 13th.
- * At Wooster, Ohio, ice 24 inches thick.
- * At Afton, Iowa, pond ice 14 inches thick on January 25th.
- * At Keokuk, Iowa, river ice 20 to 30 inches thick on January 13th.
- * At Independence, Iowa, river ice 21 inches thick.
- * At Leavenworth, Kansas, ice 15 inches thick on January 8th.
- * At Omaha, Nebraska, ice 24 inches thick on January 31st.
- * At Plattsmouth, Nebraska, ice 24 to 30 inches thick on January 13th.
- * At La Crosse, Wisconsin, river ice 13 inches thick on January 31st.
- * 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 31st.

The depth that the ground was frozen in January 1877 in the *United States*:¹¹²

- * At Brookhaven, Mississippi, the ground was frozen to a depth of 5 inches on January 1st.
- * At Alta Vista, Virginia, the ground was frozen 7 inches deep on January 6th.
- * At Danville, Kentucky, the ground was frozen 1 foot on January 9th.
- * At College Hill (near Cincinnati), Ohio, the ground was frozen 3½ feet on January 13th.
- * At Freehold, New Jersey, the ground was frozen 14 inches on January 29th.
- * At Breckenridge, Minnesota, the ground was frozen 6 feet, 4 inches on January 30th.
- * 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.

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.^{47 92}

On 1 January 1877, an inundation greatly injured the piers at Folkestone, Dover, and Hastings in *England*.⁹⁰

On 18 February 1877, a terrible hurricane occurred at the Lacedpede Islands, *Australia*.¹⁰³

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.⁹³

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.¹¹²

On the 16th to 19th of May 1877, a very heavy "Kona" storm and rain passed over the *Sandwich 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.¹¹²

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.¹¹²

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.¹¹²

The following maximum temperatures were observed during the summer from June-September 1877 in the *United States*:¹¹²

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.

During the middle of June 1877, floods on the banks of the River Thames in *England* did much damage throughout the country.⁹⁰

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.¹¹²

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.¹¹²

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.¹¹²

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.”¹¹² [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.¹¹²

On 21 August 1877, London reported there have been unusually severe floods throughout *Great Britain* and *Ireland*. This flood caused great damage to crops.¹⁰⁶

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.¹¹²

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.¹⁰⁶

In September 1877, millions of sheep and cattle perished, and hundreds of families rendered homeless by floods in *Argentina*.¹⁰⁶

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.¹⁰⁶

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.⁹⁰

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, 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.¹⁰⁶

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 23rd 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 25th, 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 24th 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 24th, 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 26th, 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 26th in the Passumpsic, Androscoggin and Kennebec rivers.¹¹²

On 24-25 November 1877, there was a storm that caused much damage on the southeastern coast [of *Great Britain*].⁹⁰

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.¹⁰⁶

On 27 November 1877, a severe hurricane devastated the Grenfell district in New South Wales, *Australia*.¹⁰³

In 1877 in *Spain*, inundations in the province of Murcia caused serious damage to railways. Also, the floods caused twenty-two people to drown.¹⁰⁶

In 1877 at Wreschen (now Września, *Poland*), during service, the church was struck by lightning killing six and injuring 80 others.¹⁰⁶

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.¹⁰⁶

Also refer to the section 1876 A.D. – 1879 A.D. for information on the worldwide drought and famine during that timeframe.

Winter of 1877 / 1878 A.D. 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.¹¹³

1878 A.D. On 14 January 1878, a cyclone struck Darwin in the Northern Territory of *Australia*. Every building in Darwin was damaged.⁹⁹

On Bourbon Island (now *Reunion Island*) in the *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.⁵⁷

On 17 January 1878, a cyclone struck Darwin, *Australia*. Every building was damaged in the city.¹⁰¹

In New South Wales, *Australia* in 1878, there was a drought.¹⁰³

On 18 January 1878, the temperature at Brewarrina in New South Wales, *Australia* rose to 124° F (51.1° C) in the shade.¹⁰³

On 21 February 1878 at Rockhampton in Queensland, *Australia*, there were four sudden deaths caused by the great heat.¹⁰³

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.¹⁰³

In *Tahiti* in February 7th, there was a terrible hurricane, by which much property was destroyed and about 120 lives lost.⁵⁷

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.⁴⁷

On 20 February 1878, there were disastrous floods at Sandhurst in Victoria, *Australia*.¹⁰³

On 8 March 1878, a cyclone struck Cairns, *Australia*, doing considerable damage.¹⁰¹

On 16 March 1878, there was a serious flood in Melbourne, *Australia*. Several chains of the Yau Yean aqueduct were swept away.¹⁰³

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:⁴⁷

“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.”⁴⁷

“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.”⁴⁷

In *England* on the 29th 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.⁵⁷

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 1st of November to the 20th 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.”⁴⁷

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.”⁴⁷

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 all ordinary traffic was suspended, and the inhabitants were carried through the streets to the railway stations in boats and carts.⁴⁷

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.⁵⁷

On 10-11 April 1878, there were inundations in London, *England* from storms and heavy rain.⁹⁰

In Canton (now Guangzhou), *China* on April 12, there was a destructive hurricane, accompanied by two waterspouts, caused immense damage.⁵⁷

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.”⁵⁷

In *England* in May, there were great floods in the Thames valley.⁴⁷

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. 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." ⁹³

In Hong Kong, *China* on May 21, there were terrible thunderstorms, occasioning much damage.⁵⁷

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.⁵⁷

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 on the 28th and 29th, 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.⁵⁷

In June 1878, there was an inundation in northern *Italy*. Much damage was caused by the overflowing of the Po and Mincio rivers.⁹⁰

In *England* in June, great rainfall at Bath and other parts of the West of *England*.⁴⁷

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."⁹³

On 27 June 1878 in *Scotland*, there was a severe hailstorm in Edinburgh.⁹³

In *Ireland* on June 27, a great storm struck the south of *Ireland*; much damage occasioned.⁵⁷

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.⁹³

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*.⁵⁷

In the *United States* on the 4th 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.⁵⁷

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.⁵⁷

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.⁵⁷

In *England*, during the latter part of July, there were continued storms of great severity.⁵⁷

In August 1878, there were many thunderstorms, which destroyed life and property in *England*.⁹⁰

On 25 August 1878 in *Italy*, a hailstorm did great damage to crops.⁹³

In *France*, the losses from hailstorms in 1878 were very light.⁹³

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.⁹³

On 16-17 October 1878, an inundation caused by heavy rains struck Murcia, *Spain*. The provinces of Andalusia, Alicante, Almeria, and Malaga suffered about 1,000 lives lost. There was much damage to property and about 2,000 houses were destroyed.⁹⁰

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.⁹⁹

About 10 December 1878, there was an inundation in *Hungary*.⁹⁰

Also refer to the section 1876 A.D. – 1879 A.D. for information on the worldwide drought and famine during that timeframe.

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.⁷⁰

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 3rd. 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.^{113, 126}

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.⁹⁹

In March 1879, there were heavy floods at Cooma in New South Wales, *Australia*.¹⁰³

On 12-13 March 1879, there was an inundation at Szegedin, *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].⁹⁰

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."⁹³

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.⁹³

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 £2000.⁹³

On 2-3 August 1879, a storm struck Kew, *England* and neighborhood. On 16-17 August 1879, a storm struck Cheshire, *England* and *Wales*.⁹⁰

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.¹²⁴

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.^{99, 109}

On 28 December 1879, a violent gale struck *Scotland*. The Tay bridge was blown down.⁹⁰

Also refer to the section 1876 A.D. – 1879 A.D. for information on the worldwide drought and famine during that timeframe.

Winter of 1879 / 1880 A.D. There were long frosts with thaws from 22 November 1879 to 2 February 1880 [in *England*].⁹⁰

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 Hermosa. **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.¹²⁵

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.^{113, 126}

1880 A.D. – 1886 A.D. Australia.

During 1880-86, *Australia* experienced a national drought.¹⁰¹

On 24 and 25 January 1880, the high temperature in Perth, *Australia* reached 110° F (43.3° C). There were 21 days in January/February 1880 where the temperature was 100.0° F or greater.¹⁰²

During the summer of 1880-81 in Perth, *Australia*, there were 10 days when the temperature was 100.0° F

or greater.¹⁰²

On 17 February 1882, the high temperature in Perth, *Australia* reached 113.8° F (45.4° C). A week earlier on 10 February, the high temperature was at 113.6° F (45.3° C). During the summer of 1881-82, there were 10 days when the temperature was 100.0° F or greater.¹⁰²

On 14 December 1882, the high temperature in Perth, *Australia* reached 111° F (43.9° C). During the summer of 1882-83, there were 6 days when the temperature was 100.0° F or greater.¹⁰²

During the summer of 1883-84 in Perth, *Australia*, there were 5 days when the temperature was 100.0° F or greater.¹⁰²

On 31 January 1885, the high temperature in Perth, *Australia* reached 112° F (44.4° C). During the summer of 1884-85, there were 9 days when the temperature was 100.0° F or greater.¹⁰²

During the summer of 1885-86 in Perth, *Australia*, there were 14 days when the temperature was 100.0° F or greater.¹⁰²

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 1870-71.¹⁰¹

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.¹⁰¹

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.¹⁰¹

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 1859.¹⁰¹

1880 A.D. On 24 March 1880 in *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.⁹³

Around 18 April 1880, destructive tornadoes struck the western states in *North America* and caused great loss of life and property.⁹⁰

On 25 May 1880 in *India*, there was a great storm at Mussoorie. 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.⁹³

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 are completely ruined, many of the hailstones which fell there weighing upwards of 15 grams."⁹³

On 20 June 1880 in *Romania*. "Heavy hailstorms caused grave damage to the crops in the district of Bralia."⁹³

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.¹²⁵

On 13 July 1880 in *England*. "Very large stones in the neighborhood of Liverpool."⁹³

On 24 July 1880 in *Ireland*, there was a very severe hailstorm at Moylough in the County of Galway, which lasted half an hour.⁹³

In July 1880, there was a very severe famine in Tauris and *Asia Minor*.⁹⁰

Many thunderstorms in *England* in July 1880.⁹⁰

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.⁶⁷

Russia suffered from a major famine in 1880.⁹⁶

In 1880 in *Germany*, the hail damage losses sustained by the Magdeburg Company were very heavy during this season.⁹³

On 20 August 1880 in *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.⁹³

About 8-11 October 1880, inundations struck the midland counties of *England* causing much damage.⁹⁰

On 27-28 October 1880, there were severe storms in *England* that caused much destruction by inundations.⁹⁰

Also refer to the section 1880 A.D. – 1886 A.D. for information on the drought in Australia during that timeframe.

Winter of 1880 / 1881 A.D. The *Baltic Sea* froze.³⁷

During the winter of 1880-81, the *Baltic Sea* was completely covered with ice.⁶⁸

On the 16th of January 1881, an area of low pressure developed over the *Azores*. On the 17th, this disturbance moved northeastward and was centered near the southern part of the *Bay of Biscay*. On the 18th, 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 18th, 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 19th, the storm center had moved over *Belgium* and *Holland* and then into *Germany*. By the 20th, the center had moved into eastern *Prussia*. On the 21st, the center was over central *Russia*. On the 22nd, the center was in the vicinity of the Ural Mountains.⁷⁵

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.⁹⁰

There was a very severe frost in *Britain* beginning on 18 January 1881 lasting about 14 days.⁹⁰

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 19th. 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 30th. 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 30th. 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.^{113, 126}

1881 A.D. 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).⁹⁷

In August 1881, significant rainfalls produced floods in Cheshire and Lancashire, *England*.⁹⁰

In October 1881, there were great inundations caused by rains in southeast *Europe*.⁹⁰

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.⁹⁰

On 19-20 October 1881, a storm on the south and west coasts of *England* caused many wrecks with much loss of life.⁹⁰

On 26-27 November 1881, there was great destruction of life and property [in *Great Britain*] by gales.⁹⁰

On 27 November 1881, the lighthouse, Calf Rock, in Bantry Bay, *Ireland* was destroyed.⁹⁰

On 8 October 1881, a typhoon struck Haifong [Hai Phong, *Vietnam*], about 300,000 people perished.⁹⁰

In 1881, a powerful cyclone struck Haiphong, *Vietnam* causing 300,000 deaths.⁹⁸

On 17-21 December 1881, destructive gales struck *England*. There were many wrecks and loss of life by sea and land.⁹⁰

Also refer to the section 1880 A.D. – 1886 A.D. for information on the drought in Australia during that timeframe.

Winter of 1881 / 1882 A.D. The following are the lowest temperatures observed in January 1882 in the *United States and Canada*:⁷⁵

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 & Pensacola, Florida	(32° F, 0.0° C)

The depth that rivers and lakes froze in January 1882 in the *United States*:⁷⁵

* 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 16th.

* At Dubuque, Iowa, the *Mississippi River* frozen over; teams [of wagons] crossing on the ice on the 18th.

* 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 28th, ice eight inches thick.
- * At Marysville, California, the *Yuba River* on the 13th full of floating ice; coldest weather for years.
- * At Madison, Wisconsin, *Forest Lake* frozen over on the 2nd.
- * At Terry's Landing (Terry, Montana), the *Yellowstone River* closed by ice on the 13th.
- * At Fort Keogh, Montana, the *Yellowstone River* frozen over on the 5th.
- * At Fort Custer, Montana, the *Big Horn River* closed by ice on the 9th.
- * At Charleston, Illinois, the *Embarrass River* was frozen over on the 5th; on the 24th the ice was 3-5 inches thick.
- * At Rockford, Illinois, the *Rock River* was frozen solid on the 1st.
- * At Fort Brady, Michigan, the *Sault St. Marie River* was frozen over on the 3rd.
- * At Madison Barracks, New York, *Lake Ontario* bay was frozen over on the 2nd.
- * At Buffalo, New York, the *Niagara River* was frozen over on the 4th.
- * At Port Huron, Michigan, an ice bridge formed across *Lake Huron* Bay from Fort Gratiot Lighthouse to Point Edwards on the 24th.
- * At Alpena, Michigan, Thunder Bay on *Lake Huron* was frozen over on the 1st; navigation closed.
- * At Grand Haven, Michigan, the *Grand River* was frozen over on the 4th.
- * At Duluth, Minnesota, *Lake Superior* was frozen over 600 feet from the docks on the 10th.
- * 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 24th off Cold Spring in the Highlands.
- * In New York City, navigation on the *North Hudson River* was closed on January 4th 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 24th.
- * At Cape Lookout, North Carolina, the *Core Sound* was frozen over on the 22nd.
- * At Chicago, Illinois on the 3rd and Milwaukee, Wisconsin on the 5th, *Lake Michigan* was frozen.
- * At Port Huron, Michigan, the *Black River* was frozen over on the 1st and the ice was 7 inches thick on the 17th.
- * At Toledo, Ohio, the *Maumee River* was frozen over on the 2nd.
- * At Cleveland, Ohio, the *Cuyahoga River* was frozen over on the 2nd and *Lake Erie* on the 4th 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 1st.
- * At Burlington, Vermont, *Lake Champlain* was frozen between the docks on the 5th and navigation was closed on the 23rd.
- * At Sandusky, Ohio, the *Sandusky Bay* was frozen over during the night of the 1st and navigation was suspended.
- * At Bangor, Maine, the *Penobscot River* was closed for navigation on the 2nd.
- * At New Haven, Connecticut, the *Quinnipiac River* and the harbor was frozen over on the 4th. 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.

On 12 & 13 January 1882, a snowstorm struck Southern California in the *United States*. At San Geronio, California on the 12th, 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 13th, the hills all about the city were white with snow. In the San Geronio 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 Geronio, California received a total of 16.5 inches of snow in January. At San Geronio the minimum temperature was 19° F (-7.2° C) on the 12th.] At Riverside, California on the 13th, snow was 5 inches and still falling; good sleighing in the orange groves. In Tucson, Arizona on the 12th, there was very heavy snowfall during the night in the desert and on the 13th, a fierce snowstorm raged in the mountains. In Campo, California on the 12th, the minimum

temperature was 6.5° F (-14.2° C). On the 13th, snow fell to a depth of 20 inches and “all communications with the outside world cut off.” On the 15th, 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 16th, all communications still cut off. On the 18th, snow slowly disappearing and reports from the surrounding country show great losses in livestock. The roads were still impassable.⁷⁵

In San Diego, California, the storm, which began on the 12th, 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 13th, the rainfall was 3.02 inches.] It was also the coldest storm on record. On the morning of the 14th, 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.”⁷⁵

The storm as it passed over Ventura County, California on the 12th, 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 12th, 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.⁷⁵

Several snowstorms struck *North America* during February 1882. At St. Paul, Minnesota, snowstorms on the 20th and 21st 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 22nd, the streets were blockaded by 4 feet of snow. In Carbondale, Pennsylvania on the 4th 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)].⁷⁵

1882 A.D. Severe gales produced much destruction in *England* and *Scotland* on 6 January and 29 April 1882.⁹⁰

On 16-17 January 1882, a severe cyclone struck Darwin, *Australia*.¹⁰¹

On 17 January 1882, a cyclone struck Darwin in the Northern Territory of *Australia*. The gale caused severe damage to buildings in the city.⁹⁹

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.⁹⁷

On 26 March 1882, an excessive rain and hailstorm visited a section of the country about 20-miles north of Corning, Missouri in the *United States*. Hail in some places drifted to depths of 3 ½ feet [1.1 meters]⁷⁵.

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.⁷⁵

Around 16 June 1882, tornado nearly destroyed Grinnell, Iowa in the *United States* and other towns. There was a great loss of life.⁹⁰

The following are the highest temperatures observed during July 1882 in the *United States*:⁷⁵

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, *India* causing 100,000 deaths.⁹⁸

Violent gales with damage struck [*Great Britain*], 22-23 August and 24 October 1882.⁹⁰

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.⁹⁰

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*.⁹⁰

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 were destroyed in December 1882.⁹⁰

In December 1882, there were great floods in the Thames valley and midland counties of *England*.⁹⁰

Also refer to the section 1880 A.D. – 1886 A.D. for information on the drought in Australia during that timeframe.

Winter of 1882 / 1883 A.D. 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.^{113, 126}

1883 A.D. *Russia* suffered from a major famine in 1883.⁹⁶

Early in January 1883, inundations near Worms, *Germany* caused much destruction. About 60 people drowned.⁹⁰

On 10 January 1883, Raab in *Hungary* was partly submerged by a flood.⁹⁰

Violent gales with damage struck [*Great Britain*], 26-28 January, 10 February, and 6 March 1883.⁹⁰

In February 1883, there were inundations in Pennsylvania, and Cincinnati, Ohio in the *United States*.⁹⁰

In April 1883, tornadoes struck the southern states of the *United States*. About 150 people were killed.⁹⁰

On 16 May 1883, floods in Cachar, *India* caused great distress.⁹⁰

About 21 June 1883, the River Neisse rose and flooded *Silesia* causing much damage.⁹⁰

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.⁹⁰

On 1-2 September 1883, violent gale in the *British Channel* caused many wrecks.⁹⁰

On 26 September 1883, a destructive gale struck on the coast of *Scotland* and *Ireland*.⁹⁰

Around 29 October 1883, there was an overflow of the River Peneus, in Thessaly, *Greece* which did much damage.⁹⁰

In the morning of 12 December 1883, a storm caused great loss of life and damage in London and other parts of *Great Britain*.⁹⁰

Also refer to the section **1880 A.D. – 1886 A.D.** for information on the drought in Australia during that timeframe.

Winter of 1883 / 1884 A.D. The minimum temperatures in Montana, Dakota and Minnesota in the *United States* on the January 4th, 1884 and over the central valleys and Southern states on the 5th and 6th 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 4th. Very low temperatures also occurred on the 24th – 26th during the passage of a high-pressure region over the lake region. The following are the lowest temperatures observed during January 1884.¹²⁶

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)

Major snowstorms struck the *United States* in January 1884. Oswego, New York reported the snowstorm on the 3rd interfered with railroad traffic. On the 9th 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 7th. Richmond, Kentucky reported a depth of fourteen inches of snow on the 9th. Belleville, Ontario, *Canada* reported on the 9th the depth of snow was three feet on the level. Titusville, Pennsylvania reported that the snowfall of the 9th 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 1st to the 9th of January measured thirty-three inches. Wheeling West Virginia reported a heavy snowstorm prevailed on the 8th. The ground was covered to an average depth of twenty inches.¹²⁶

The depth that rivers, bays and lakes froze in January 1884 in the *United States*:¹²⁶

- * At Calais, Maine, the *Saint Croix River* was closed to navigation during the night of the 15th-16th.
- * At Narragansett Pier, Rhode Island, large fields of ice passed out of the *Narragansett Bay* on the 20th.
- * At Block Island, Rhode Island: the harbor froze on the 6th.
- * At Burlington, Vermont, *Broad Lake* froze over on the 9th, which is the earliest closing of the last ten years.
- * At Charlotte, Vermont, the *Lake Champlain* was firmly frozen on the 10th.
- * At New Haven, Connecticut, the harbor froze on the 6th.
- * At New York City, New York, the flood tide on the morning of the 13th 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 22nd 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 27th.
- * At Barnegat City, New Jersey, *Barnegat Bay* was closed by ice on the 7th, cutting off communication with the mainland.
- * At Little Egg Harbor, New Jersey, there were large quantities of ice in the harbor on the 9th.
- * At New York City, New York, there was considerable floating ice on the *Hudson River* on the 12th.
- * 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 8th. 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 7th.
- * At Chincoteague, Virginia, *Chincoteague Bay* froze over on the 6th.
- * At Baltimore, Maryland, brisk winds on the 8th 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 9th 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 6th, and on the 7th it varied from two to three inches in thickness.
- * At Washington D.C., the *Potomac River* froze over on the 1st. The ice was strong enough for skating from about the 7th to 27th.
- * At Oxford, Maryland: a breaking of the ice on the *Choptank River* occurred during the night of the 8th-9th. 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 9th 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 25th.
- * At Detroit, Michigan, the *Detroit River* was frozen from shore to shore on the 1st.
- * At Pittsburg, Pennsylvania: during the night of the 10th-11th, 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 6th 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 7th-9th.
- * 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 12th, resulting in heavy losses to barge owners and lumbermen. The losses sustained by the stove 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 4th.
- * 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 3rd. 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 5th.
- * At Grand Haven, Michigan, the river froze over on the 3rd.
- * At Grand Haven, Michigan, the westerly winds of the 23rd 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 19th a field of ice extended lakeward a distance of ten miles.
- * At Traverse City, Michigan, the *Grand Traverse Bay* was frozen over on the 15th.
- * In the *Straits of Mackinac* at Mackinaw City, Michigan, the steamer *Algolah*, in attempting to cross the straits on the 3rd, 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 14th, and in attempting to return on the 15th became fast in the ice in the center of the straits. She arrived here on the 18th, 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 9th.
- * At Cairo, Illinois, the *Mississippi River* froze over on the 4th.
- * At Memphis, Tennessee, ice formed along the shores on the west bank of the *Mississippi River* on the 6th.
- * At Saint Louis, Missouri, ice dams on the *Mississippi River* obstructed the harbor from the 8th to the 29th.
- * 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 5th and was compelled to return back to Vicksburg.
- * At Leavenworth, Kansas on the 5th, 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 3rd.
- * At Manhattan, Kansas, ice in the *Kansas River* was ten and one-half inches thick on the 7th.
- * At Nashville, Tennessee, there was floating ice on the *Cumberland River* on the 9th and 10th.
- * At Chattanooga, Tennessee, there was floating ice on the *Tennessee River* on the 8th and 9th. On the 9th, 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 7th.
- * At Montgomery, Alabama, on the 30th; 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 5th; ice remained until the 24th. The *Elk River* was frozen over near Fayetteville on the 7th, sufficient for skating. The *Ocoee River* froze over on the 7th and 8th.
- * At Shreveport, Louisiana, there was floating ice on the *Red River* on the 8th.
- * At El Paso, Texas: the *Rio Grande River* froze over on the 1st.
- * At Fort Smith, Arkansas, on the 11th 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 7th to 13th.
- * At Lynchburg, Virginia, ice on the streams in this vicinity was four inches thick on the 9th.
- * At Brevard, North Carolina, the creeks in this vicinity were frozen on the 6th.

1884 A.D. 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.⁹⁰

On 30 January 1884, a cyclone struck Bowen, *Australia*, unroofing almost all the houses in the city.¹⁰¹

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.⁹⁹

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.⁹⁰

Around 18 February 1884, tornadoes struck in the southern states of the *United States* killing about 600 people.⁹⁰

At the end of May 1884, there was a disastrous flood in eastern *Spain*.⁹⁰

About 23 June 1884, there were floods in *Galicia*. A new railway bridge over the Vistula River was destroyed. 20 lives were lost.⁹⁰

The following are the highest temperatures observed during July 1884 in the *United States*:¹²⁶

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 21st 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 23rd 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 11th, 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 24th, 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 15th, a hailstorm killed many birds and small animals. At Omaha, Nebraska on the 13th, 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 20th, 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 19th, 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 25th; hogs, sheep and cattle were killed by hailstones, some of which weighed several ounces.¹²⁶

On 25 July 1884, a waterspout struck Saint Louis, Missouri in the *United States*:¹²⁶

“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.”

On 7 October 1884, storm struck Catania, *Sicily*.⁹⁰

In November 1884, there was a great inundation caused by heavy rains in eastern *Spain*. There was much distress in Alicante, Almeria and Valencia.⁹⁰

Also refer to the section 1880 A.D. – 1886 A.D. for information on the drought in Australia during that timeframe.

Winter of 1884 / 1885 A.D. The following are the lowest temperatures observed during January 1885 in the *United States*:¹¹³

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° F in December. The temperature at Saint Vincent, Minnesota fell to -47.8° F in December and -39.2° F in February. The temperature at Saint Paul, Minnesota fell to -27.0° F in December and -24.5° F in February. The temperature at Pike's Peak, Colorado fell to -20.0° F in December and -24.0° F in February. The temperature at La Crosse, Wisconsin fell to -26.0° F in December and -22.0° F in February. The temperature at Milwaukee, Wisconsin fell to -21.6° F in December and -23.6° F in February. The temperature at Mount Washington, New Hampshire fell to -42.0° F in December, -30.8° F in February and -47.8° F in March. The temperature at Dayton, Washington fell to -26.0° F in December. The temperature at Yankton, South Dakota fell to -18.2° F in February. The temperature at Chicago, Illinois fell to -13.7° F in February. The temperature at Greencastle, Indiana fell to -13.1° F in February. The temperature at Dubuque, Iowa fell to -20.0° F in February. The temperature at Davenport, Iowa fell to -17.3° F in February. The temperature at Leavenworth, Iowa fell to -16.2° F in February. The temperature at Escanaba, Michigan fell to -25.0° F in February. The temperature at Omaha, Nebraska fell to -17.9° F in February. The temperature at North Platte, Nebraska fell to -22.2° F in February. The temperature at Toledo, Ohio fell to -15.5° F in February.^{113, 126}

The depth that rivers and lakes froze in January 1885 in the *United States*:¹¹³

- * 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 22nd the steamer *Popham* was cut through by the ice and sank on Phippsburg flats.
- * At Chincoteague, Virginia, the *Chincoteague Bay* froze over on the 23rd.
- * At Hartford, Connecticut, the *Connecticut River* was frozen for the third time during the winter on the 21st and 22nd. 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 26th.
- * At Albany, New York, the *Hudson River* froze on the 3rd.
- * At Port Huron, Michigan, *Lake Huron* on the 19th was covered with ice as far as the eye could reach.
- * At Traverse City, Michigan, *Lake Michigan* on the 28th 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 20th and drifted with the ice being unable to reach either shore for the rest of the month.
- * At Duluth, Minnesota, *Lake Superior* on the 16th 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 23rd.
- * 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 29th.
- * At Tiffin, Ohio, the *Sandusky River*, the ice was 7 inches thick on the 22nd.
- * At Columbia, Pennsylvania, the *Susquehanna River* froze over on the 23rd.
- * At Port Deposit, Maryland, the *Susquehanna River* on the 23rd 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 21st.

* At New Haven, Connecticut, the ice on *Lake Whitney* was 10 inches thick on the 28th.

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.”¹¹³

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 8th, 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 1885.¹¹³

Severe snowstorms struck the Midwest and Northeast in the *United States* in January 1885. Hillsborough, Illinois reports on the 16th, the snow covered the ground to a depth of nearly two feet. Quincy, Illinois reported one foot of snowfall. Kankakee, Illinois reported on the 28th, snow was two feet deep. Pana, Illinois reported that on the 28th, 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 28th, more than a foot of snow fell.¹¹³

On 16 January 1885, destructive snowstorms struck Piedmont, *Italy*.⁹⁰

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.⁹⁹

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.¹²³

The following are the highest temperatures observed during the month of July 1885 in the *United States*:

¹¹³

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 3 June 1885 a destructive cyclone near Aden, *Yemen*. About 50,000*l.* damages reported. Ships sunk.⁹⁰

On 12-15 October 1885, heavy storms struck the Labrador coast in *Canada* wrecking about 80 craft with about 300 lives lost.⁹⁰

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.¹⁰⁵

On 2 December 1885, a storm off Colon, *Panama* wrecked 15 vessels with 50 lives lost.⁹⁰

1886 A.D. On 1-3 March 1886, heavy snowstorm struck northeast *England*. The storm stopped locomotion [made travel impossible].⁹⁰

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.⁹⁰

On 12 May 1886, a destructive hurricane struck Madrid, *Spain*. Thirty-two lives were lost and 320 people were wounded.⁹⁰

On 12-15 May 1886, destructive tornadoes struck southern Ohio, Indiana, and Illinois in the *United States*.⁹⁰

On 10 August 1886, violent storm struck northeast *France*. The storm caused much damage at Rheims and Nancy.⁹⁰

On 16 August 1886, a hurricane struck at St. Vincent in the *Caribbean*. The hurricane caused great loss of life and property.⁹⁰

On 16 August 1886, there was an inundation of Mandalay, *Burma* from the Irrawaddy River. There was great loss of life and property. By 25 August, the waters were subsiding.⁹⁷

On 18 August 1886, there was a great inundation at Mandalay, *Burma*.⁹⁰

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.¹²⁴

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.⁹⁰

On 15-16 October 1886, severe gale [in *Great Britain*] caused very great destruction on sea and land.⁹⁰

In *Bangladesh*, a great cyclone struck Bengal 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.⁴⁷

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.⁹⁰

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. The following are the lowest temperatures observed during January 1887 in the *United States*:¹¹⁴

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*: ¹¹⁴

* At Cairo, Illinois, the *Mississippi River* was frozen over from the 1st to the 19th 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 2nd.

* At Baltimore, Maryland, the harbor was covered with ice 2 to 5 inches thick on the 4th.

* At Lynchburg, Virginia, the *James River* was frozen over on the 3rd.

* At Leavenworth, Kansas, and points north, the *Missouri River* was frozen over the entire month.

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.⁹⁰

1887 A.D. – 1889 A.D. China and Asia Minor.

In 1887-89, there was a famine in *China*.⁹⁰

In 1887, there was a famine in *Asia Minor*.⁹⁰

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.⁹⁹

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.⁹⁹

On 23 May 1887, a destructive cyclone at Calcutta, *India*.⁹⁰

The following are the highest temperatures observed during July 1887 in the *United States*:¹¹⁴

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)	

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.¹¹⁴

At Palo Alto, Mississippi in the *United States*, a violent lightning storm struck on the afternoon of July 10th. 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.¹¹⁴

In Wabash, Indiana in the *United States* during the night of July 18th/19th, 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 \$50,000.¹¹⁴ [In present currency, that would be equivalent to \$1.2 million using CPI inflation.]

In July 1887, there were great floods in southern *United States*.⁹⁰

On 16 August 1887, a destructive hurricane struck Bordeaux and southern *France* causing loss of life.⁹⁰

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.⁹⁰

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.⁴⁵

In September-October 1887, there was a great overflow of the Hoang-Ho or Yellow River in *China*.⁹⁰

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*.⁹⁰

In 1887 in *Australia*, severe floods took place in Victoria.¹⁰¹

Also refer to the section 1887 A.D. – 1889 A.D. for information on the famine in China and Asia Minor during that timeframe.

Winter of 1887 / 1888 A.D. The *Baltic Sea* froze.³⁷

During the winter of 1887-88, the *Baltic Sea* was completely covered with ice.⁶⁸

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 1888.⁹⁰

The *United States* suffered from unusually cold temperatures during the winter of 1887-88. The following are the lowest temperatures observed during January 1888:¹²¹

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*:¹²¹

* At Bar Harbor, Maine, the *Frenchman's Bay* contained much ice during the latter part of January. Navigation was closed on January 28th.

* At Portland, Maine, the harbor at *Casco Bay* was frozen over with thin ice from January 24th.

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 23rd and broke up on February 3rd.
- * At Vineyard Haven, Massachusetts, the *Holmes Hole Harbor* was frozen over from January 17th to the 23rd.
- * At Nantucket, Massachusetts, the *Nantucket Harbor* was frozen over on January 21st, 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 21st. *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 24th.
- * At New Haven, Connecticut, *New Haven Bay* froze over on January 17th.
- * At Burlington, Vermont, *Lake Champlain* froze over on January 22nd, 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 19th. There was an unusual amount of drift ice in the upper bay on January 23rd.
- * At Port Jervis, New York, the *Delaware River* was gorged [with ice] for a distance of four miles on February 23rd. The backwater flooded cellars and basements.
- * At Starkey, New York, *Seneca Lake* froze over on January 22nd. 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 30th.
- * 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 30th Street Bridge.
- * At Erie, Pennsylvania, the ice in *Presque Isle Bay* was 20 inches thick on February 16th.
- * 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 21st.
- * At Cairo, Illinois, there was floating ice in the *Ohio River* from January 17th to the 21st.
- * 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 15th. 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 15th and broke on January 31st.
- * 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 17th.
- * At Mackinaw City, Michigan, the *Mackinaw Strait* froze over on January 1st and by the 2nd the ice was 2 inches thick.
- * At Port Huron, Michigan, the *Saint Clair River* was closed for navigation due to the ice on January 2nd. An ice bridge formed on January 20th.
- * At Grand Haven, Michigan, the *Grand River* was frozen over on February 7th. On February 12th, *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 14th. The minimum temperature of 14° F was recorded on January 14th. This was the lowest temperature since 21 January 1854 when a

similar cold temperature was observed. Between the 15th and the 18th 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 15th. Ice formed to a thickness of four inches.

* At Portland, Oregon, the *Columbia River* was frozen over on January 9th closing navigation.

* At Portland, Oregon, the *Willamette River* froze over on January 13th. People crossed on the ice on January 15th.

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.⁵¹

On 11-13 March 1888, New York City in the *United States* was battered by a destructive blizzard.⁹⁷

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.⁹⁴

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.¹⁰¹

On [17] February 1888, a cyclone struck Mackay in Queensland, *Australia*. Ships and homes were destroyed.⁹⁹

On 19 February 1888, a cyclone [tornado] struck in Illinois, in the *United States* causing great destruction of life and property.⁹⁰ [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 9-11 March 1888, there was a violent gale [in *Great Britain*]. Several vessels were wrecked causing loss of life.⁹⁴

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.⁹⁰

On 27 March 1888, the town of Ninnescah, Kansas in the *United States* was destroyed by a gale.⁹⁴

About 27 March 1888, the Vistula River [in *Poland*] overflowed. About 77 villages were submerged.⁹⁰

On 28 March 1888, there was a great storm and a tidal wave causing much destruction near Wellington, *New Zealand*.⁹⁴

On 7 April 1888, there was a destructive hurricane in Dacca [now Dhaka, *Bangladesh*]. About 69 persons were killed.⁹⁷

Around 8 May 1888, there was a great flood in the Canton River [the Pearl River in *China*]. It is said that 3,000 people drowned.⁹⁰

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.⁹⁰

During 17-20 June 1888, there were inundations in *Mexico* caused by heavy rains. These floods caused great loss of life.⁹⁰

The following are the highest temperatures observed during July 1888 in the *United States*:¹²¹

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	(90.9° F, 32.7° C)
Cheyenne, Wyoming	(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.¹²¹

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.]¹²²

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.⁹⁰

In July and August 1888, there were great floods in *Germany*.⁹⁰

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.⁹⁷

On 4 September 1888, there was a destructive cyclone in the *West Indies* and *Cuba*.⁹⁷

In October 1888, there were great floods in *France* and *Switzerland*.⁹⁰

On 15-16 November 1888, there was a destructive gale in *Scotland*, northern *England* and *Ireland*. The gale caused many shipwrecks. Forth bridge was damaged.⁹⁷

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.⁹⁷

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.¹⁰¹

Also refer to the section 1887 A.D. – 1889 A.D. for information on the famine in China and Asia Minor during that timeframe.

1889 A.D. – 1892 A.D. India, Russia, Japan, Hungary and Montenegro.

There was a famine in 1889-92 in Madras [Chennai], *India*.⁹⁰

There was a famine in 1889-92 in *Montenegro*.⁹⁰

There was a famine in *Japan* in 1890.⁹⁰

Russia suffered from a major famine in 1891-92.^{90, 96} It is said that 35 million people starved during this famine.⁹⁶

According to a Vienna, Austria news account of March 2, there was a famine in the County of Arva, in *Hungary*. Many children have died in the Namszto district. Seventy-five cases of death from starvation have been reported in two months. The people's food consists of hominy mixed with tree bark, or maize mixed with chopped straw.⁹⁵

Winter of 1888 / 1889 A.D. The following are the lowest temperatures observed during January 1889 in the *United States*:¹²⁰

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: ¹²⁰

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: ¹²⁰

- * 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 28th as far as could be seen.
- * At Alpena, Michigan, *Thunder Bay and Thunder Bay River*, were partly frozen over on the 12th.
- * At Keokuk, Iowa, the *Mississippi River* was full of floating ice on the 17th.
- * At Leavenworth, Kansas, there was floating ice intermittently in the *Missouri River* during January.

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.⁹⁷

On 2-3, 8 February 1889, there were destructive gales over *Great Britain*. The storm produced [ship] wrecks and loss of life.⁹⁷

On 8-9 March 1889, there were destructive floods in the midland and southwestern *England*. Leicester, Bristol, Taunton and other places suffer much.⁹⁰

On 15-16 March 1889, a violent hurricane struck at the Samoan Isles in the Pacific. 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.⁹⁷

In April 1889, the Torrens River in *Australia* flooded. Highest recorded flooding occurred in the Adelaide region. There was heavy damage to buildings, roads and crops.⁹⁹

In May 1889, there were floods in the Conemaugh Valley, Pennsylvania in the *United States*.⁹⁰

On 10 May 1889, a destructive storm struck on the east coast of the *United States*.⁹⁷

On 17 May 1889, there was a great storm in southern *Germany*, especially in *Austria, Bohemia*. The storm produced a great loss of life and property. Then on 3-4 June 1889, another storm struck *Switzerland*.⁹⁷

On 25 May 1889, a great storm struck the coast of Sydney, *Australia* with much loss of life and property.⁹⁷

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.⁹⁷

The following are the highest temperatures observed during July 1889 in the *United States*:¹²⁰

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: ¹²⁰

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, *Canada* (90° F, 32.2° C)
Grand Turk Island, *West Indies* (84° F, 28.9° C)
Hamilton, *Bermuda* (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 3rd 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 3rd, 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.¹²⁰

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 18th and 19th the Little Kanawha River rose very rapidly during the 19th and 20th, 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 19th. 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.¹²⁰ [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.¹²⁰

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 30th until 3:30 p.m. on the 31st. A total of 6.15 inches of rain fell during the 24 hours ending at 3:30 p.m. On the 31st. 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)].¹²⁰

In July and August 1889, there were destructive floods in *China* and *Japan*.⁹⁰

On 21 August and 5-7 October 1889, there were great storms over the *United Kingdom* producing [ship] wrecks with loss of life.⁹⁷

In September 1889, there was a great overflow of the Hoang-Ho or Yellow River in *China*.⁹⁰

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.⁹⁷

On 23 September 1889, 29 vessels were wrecked in Delaware Bay in the *United States*, about 31 lives lost.⁹⁷

On 7 October 1889, there was a great storm on the island of Sardinia, *Italy*.⁹⁷

On 26-27 October 1889, there was a destructive storm on the coast of Carolina, in the *United States*.⁹⁷

In 1889 in *Australia*, severe floods took place in Victoria.¹⁰¹

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.

Also refer to the section 1889 A.D. below for information on the drought in the western United States during 1889.

1889 A.D. United States.

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.¹²⁰

The following are reports of drought conditions in July 1889 in the western *United States*:¹²⁰

- * 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 30th 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*:¹²⁰

- * 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 11th, and at Wilcox, Arizona, on the 6th, 12th, 28th, and 29th.

The following are reports of forest fires in July 1889 in the *United States*:¹²⁰

- * 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 12th, 13th; San Diego, California, on the 29th, 30th; Linkville, Oregon, on the 26th, 28th; Roseburg, Oregon, on the 27th, 31st; and Port Angeles, Washington, on the 19th.

The following are the highest temperatures observed during July 1889 in the western *United States*:¹²⁰

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)

Winter of 1889 / 1890 A.D. The following are the lowest temperatures observed during January 1890 in the *United States*:¹¹⁹

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: ¹¹⁹

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. ¹¹⁹

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: ¹¹⁹

- * At Alpena, Michigan, *Thunder Bay and Thunder River* froze over on the 16th.
- * At Machias, Maine, the *Machias River* was closed to navigation by ice on the 12th.
- * 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 9th.
- * At Davenport, Iowa, the *Mississippi River* froze over on the 16th.
- * 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, 28th, 29th, and 30th.

On 12 January 1890, there were destructive storms in the western *United States*. These storms struck Canada on 14 January 1890.⁹⁷

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.⁹⁷

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.]⁹⁷

1890 A. D. In early February 1890, there were disastrous floods on the upper River Severn in *Wales*, which caused much suffering.⁹⁰

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.¹⁰¹

About 13 March 1890, there were destructive floods caused by heavy rains in the Mississippi valley and Southern States in the *United States*.⁹⁰

In March 1890, there was a great flood in the lower Mississippi valley in the *United States*.¹¹⁹

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 1890.⁹⁷

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.⁹⁷

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.¹¹⁹

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.⁹⁷

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.⁹⁹

On 4 May 1890, there was a cyclone [tornado] in Texas in the *United States*, much destruction, 15 persons killed.⁹⁷

On 20 June 1890, a tornado struck in Lee County, Illinois in the *United States*, 15 deaths.⁹⁷

The following are the highest temperatures observed during July 1890 in the *United States*:¹¹⁹

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: ¹¹⁹

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)].¹¹⁹

On 9 July 1890, a great cyclone at Muscat, *Oman* caused floods. It was reported that about 700 persons perished.⁹⁷

In July 1890, there was a terrible cyclone [tornado] in Minnesota in the *United States*.⁹⁷

On the 13 July 1890, about 6 p.m. (75th Meridian time – Eastern Time Zone), a tornado swept over Ramsey County, Minnesota in the *United States* causing the death of 6 persons, and injuring 23, demolishing buildings, uprooting trees. The rainfall was heavy and hailstones large enough to kill chickens fell some distance north of the path of destruction. Foliage was stripped from trees and plants, and near the ruined buildings the trees were barked, possibly by flying debris. A remarkable feature of the storm was that sticks of timber from demolished buildings were found driven into the ground. About 9 p.m., a violent storm passed over Lake Pepin (*Mississippi River*), 50 miles southeast from 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 \$10,000.¹¹⁹

On 20 July 1890, there was a destructive cyclone at Slonim, Russia [now *Belarus*], 19 lives lost.⁹⁷

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.⁹⁷

In August 1890, there were destructive storms in *Austria, France, Switzerland* and in the *United States*.⁹⁷

In August 1890, there were destructive floods in *China*.⁹⁰

In August and September 1890, there were destructive floods in *Austria, Bohemia, central Europe* and *France*.⁹⁰

On 16-17 September 1890, the Orinoco River and its tributaries in *South America* overflowed causing great destruction.⁹⁰

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.⁹⁷

On 23 November 1890, a violent northwest gale struck the *English Channel*. There were several wrecks on the southern coast [of *England*].⁹⁷

On 23-25 November 1890, violent gales struck throughout *Europe*.⁹⁷

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*.⁹⁰

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 1890.⁹⁷

On 24 December 1890, violent storms struck the *North Atlantic*. Over 60 vessels were reported lost.⁹⁷

On 28 December 1890 at Deniliquin, *Australia*, 200 houses were damaged by a severe thunderstorm and tornado.⁹⁹

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.

Winter of 1890 / 1891 A.D. The frost in *Britain* began on 25 November 1890 and continued with intermissions till 22 January 1891.⁹⁰

On 16 January 1891, a trap with a tandem team drove across the ice on the Serpentine in Hyde Park in England.⁹⁰

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.⁹⁷

On 7 February 1891, there were violent blizzard in Nebraska and South Dakota in the *United States*, many perished.⁹⁷

On 8-9 March 1891, a blizzard struck Minnesota, Iowa, Illinois and Wisconsin in the *United States*.⁹⁷

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.⁹⁷

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.⁹⁰

On 12-13 February 1891, there was a destructive cyclone over the *Fiji and Navigation Isles*, great loss of life and shipping.⁹⁷

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.⁹⁰

On 2 June 1891, there was a destructive cyclone [tornado] in South Dakota in the *United States*.⁹⁷

On 10 June 1891, a cyclone destroyed the village of Ponikwa in Galicia [now *Poland*] and killed about 30 persons.⁹⁷

About 24 June 1891, a destructive storm struck Iowa, Minnesota, and other states in the *United States*.⁹⁷

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.⁹⁹

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.⁹⁷

On 6 July 1891, there was a destructive storm at Baton Rouge, Louisiana in the *United States*, with loss of life.⁹⁷

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 in *China*].⁹⁰

About 26 July 1891, there were great floods in Posen [region in *Poland*]. There was loss of life and destruction of property.⁹⁰

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.⁹⁴

On 13-14 August 1891, there were heavy rains and destructive floods in east Lancashire in *England*.⁹⁰

On 18 August 1891, there was a cloudburst at Kollmann [a city that lies on the banks of the Eisak River], between Botzen and Bixen (Tyrol) in southern *Germany*. The lowlands were flooded. This flood caused about 60 deaths.⁹⁴

On 24-26 August 1891, there were destructive storms and floods in *Great Britain*, especially on the northwest coast.⁹⁴

Around 9 September 1891, there was a destructive storm off Nova Scotia, *Canada*. There were about 20 vessels wrecked, with loss of life.⁹⁴

On 11-13 September 1891, there was a great storm throughout southern *Spain*.⁹⁴

On 13 September 1891, there were heavy rains and destructive inundations in *Spain*.⁹⁰

On 20-21 September 1891, there were violent storms with loss of life in midland and northern *English counties*, and parts of *Scotland*.⁹⁴

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.⁹⁴

About 22 October 1891, there were disastrous floods in *Spain*, *France*, *Italy*, and *England* (especially in the south and west of *England*).⁹⁰

About 25 October 1891, floods at Limoux, *France* caused the collapse of buildings and about 20 persons killed.⁹⁰

On 2 November 1891, there was a destructive cyclone in the *Bay of Bengal*, with loss of life.⁹⁴

Beginning on the night of the 10th 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.⁹⁴

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*.⁹⁴

On 11 November 1891, there was a violent gale at Liverpool, *England* and on the *Irish coasts*, with loss of life.⁹⁴

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.⁹⁰

On 7-11 December 1891, there were violent gales in the *English Channel* causing [ship] wrecks and loss of life.⁹⁴

On 8-9 December 1891, there were violent gales, which caused [ship] wrecks and loss of life in the *English Channel* and *France*.⁹⁴

On 10-13 December 1891, there were violent gales over northwestern *Europe* and the *British Isles*.⁹⁴

In 1891 in *Australia*, the Murrumbidgee River overflowed its banks.¹⁰¹

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.

1892 A.D. On 19 January 1892 in Sioux City, Iowa, in the *United States*, the low temperature was -28° F (-33.3° C).¹¹¹

There were disastrous floods in Andalusia, Murcia, and Estremadura in *Spain*, about 12 March 1892.⁹⁰

In 1892, there was a famine in Bombay and Rajputana, *India*.⁹⁴

Disastrous floods in upper *Italy* about 31 March 1892; railway communications stopped.⁹⁰

On 31 March 1892, there was a destructive tornado in the northwestern *United States*. Over 30 persons were killed.⁹⁴

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. The floods abated around 25 May 1892.⁹⁷

On 29 April 1892, there was a disastrous hurricane in *Mauritius* Island.⁹⁴

About 6 May 1892, floods caused a rise of the rivers in Illinois in the *United States*; 15 towns flooded.⁹⁰

On 26 May 1892, seven months of drought in New South Wales, *Australia* was relieved by rain.⁹⁷

On 15-16, June 1892, there were destructive storms in Minnesota in the *United States* and in *Canada*, which caused great loss of life.⁹⁴

On 12 September 1892, there was a cyclone on the *Cape Verde Islands*. Houses, shipping, plantations, and cattle were destroyed.⁹⁴

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.⁹⁷

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.⁹⁷

On 13 October 1892, there were destructive floods in Derbyshire, *England* and *Wales*.⁹⁷

In October 1892, there were disastrous floods in the island of Sardinia, *Italy* and *Venezuela*.⁹⁷

Around 7 November 1892, there was a great storm in the *Black Sea*. Eight ships said to have been wrecked, including the *Lord Byron*.⁹⁴

In December 1892, a destructive storm struck the *Black Sea*. The loss of 30 steamers was reported, including the *City of Manchester*.⁹⁴

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.

Winter of 1892 / 1893 A.D. The River Thames in London, *England* froze between Maidenhead and Windsor.²⁹

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.⁹⁴

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.]^{37, 68}

During the winter of 1892-93, the *Baltic Sea* was completely covered with ice.⁶⁸

The following are the lowest temperatures observed during January 1893 in the *United States*:¹¹⁷

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: ¹¹⁷

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].¹¹⁷

Ice formed in rivers, lakes and harbors, and caused the closing of navigation at many locations in January 1893 in the *United States*: ¹¹⁷

- * At Portland, Maine, ice formed in the lower bay on the 14th for the first time since 1884.
- * Great floes of ice interfered with navigation in *Boston Harbor* in Massachusetts from the 11th to the 13th.
- * At Vineyard Haven, Massachusetts, the harbor was frozen on the 12th.
- * At New London, Connecticut, the *Connecticut River* was frozen over on the 11th.
- * 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 17th to the 22nd.
- * Heavy ice was encountered about the Delaware Breakwater, in the *Delaware River* and in the *Delaware Bay*.
- * A report from Norfolk, Virginia, dated the 24th, 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 20th.
- * 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 12th.
- * At Washington, D. C., navigation on the *Potomac River* was closed by ice from the 16th to the 28th. 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 8th to the 26th.

- * At Richmond, Virginia, the *James River* was frozen from the 7th to the 26th.
- * At Kitty Hawk, North Carolina, *Albemarle Sound and Bay* were frozen over from the 3rd to the 28th, 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 19th; from the 20th to the 23rd persons were crossing on the ice.
- * At Fayetteville, North Carolina, the *Cape Fear River* was frozen over on the 19th.
- * At Cheraw, South Carolina, the *Pee Dee River* was frozen over from the 14th to the 26th.
- * At Saint Stephens, South Carolina, floating ice was reported in the *Santee River*, on the 21st and 22nd.
- * At Resaca, Georgia, the *Oostanaula River* was frozen over from the 14th to the 24th.
- * At Rome, Georgia, the *Oostanaula River* was frozen on the 16th for the first time since January 1857. On the 23rd 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 19th to the 21st.
- * At Cordova, Alabama, floating ice was reported in the *Big Warrior River* on the 16th. On the 17th the river was partly frozen.
- * At Wilsonville, Alabama, the *Coosa River* was frozen on the 20th.
- * At Florence, Alabama, there was floating ice in the *Tennessee River* from the 11th to the 19th.
- * At Charleston, West Virginia, floating ice was reported in the *Kanawha River* on the 1st and the river was closed to navigation on the 7th.
- * At Freeport, Pennsylvania, the *Alleghany River* was closed on the 7th.
- * In New York on the 17th, 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 11th to the 25th.
- * At Parkersburg, West Virginia, the *Ohio River* was frozen on the 1st.
- * 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 6th. On the 8th, 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 13th to 26th.
- * 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 1st to the 6th. On the 7th the river was full of floating ice. On the 8th and 9th, the river above the city was gorged with ice. On the 10th, 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 15th.
- * At Louisa, Kentucky, navigation on the *Big Sandy River* was closed on the 1st.
- * At Nashville, Tennessee, a thin ice covered the *Cumberland River* on the 13th for the first time since 1877. By the 16th, the ice was 2 to 3 inches thick on the river.
- * At Knoxville, Tennessee, the *Tennessee River* was frozen over on the 16th.
- * At Chattanooga, Tennessee, the *Tennessee River* was frozen from the 17th to the 22nd.
- * At Paducah, Kentucky, the *Tennessee River* was frozen over on the 16th.
- * At St. Louis, Missouri, the *Mississippi River* was closed for navigation on the 21st.
- * At Cairo, Illinois, the *Mississippi River* was frozen from shore to shore on the 10th, and the *Ohio River* was full of floating ice.
- * At Memphis, Tennessee, heavy floating ice was reported on the *Mississippi River* from the 12th to the 19th.
- * At Helena, Arkansas, ice was reported in the *Mississippi River* on the 15th.
- * On the 22nd, 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 10th. On the 23rd 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 17th.
- * 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 1st to 3rd, and 16th to 31st.

From January 17th to the 19th 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: ¹¹⁷

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 14th, reached an extreme velocity of 110 miles. The gale continued until about noon of the 15th, 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 14th, and 76 miles per hour on the 15th. ¹¹⁷

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. ¹⁰¹

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.⁹⁹

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*.⁹⁷

On 10 February 1893, a destructive gale caused loss of life, throughout the *United Kingdom*, the *English Channel*, and the *North Sea*.⁹⁴

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.⁹⁷

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.⁹⁴

On 9-11 March 1893, there were floods caused by the rising of the Hunter River. Newcastle, *Australia* and other places submerged.⁹⁷

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.⁹⁴

On 7 April 1893, hotels and other buildings destroyed by a great wave [from Lake Michigan] in Chicago, Illinois in the *United States*.⁹⁷

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.⁹⁴

In May 1893, there was a great rising [flood] of the Mississippi River in the *United States*.⁹⁷

In May 1893, there were inundations in *Romania*. Railways were stopped and villages destroyed.⁹⁷

The following are the highest temperatures observed during July 1893 in the *United States*:¹¹⁷

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: ¹¹⁷

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.¹¹⁷

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.⁹⁴

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.¹¹⁷

On 15 August 1893, Madrid, *Spain* reached a high temperature of 112° F (44.4° C).⁹⁷

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).⁹⁷

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.¹⁰⁷

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.¹¹⁸

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*.⁹⁷

On 1-2 October 1893, a great Atlantic hurricane struck Louisiana in the *United States* causing approximately 2,000 deaths.¹⁰⁷

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.⁹⁴

The hurricane of 2 October 1893 caused the loss of over 1,000 lives on the coast of Louisiana in the *United States*.¹¹⁸

On 2 October 1893, a destructive storm struck New Orleans, Louisiana in the *United States*. There were 1,200 deaths. Buildings and works destroyed.⁹⁷

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 1893.⁹⁴

On 12 December 1893, a destructive gale struck London, England and southern and western coasts.⁹⁴

Winter of 1893/ 1894 A.D. The following are the lowest temperatures observed during January 1894 in the *United States*:¹¹⁶

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: ¹¹⁶

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*: ¹¹⁶

- * At Dubuque, Iowa, the Mississippi River was frozen over on the 8th.
- * 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 25th.
- * 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 25th.
- * At Marquette, Michigan, on Lake Superior, the harbor was frozen over on the 25th.
- * 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).¹¹¹

On 12 February 1894, violent blizzard struck the west of *United States*.⁹⁴

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.⁹⁴

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.⁹⁹

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, Halls Creek, and Melbourne. 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.⁹⁹

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.⁹⁴

On 12-13 February 1894, there was a great storm over *Europe* and the *United States*.⁹⁴

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.⁹⁷

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 1894.⁹⁷

There were destructive floods in the Punjab, *India* in May; and in *Hungary* in June 1894.⁹⁷

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.¹¹⁶

On 7 June 1894, there was a violent hailstorm at Vienna, *Austria* and other parts of *Hungary*, with loss of life, vineyards destroyed.⁹⁴

The following are the highest temperatures observed during July 1894 in the *United States*:¹¹⁶

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: ¹¹⁶

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).¹¹¹

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 26th 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.¹¹⁶

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.¹¹¹

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.¹¹¹

On 31 July 1894, New York in the *United States* reached a high temperature of 105° F (40.6° C).⁹⁷

On 12 August 1894, there was a destructive cyclone at Herencia, *Spain*, causing a great loss.⁹⁴

On 13 September 1894, floods were reported at Lucknow, *India*. Houses were submerged underwater.⁹⁷

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.⁹⁴

On 11 October 1894, a violent gale was reported off Newfoundland, *Canada*. There were many [ship] wrecks and loss of life.⁹⁴

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*.⁹⁴

On 23 October 1894, a severe drought was reported in New Orleans, Louisiana in the *United States*.⁹⁷

On 31 October 1894, floods were reported in *France* and *Belgium*. About 100,000 hands [people] were out of work due to the floods.⁹⁷

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.⁹⁴

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.⁹⁷

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.⁹⁷

On 21-22 December 1894, there was a violent gale over the *United Kingdom*, *Holland* 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.⁹⁴

On 28-30 December 1894, another gale struck [*Great Britain*] with loss of life.⁹⁴

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, *England*, and 13° F (-10.6° C) in London, *England*.⁹⁴

During the winter of 1894, very severe storms with heavy winds and snow prevailed in the *United Kingdom* and portions of the continent.¹¹¹

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.¹¹¹

The following are the lowest temperatures observed during January 1895 in the *United States*:¹¹⁵

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*:¹¹⁵

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.”¹¹⁵ [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 1/8th inch of mud. It was caused by a collision of a rainstorm and a dust storm.]

1895 A.D. – 1903 A.D. Australia.

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%.⁹⁹

An Australian newspaper in 1900 reported:¹⁰⁰

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.¹⁰¹

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.¹⁰¹

The drought also affected Tasmania. The state was very dry, especially in the north until 1902. In 1897, there were severe brushfires.¹⁰¹

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.¹⁰¹

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.¹⁰¹

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.¹⁰¹

Between 1891 and 1903, the coastal, northern and central regions of Western Australia were severely affected by the drought.¹⁰¹

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.¹⁰¹

The dryness of this drought may have exasperated brush fires. For a week, the Hobart area in Tasmania 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.⁹⁹

On 31 December 1897, there was a three-day bushfire in Tasmania 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 brushfire spread from Colebrook to the north of Hobart.¹⁰¹

In January 1898 in Victoria, *Australia*, brushfires burned for more than a week in Gippsland and Gisborne.¹⁰¹

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.⁹⁹

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).⁹⁹

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.⁹⁷

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.¹⁰²

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).⁹⁷

In Adelaide, *Australia*, on 1 January 1900, the temperature reached 112.2° F (44.6° C).⁹⁷

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.⁹⁹

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.⁹⁹

On 22 August 1902, the drought in New South Wales, *Australia* ends in the northern districts.⁹⁷

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.⁹⁴

On 21 January 1895, there were destructive floods in the Thames valley and southwest counties of *England* and in *Wales*.⁹⁷

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.⁹⁴

On 21 April 1895, floods were reported on the lower Danube River. Villages were submerged. There was much suffering and some deaths.⁹⁷

On 27 April 1895, a reservoir in the Vosges, *France* burst.⁹⁷

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.⁹⁴

The following are the highest temperatures observed during July 1895 in the *United States*:¹¹⁵

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*:¹¹⁵

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 5th.¹¹⁵

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.¹¹⁵ [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.¹¹⁵

On 26 and 27 July 1895, disastrous storms struck North Dakota, eastern Missouri, Iowa, Illinois, and Indiana in the *United States*. On the 26th, 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.¹¹⁵

On 6 July 1895, there were destructive tornadoes in Kansas and Missouri in the *United States* with loss of life.⁹⁴

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*.⁹⁴

On 1-2 October 1895, there was a destructive gale on the western coast of *England*, with loss of life.⁹⁴

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.⁹⁴

On 23-25 December 1895, a southeast gale struck over the *United Kingdom* causing a great loss of life.⁹⁴

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.²⁹

The following are the lowest temperatures observed during January 1896 in the *United States*:¹¹⁸

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*:¹¹⁸

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:¹¹⁸

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.

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.¹⁰¹

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.⁹⁹

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.⁹⁹

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.⁹⁴

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*.⁹⁷

In March 1896, there were floods in many parts of *Switzerland*, through snow and heavy rains.⁹⁷

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.⁹⁴

In the *United States* on 25 May 1896, very destructive tornadoes struck southeastern Michigan in the evening.¹¹⁸

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.]

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.¹¹⁸

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 gyratory 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.

The following are the highest temperatures observed during July 1896 in the *United States*:¹¹⁸

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*:¹¹⁸

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)

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.¹¹⁸ [The confirmed death toll was 255, but this figure does not include the people that died on boats whose bodies were washed down the Mississippi River. The total damage from this event in present currency is estimated at \$3.8 billion (2009 USD).]

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 2nd 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.¹²⁶

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 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: ¹¹⁸

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.

On 10 August 1896 due to the high temperature in Chicago, Illinois in the *United States*, there were 51 deaths.⁹⁷

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.⁹⁷

On 10 September 1896, there was a tornado in Paris, *France*.⁹⁴

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 1896.⁹⁴

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.⁹⁴

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*.⁹⁷

On 20 October 1896, there were destructive floods caused by heavy rains in *Italy* and *France*.⁹⁷

On 4 November 1896, there were destructive floods, with loss of life, in Sao Miguel, *Azores*.⁹⁷

On 26 November 1896, there was a destructive storm at Athens, *Greece*.⁹⁴

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*.⁹⁴

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 1896.⁹⁷

On 29 December 1896, it was reported that Nevertire, *Australia* was destroyed by a cyclone.⁹⁷

Also refer to the section 1895 A.D. – 1903 A.D. for information on the drought in Australia during that timeframe.

1896 A.D. – 1900 A.D. India.

A very severe famine in *India* in 1896-98.⁹⁴

A famine in *India* from September 1899 to January 1901.⁹⁴

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.¹⁰¹

On 7 January 1897, it was reported that Port Darwin in Victoria, *Australia* was wrecked by a hurricane; many deaths.⁹⁴

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.⁹⁹

On 9 January 1897, there were floods in *Spain* through the rising of the Guadalquivir River.⁹⁷

In early February 1897, there were extensive floods through heavy rains and snow, in southern midlands and eastern counties [in *England*].⁹⁷

On 20 March 1897, there were destructive floods, with loss of life, in the Mississippi valley in the *United States*.⁹⁷

On 15-16 June 1897, there was a destructive gale in *Irish Sea* and the west coast of *Great Britain*.⁹⁴

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.⁹⁴

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.⁹⁷

In 1897, a powerful cyclone struck Chittagong, *Bangladesh* causing 175,000 deaths.⁹⁸

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.⁹⁷

On 21 September 1897, a cyclone struck near Brindisi, *Italy*. There was much damage and 45 deaths.⁹⁴

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 1897.⁹⁴

On 28-30 November 1897, there were destructive floods and tidal waves on the *Kentish coast*. Damage estimated of the loss were 30,000l.⁹⁷

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 1898.⁹⁴

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. On 12 January 1898, a tornado struck Fort Smith, Arkansas in the *United States*. Thirty-three people were killed outright, 19 died from injuries. Property loss was estimated at \$450,000. [In present currency, that would be equivalent to \$12 million in damages based on the Consumer Price Index (CPI) inflation rates.] The path of destruction was 300 feet wide and 1 mile long. This tornado was not unusually severe but unfortunately it passed directly through the business and residence portion of the chief city in western Arkansas.¹²²

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]¹²²

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.⁹⁷

On 21-22 February 1898, there was a destructive snowstorm in southwestern counties [of *England*].⁹⁴

On 24-26 March 1898, there were severe gales with snow, over the *United Kingdom*, with loss of life.⁹⁴

1898 A.D. – 1899 A.D. Russia.

Russia suffered from a major famine in 1898-99.⁹⁶

1898 A.D. On 4 February 1898, a cyclone struck Mackay, *Australia*, severely damaging the city.¹⁰¹

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.⁹⁹

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.⁹⁹

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.⁹⁹ [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 2nd 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*.¹⁰²

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.¹⁰²

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."¹⁰²

About 18 May 1898, destructive tornadoes struck Iowa, Illinois and Minnesota in the *United States* with loss of life.⁹⁴

On 26 September 1898, a destructive tornado struck at St. Catharine's and Merriton, Niagara, in *Canada*. The tornado caused 5 deaths.⁹⁴

On 15 October 1898, severe gale struck round *Great Britain*, many deaths.⁹⁴

On 2-3 November, there was a gale in Great Britain, with loss of life.⁹⁴

In early November 1898, there were destructive floods in Shan-Tung [Shandong, *China*].⁹⁷

On 27 November 1898, there was a violent gale off New England in the *United States*. Six vessels were wrecked causing 180 deaths.⁹⁴

On 26-27, and 31 December 1898, there was a destructive southwest gale over the *United Kingdom*.⁹⁴

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.

Winter of 1898 / 1899 A.D. 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).^{22, 23}

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.³³

On 9-13 February 1899, a blizzard struck New York and the *United States*. Forty deaths were reported.⁹⁴

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 9th to the 12th many places in the Central, Western, and Northwestern States reported the coldest weather on record. During the 13th and 14th the cold wave overspread the Southern and Eastern States, attended, on the 13th, 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.^{67, 123}

The following are the lowest temperatures observed during February 1899 in the *United States*:¹²³

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)
Newfolds, 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)

The following is the thickness of the ice in rivers during the week of 13 February 1899: ¹²³

Moorhead, Minnesota	38.0 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, Pennsylvania	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
Albany, New York	11.0 inches
New Brunswick, New Jersey	8.0 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: ¹²³

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 13th 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 13th and 14th, 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 12th, 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 8th to, and including, the 16th, 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 7th to the 17th, both dates included."

New York City reported the following: "During Sunday night and Monday heavy snow fell without intermission. Up to midnight Sunday (12th), 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 (13th), 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. (13th), 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 11th, and continued until early in the morning of the 14th. 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 13th, 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 15th. 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 11th 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 12th railroads and trolleys were so badly blocked that transportation of all kinds was almost suspended. The storm continued with unabated energy throughout the 12th and 13th, 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 14th 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 Colon, Panama) reports "On the 13th 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 13th, and gradually shifted to northeast during the morning of the 14th, 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."

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.⁹⁴

1899 A.D. On 2-3 January 1899, there was a gale in the *English Channel* and *Irish Sea*, with loss of life.⁹⁴

On 12-16 January 1899, violent gales struck over the *United Kingdom* and *European Continent*. Some deaths were reported.⁹⁴

On 20-24 January 1899, there was a gale that caused floods in *Wales* and the Thames valley in *England*.⁹⁴

On 11-13 February 1899, there was a destructive southwest gale and tidal wave in *Wales*.⁹⁴

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.¹⁰¹

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.⁹⁹

On 11 March 1899, a hurricane struck Queensland, *Australia*, 411 persons drowned.⁹⁴

On 7 April 1899, there was a southwest gale over the *United Kingdom*, with loss of life.⁹⁴

On 27-28 April 1899, a cyclone [tornado] devastated Kirckville and Newtown, Missouri in the *United*

States. It caused about 100 deaths.⁹⁴

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.⁹⁴

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 12th, 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:¹²³

- * 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.

The following are the highest temperatures observed during July 1899 in the *United States*:¹²³

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: ¹²³

Ciudad Porfirio Díaz, *Mexico* (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 & 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.⁹⁷

In early July 1899, there was an overflow of the Brazos River, in Texas in the *United States*, which caused over 100 deaths.⁹⁷

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 \$10,000,000.¹²³

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 12th and 15th 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.⁹⁷

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.⁹⁹

On 3 August 1899, destructive storm off Florida in the *United States*, many deaths.⁹⁴

On 7-12 August 1899, there was a fearful hurricane in the *Lesser Antilles*; 100 deaths, at Montserrat, 1,500 injured, 8,000 homeless, total deaths about 2,000.⁹⁴

During 8-19 August 1899, a great Atlantic hurricane struck the island of *Puerto Rico* and the Carolinas in the *United States* causing 3,433 deaths.¹⁰⁷

On 8-15 August 1899, there were destructive storms in South America in *Chile*.⁹⁴

On 10 August 1899, there were destructive floods in Chubut region in *Argentina*.⁹⁷

On 3 September 1899, there was a hurricane in the *Azores*, which caused [ship] wrecks and loss of life.⁹⁴

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.⁹⁴

On 15 September 1899, there were floods in *Austria*. Nineteen lives lost by the collapse of a bridge over the Traun River.⁹⁷

On 29-30 September and 2 October 1899, there was a gale in the *English Channel*, wrecks and loss of life.⁹⁴

On 7 October 1899, there was a typhoon in central and eastern *Japan*. Train was blown off a bridge, 50 deaths.⁹⁴

On 7- 8 October 1899 and in April 1900, there were destructive floods in Salem [*England*]. Villages were swept away. There were 40 deaths.⁹⁷

On 8 October 1899, there was a destructive storm and floods in Salerno, *Italy*, which caused about 40 deaths. Then on 20 October 1899, there was another storm in southern *Italy*, much damage and 3 deaths.⁹⁴

On 27-30 October 1899, there was a destructive storm in *Jamaica*; several deaths.⁹⁴

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.

1900 A.D. 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.⁹⁷

On 29 April 1900, there was a cyclone in Huelva, *Spain*; much damage done.⁹⁴

The following are the highest temperatures observed during July 1900 in the *United States*:¹²⁴

Montgomery, Alabama	(94° F, 34.4° C)
Mobile, Alabama	(94° F, 34.4° C)
Tucson, Arizona	(108° F, 42.2° C)

Yuma, Arizona	(112° F, 44.4° C)
Little Rock, Arkansas	(93° F, 33.9° C)
Fort Smith, Arkansas	(93° F, 33.9° C)
San Francisco, California	(73° F, 22.8° C)
San Diego, California	(84° F, 28.9° C)
Fresno, California	(109° F, 42.8° C)
Denver, Colorado	(96° F, 35.6° C)
Pueblo, Colorado	(100° F, 37.8° C)
New Haven, Connecticut	(96° F, 35.6° C)
New London, Connecticut	(95° F, 35.0° C)
Millsboro, Delaware	(100° F, 37.8° C)
Washington, D.C.	(99° F, 37.2° C)
Pensacola, Florida	(90° F, 32.2° C)
Key West, Florida	(89° F, 31.7° C)
Augusta, Georgia	(97° F, 36.1° C)
Savannah, Georgia	(99° F, 37.2° C)
Swan Valley, Idaho	(98° F, 36.7° C)
Chicago, Illinois	(92° F, 33.3° C)
Cairo, Illinois	(91° F, 32.8° C)
Indianapolis, Indiana	(92° F, 33.3° C)
Lafayette, Indiana	(92° F, 33.3° C)
Dubuque, Iowa	(92° F, 33.3° C)
Keokuk, Iowa	(94° F, 34.4° C)
Topeka, Kansas	(95° F, 35.0° C)
Dodge City, Kansas	(98° F, 36.7° C)
Louisville, Kentucky	(95° F, 35.0° C)
Lexington, Kentucky	(93° F, 33.9° C)
New Orleans, Louisiana	(92° F, 33.3° C)
Shreveport, Louisiana	(95° F, 35.0° C)
Eastport, Maine	(78° F, 25.6° C)
Portland, Maine	(92° F, 33.3° C)
Baltimore, Maryland	(100° F, 37.8° C)
Boston, Massachusetts	(97° F, 36.1° C)
Nantucket, Massachusetts	(83° F, 28.3° C)
Marquette, Michigan	(91° F, 32.8° C)
Detroit, Michigan	(92° F, 33.3° C)
Saint Paul, Minnesota	(95° F, 35.0° C)
Vicksburg, Mississippi	(92° F, 33.3° C)
Saint Louis, Missouri	(94° F, 34.4° C)
Billings, Montana	(110° F, 43.3° C)
Helena, Montana	(97° F, 36.1° 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)
New Brunswick, New Jersey	(101° F, 38.3° C)
Cape May, New Jersey	(94° F, 34.4° C)
Santa Fe, New Mexico	(87° F, 30.6° C)
Albany, New York	(99° F, 37.2° C)
New York City, New York	(94° F, 34.4° C)
Charlotte, North Carolina	(98° F, 36.7° C)
Kitty Hawk, North Carolina	(98° F, 36.7° C)
Bismarck, North Dakota	(101° F, 38.3° C)
Williston, North Dakota	(102° F, 38.9° C)
Cincinnati, Ohio	(94° F, 34.4° C)
Columbus, Ohio	(97° F, 36.1° C)

Oklahoma City, Oklahoma	(94° F, 34.4° C)
Fort Sill, Oklahoma	(97° F, 36.1° C)
Roseburg, Oregon	(95° F, 35.0° C)
Portland, Oregon	(90° F, 32.2° C)
Erie, Pennsylvania	(91° F, 32.8° C)
Philadelphia, Pennsylvania	(99° F, 37.2° C)
Block Island, Rhode Island	(84° F, 28.9° C)
Charleston, South Carolina	(97° F, 36.1° C)
Columbia, South Carolina	(99° F, 37.2° C)
Yankton, South Dakota	(99° F, 37.2° C)
Nashville, Tennessee	(93° F, 33.9° C)
Knoxville, Tennessee	(94° F, 34.4° C)
San Antonio, Texas	(96° F, 35.6° C)
Galveston, Texas	(89° F, 31.7° C)
Salt Lake City, Utah	(99° F, 37.2° C)
Burlington, Vermont	(90° F, 32.2° C)
Lynchburg, Virginia	(98° F, 36.7° C)
Norfolk, Virginia	(100° F, 37.8° C)
Olympia, Washington	(90° F, 32.2° C)
Spokane, Washington	(100° F, 37.8° C)
Morgantown, West Virginia	(97° F, 36.1° C)
Milwaukee, Wisconsin	(93° F, 33.9° 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 1900:¹²⁴

Ciudad Porfirio Díaz, <i>Mexico</i>	(99° F, 37.2° C)	(now Piedras Negras, Coahuila)
Leon de Aldamas, <i>Mexico</i>	(87° F, 30.6° C)	(now León, Guanajuato)
Coatzacoalcos, <i>Mexico</i>	(91° F, 32.8° C)	
Guanajuato, <i>Mexico</i>	(88° F, 31.1° C)	
Progreso, <i>Mexico</i>	(100° F, 37.8° C)	
Tampico, <i>Mexico</i>	(93° F, 33.9° C)	
Veracruz, <i>Mexico</i>	(90° F, 32.2° C)	
Puebla, <i>Mexico</i>	(79° F, 26.1° C)	
Topolobampo, <i>Mexico</i>	(98° F, 34.7° C)	
Cienfuegos, <i>Cuba</i>	(93° F, 33.9° C)	
Havana, <i>Cuba</i>	(90° F, 32.2° C)	
Puerto Principe, <i>Cuba</i>	(93° F, 33.9° C)	
Santiago de Cuba, <i>Cuba</i>	(94° F, 34.4° C)	
Basseterre, <i>Saint Kitts</i>	(88° F, 31.1° C)	
Bridgetown, <i>Barbados</i>	(88° F, 31.1° C)	
Kingston, <i>Jamaica</i>	(94° F, 34.4° C)	
Roseau, <i>Dominica</i>	(90° F, 32.2° C)	
San Juan, <i>Puerto Rico</i>	(89° F, 31.7° C)	
Isle de Vieques, <i>Puerto Rico</i>	(89° F, 31.7° C)	
Humacao, <i>Puerto Rico</i>	(95° F, 35.0° C)	
Willemstad, <i>Curaçao</i>	(89° F, 31.7° C)	
Santo Domingo, <i>Dominican Republic</i>	(90° F, 32.2° C)	
Turks Island	(91° F, 32.8° C)	
St. John, New Brunswick, <i>Canada</i>	(78° F, 25.6° 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.^{99, 109}

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).⁹⁷

On 15 August 1900, there were floods in various parts of *Japan*, 200 deaths reported.⁹⁷

On 29 August 1900, there was a destructive cyclone at Mafeking [Mahikeng, *South Africa*].⁹⁴

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.⁹⁴

On 8 September 1900, a great Atlantic hurricane struck Galveston, Texas in the *United States* causing between 8,000 – 12,000 deaths.¹⁰⁷

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.

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.

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 7th and the morning of the 8th. There was cirrus clouds moving from the southeast during the forenoon of the 7th, 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 7th, 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 7th. 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 8th, 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 7th. 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 8th, 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 9th was blowing at the rate of 26 miles per hour from the south.

The barometer commenced falling during the afternoon of the 6th and continued falling steadily but slowly up to noon of the 8th, when it read 29.42 inches. The barometer fell rapidly from noon until 8:30 p.m. of the 8th, 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 8th 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 8th not a house remained on the 9th, 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.⁹⁴

On 22 September 1900, floods were reported in Calcutta and Delhi, *India*, with loss of life.⁹⁷

On 26-27 October 1900, there was a heavy rainstorm and destructive floods in the Newcastle district of *England* resulting in 5 deaths.⁹⁴

On 11-13 November 1900, a destructive typhoon struck off *Guam* and the *Philippines*. Hundreds were killed.⁹⁴

In early November 1900, there was a typhoon at Hong Kong, *China*, which caused over 70 deaths.⁹⁴

On 20 November 1900, a destructive cyclone [tornado] struck Columbia, Tennessee in the *United States* causing many deaths.⁹⁴

On 20-21 December 1900, there was a gale over *United Kingdom* with loss of life. Twenty-two Shetland fishermen drowned.⁹⁴

On 27, 29 December 1900, there was a destructive gale over the *United Kingdom*.⁹⁴

On 30-31 December 1900, there were heavy floods in the Midlands and western *England*.⁹⁷

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.

References

1. **Charles Peirce**, *A Meteorological Account of the Weather in Philadelphia from January 1, 1790 to January 1 1847*, Lindsay & Blakiston, Philadelphia, 1847.
2. *The Tablet of Memory; showing every Memorable Event in History, from the Earliest Period to the Year 1817*. Thirteenth Edition, London, 1818.
3. *The Chronicle of Theophanes: an English translation of anni mundi 6095-6305 (A.D. 602-813)*, by Theophanes (the Confessor), Harry Turtledove (translator, editor), University of Pennsylvania, 2006.
4. *The Black Sea Flood Question: Changes in Coastline, Climate and Human Settlement*, by Valentina Yanko-Hombach, Allan S. Gilbert, Nicolae Panin and Pavel M. Dolukhanov, Springer, The Netherlands, 2007.
5. *The Tablet of Memory or the Historian's Assistant showing every Memorable Event in History*, London, 1773.
6. Devastating hailstorm that thwarted Edward III., *The Times*, 13 April 2010.
7. **H. H. Lamb, Knud Frydendahl** *Historic storms of the North Sea, British Isles and Northwest Europe*, Cambridge University Press, Cambridge 1991.
8. *River Thames frost fairs*, Wikipedia, URL: http://en.wikipedia.org/wiki/River_Thames_frost_fairs [cited 14 April 2009]
9. *Historical Weather Events 1650-1699*, URL: http://www.booty.org.uk/booty_weather/climate/1650_1699.htm [cited 14 April 2009]
10. *The Great Frost of 1683-4*, URL: <http://www.pastpresented.info/frost1683.htm> [cited 14 April 2009]
11. *Mission to the Ohio*, George Washington's Mount Vernon Estate & Gardens, URL: <http://www.mountvernon.org/visit/plan/index.cfm/pid/129/> [cited 14 April 2009]
12. **Anna Green Winslow** (1771-1773) *Diary of a Boston School Girl*, edited by Alice Morse Earle, The Riverside Press, Cambridge, 1894, pp 32-33, 42-43.
13. *George Washington crossing the Delaware River by Leutze*, Africans in America Resource Bank, URL: <http://www.pbs.org/wgbh/aia/part2/2h48.html> [cited 14 April 2009]
14. *Washington's crossing of the Delaware River*, Wikipedia, http://en.wikipedia.org/wiki/Washington's_crossing_of_the_Delaware_River [cited 14 April 2009]
15. *The Bollinger Migration to the Louisiana Territory*, part of "Bollinger Collection" compiled by Orena Bollinger in 1984, URL: <http://freepages.genealogy.rootsweb.ancestry.com/~edfrye/bollou.html> [cited 14 April 2009]
16. *The Journals of the Expedition under the Command of Captains Lewis and Clark, Volume 1*, The Easton Press, Norwalk, Connecticut, 1993 edition, pp 85-98
17. *Weather Underground, History of Bismarck, North Dakota*, URL:

http://www.wunderground.com/history/airport/KBIS/2009/1/1/MonthlyHistory.html?req_city=NA&req_state=NA&req_statena=NA [cited 14 April 2009]

18. **Sean Patrick Adams**, Warming the Poor and Growing Consumers: Fuel Philanthropy in the Early Republic's Urban North, *The Journal of American History*, **95.1** (2008).

19. History of Weather Science and Observing in the Philadelphia Area. URL:

http://www.temple.edu/tempress/chapters_1400/1618_ch1.pdf [cited 8 June 2010].

20. **Smithsonian National Museum of Natural History**, Large Holocene Eruptions, URL:

<http://www.volcano.si.edu/world/largeeruptions.cfm> [cited 31 May 2010]

21. **Patrick Webb**, Emergency Relief during Europe's Famine of 1817: Anticipated Responses to Today's Humanitarian Disasters, *Tufts Nutrition*, September 2002.

22. 1899: When the Mississippi River Entirely Froze, URL: <http://www.sciencefacts.us/1899-when-the-mississippi-river-entirely-froze/> [cited 11 June 2010]

23. February 1899: The Worst Cold Snap in North American History, URL: <http://www.britannica.com/blogs/2009/02/february-1899-the-worst-cold-snap-in-north-american-history/> [cited 11 June 2010]

24. The Great Blizzard of 1717 from "Little Stories of Old New England" by William Dow Cram published in Hampton Union and Rockingham County Gazette, December 1, 1938, URL:

<http://www.hampton.lib.nh.us/hampton/history/oral/cram/blizzard1717.htm> [cited 17 June 2010].

25. New England Weather: 1717 Snowstorm, URL: http://colonialsense.com/Society-Lifestyle/Signs_of_the_Times/New_England_Weather/1717_Snowstorm.php [cited 18 June 2010].

26. **Hans DePold**, So Cold, the Rich had to Beg, URL: <http://www.boltoncthistory.org/socold.html> [cited 18 June 2010].

27. **Ben Gelber**, The Pennsylvania Weather Book, 2002, Rutgers University Press.

28. **Christopher Chatfield**, Landmarks of World History: The Gallery of Natural Phenomena, 2010, URL:

http://www.phenomena.org.uk/Landmarks_index.htm [cited 19 June 2010].

29. Where Thames Smooth Waters Glide: Frost Fairs, URL: <http://thames.me.uk/s00051.htm> [cited 20 June 2010].

30. A Chronicle of Cold Weather, The New York Times, 12 March 1856, URL: http://query.nytimes.com/mem/archive-free/pdf?_r=1&res=9D0DE1D7103DE034BC4A52DFB566838D649FDE [cited 21 June 2010].

31. NOAA, High Flows and Flood History on the Lower Mississippi River: Below Red River Landing, LA (1543-Present), URL: http://www.srh.noaa.gov/lix/?n=ms_flood_history [cited 21 June 2010].

32. Climate and History, climate4you under "climate+history", URL: <http://www.climate4you.com/> [cited 23 June 2010]

33. List of Rivers and Harbors that Use to Freeze, 19 December 2009, JP Simon URL:

http://www.associatedcontent.com/article/2508261/when_is_the_last_time_new_york_harbor.html?cat=37 [cited 23 June 2010]

34. Detailed Chronology of Late Holocene Climate Change, James S. Aber, URL:

<http://academic.emporia.edu/aberjame/ice/lec19/holocene.htm> [cited: 27 June 2010].

35. Charles X Gustav of Sweden, Wikipedia, URL: http://en.wikipedia.org/wiki/Charles_X_Gustav_of_Sweden [cited 27 June 2010].

36. Finnish War, Wikipedia, URL: http://en.wikipedia.org/wiki/Finnish_War [cited 27 June 2010].

37. Morze Bałtyckie, , Wikipedia, URL: http://pl.wikipedia.org/wiki/Morze_Bałtyckie#Zlodzenie [cited 27 June 2010].

38. **H. Niles**, Niles Weekly Register, Volume XLVIII , 1835, Franklin Press, Baltimore.

39. **Rev. John Trusler**, The Tablet of Memory or Historian's Guide, 1782, Mercury Printers, Dublin, Ireland.

40. Tablet of Memory, Shewing Every Memorable Event in History from the Earliest Period to the Year 1783, Fifth Edition, 1783, G. Robinson, London.

41. The Tablet of Memory, Shewing Every Memorable Event in History from the Earliest Period to the Year 1809, Fifth Edition, 1809, J. Johnson et. al., London.

42. **William Darby**, Mnemonika or the Tablet of Memory, being a Register of Events from the Earliest Period to the Year 1829, Edward J. Coale, Baltimore, 1829.

43. The New Tablet of Memory; or, Mirror of Chronology, History, Statistics, Arts, and Sciences, from the Earliest Period to the Year 1838, Fifteenth Edition, 1838, Longman et. al., London.

44. **G.A. Bewdley**, Historic Flooding in the Severn Catchment,

http://www.geography.org.uk/download/GA_BewdleyFloodHistory.doc

45. 1887 Yellow River flood, Wikipedia, URL: http://en.wikipedia.org/wiki/1887_Yellow_River_flood [cited 7 July 2010].

46. Floods and Inundations, The Encyclopedia Americana: A Library of Universal Knowledge, 1919, The Encyclopedia Americana Corporation, New York.

47. (Royal) Journal of the Statistical Society, Volume XLI – Year 1878, London, Edward Stanford, 1878.

48. Great Hurricane of 1780, Wikipedia, URL: http://en.wikipedia.org/wiki/Great_Hurricane_of_1780 [cited 7 July 2010].

49. Newfoundland Hurricane of 1775, Wikipedia, URL: http://en.wikipedia.org/wiki/Newfoundland_Hurricane_of_1775 [cited 7 July 2010].

50. Research Site: Drought Planning, Newman Information Center for Desert Research and Development, URL:

<http://desert.bgu.ac.il/desert/EngSite.aspx?SiteId=5514&ItemId=5541> [cited 7 July 2010].

51. Great Blizzard of 1888, Wikipedia, URL: http://en.wikipedia.org/wiki/Great_Blizzard_of_1888 [cited 7 July 2010].

52. Laki, Wikipedia, URL: <http://en.wikipedia.org/wiki/Laki> [cited 10 July 2010].

53. **Abdullah Ceylan**, Drought management plan for Ankara, Turkey, WMO Newsletter: MeteoWorld, June 2009.

54. India Geography Famines, URL: <http://www.1902encyclopedia.com/I/IND/india-13.html> [cited 14 July 2010].

55. The Universal Chronologist and Historical Register, Part II. Comprehending the Period from the Year 1700, to the close of the Year 1825, Sherwood, Gilbert and Piper, London, 1826.
56. (Mnemonic: or, Chronological Tablets;) Exhibiting, In a methodical manner, The most Remarkable Occurrences from the Creation of the world to the present period, Edward J. Coale, Baltimore, 1812.
57. **Cornelius Walford**, The Famines of the World: Past and Present, Edward Stanford, London, 1879.
58. Filosofia Della Statistica Esposta Da Melchiorre Gioja, Presso Gius. Ruggia e Co., Lugano, 1837.
59. **Thomas Allen**, A New and Complete History of the County of York, Volume 5, I.T. Henton, London, 1831.
60. **M. Benoist**, Dictionnaire de Géographie Sacrée et Ecclésiastique (Volume 3), Paris, 1848.
61. Bulletin de la Société Départementale D'Archéologie et de Statistique de la Drome, Au Secrétariat de la Société, Valence, 1889.
62. Franz Arago's Sämmtliche Werke (Volume 8), Verlag von Otto Wigand, Leipzig, 1860.
63. United States Department of Agriculture Weather Bureau, Annual Report of the Iowa Weather and Crop Service in Co-Operation with the United States Weather Bureau for the Year 1899, Des Moines, 1900.
64. **Kazimierz Władysław Wójcicki**, Biblioteka Starożytna Pisarzy Polskich, Volume 5, Warszawa, 1844.
65. Джеймс Ентоні березня використанні-А, Хронологічний список раннього погодних явищ, впливу, 2010.
66. Bi-Monthly Report - The Agricultural Department for January through April 1864, Washington D.C., 1864.
67. Symons's Monthly Meteorological Magazine, Volume 34, 1899, Edward Stanford, London, 1900.
68. **Krzysztof Korzuchowski**, Wieloletnie Wahania Zlodzenia Bałtyku, Problemy Klimatologii Polarnej, NR 5, 1996.
69. The Gentleman's Magazine and Historical Chronicle. From January to June 1813, Volume 83, Part 1., Sylvanus Urban, London, 1813.
70. **Richard A. Proctor**, Rough Ways Made Smooth, A Series of Familiar Essays on Scientific Subjects, Longmans, Green, and Co., London, 1893.
71. The Saturday Magazine, *Some Accounts of Paris, Historical and Descriptive*, Vol. 15, July to December 1839, London
72. **Thomas Short**, A General Chronological History of Air, Weather, Seasons, Meteors in Sultry Places and different Times, London, 1749.
73. Extreme weather events of 535–536, Wikipedia, URL: http://en.wikipedia.org/wiki/Extreme_weather_events_of_535–536 [cited 28 October 2010].
74. The Annual Register, or a View of the History, Politics and Literature for the Year 1813, London, 1814.
75. United States of America War Department, Monthly Weather Review for 1882, Washington D.C., 1883.
76. **Robert Michell and Nevill Forbes**, The Chronicle of Novgorod [1016-1471], Office of the Society, London, 1914.
77. **George Adams**, The Massachusetts Register and United States Calendar for the Year 1857, Serial Number 91, Boston, 1857.
78. **William Willis**, Journals of the Rev. Thomas Smith and the Rev. Samuel Deane, Portland, 1849.
79. **Joseph-Jean-Nicolas Fuster**, Des Changements dans le Climat de la France, Histoire de ses Révolutions Météorologiques, Paris, 1845.
80. Filosofia della Statistica esposta da Melchiorre Gioja, Tomo Primo, Milano, 1826.
81. **Cavaliere Gaetono Moroni Romano**, Dizionario di Erudizione Storico-Ecclesiastica, Vol. 92, Venice, 1858.
82. **Francesco Montemarte Conte Di Corbara**, Cronica Inedita degli Avvenimenti D'Orvieto e D'Altre Parti D'Italia dall'anno 1333 all'anno 1400, Turin, Italy, 1816.
83. **Harriet Martineau**, Eastern Life - Past and Present, Lea and Blanchard, Philadelphia, 1848.
84. **Ralph A. Graves**, Fearful Famines of the Past, The National Geographic Magazine, Volume XXXII, No. 1, July 1917.
85. **Yosaburō Takekoshi**, The Economic Aspects of the History of the Civilization of Japan, Volume 2, Routledge, London, 2004.
86. **Cormac Ó Gráda**, Famine: A Short History, Princeton University Press, Princeton, 2009.
87. **Hippolyte Adolphe Taine**, The Ancient Regime, Henry Holt and Company, New York, 1876.
88. Famine in India, The New-York Literary Magazine Or Literary Repository for May 1791, New York, 1791.
89. **Shoko Okazaki**, The Great Persian Famine of 1870-71, Bulletin of the School of Oriental and African Studies, University of London, 1986.
90. **Benjamin Vincent**, Haydn's Dictionary of Dates and Universal Information, G.P. Putnam's Sons, New York, 1893.
91. **Cornelius Walford**, The Insurance Cyclopaedia, Volume III, London & New York, 1874.
92. **Cornelius Walford**, The Insurance Cyclopaedia, Volume IV, London, 1876.
93. **Cornelius Walford**, The Insurance Cyclopaedia, Volume V, London, 1878.
94. **Benjamin Vincent**, Haydn's Dictionary of Dates and Universal Information, G.P. Putnam's Sons, New York, 1906.
95. A Famine in Hungary, The New York Times, 3 March 1892.
96. **W. Horsley Gantt**, A Medical Review of Soviet Russia, The British Medical Journal, 4 July 1936.
97. **Benjamin Vincent**, Haydn's Dictionary of Dates and Universal Information, G.P. Putnam's Sons, New York, 1904.
98. Deadliest Tropical Cyclones in History, Weather Underground, URL: <http://www.wunderground.com/hurricane/deadlyworld.asp> [cited 3 April 2011].
99. Australian Government, Attorney-General's Department, Disaster Database, URL: <http://www.disasters.ema.gov.au/Browse/Categories.aspx> [cited 5 April 2011].
100. The Age Newspaper of Saturday, June 2, 1900, Melbourne, Australia.
101. **Bryce Fraser and Kevin Weldon**, Macquarie Book of Events, Macquarie Library Pty Ltd, Australia, 1983.
102. **W. Ernest Cooke**, The Climate of Western Australia from 1876-1899, Perth, 1901.

103. **J. H. Heaton**, Australian Dictionary of Dates and Men of the Times containing History of Australasia from 1542 to May 1879, Sydney, 1879.
104. **Joëlle Gergis, Philip Brohan and Rob Allan**: The weather of the First Fleet voyage to Botany Bay, 1787–1788, Weather (by the Royal Meteorological Society), Volume 65, Issue 12, pages 315–319, December 2010.
105. **Arnaldo Faustini**, The Annals of Tristan da Cunha, http://www.btinternet.com/~sa_sa/tristan_da_cunha/images/tristan_annals.pdf [cited 20 May 2011].
106. Tasmanian Mail [newspaper], Tasmania, July 7, 1877 – December 22, 1877.
107. Deadliest Atlantic Hurricanes, Weather Underground, URL: <http://www.wunderground.com/hurricane/deadly.asp> [cited 22 April 2011].
108. **Alan Moorehead**, The Fatal Impact, Penguin Books, Victoria, Australia, 1866.
109. The Hawkesbury Historical Society, Flood levels of the Hawkesbury River recorded at Windsor Bridge for floods 9.15 metres (30 feet) and over, URL: <http://www.hawkesburyhistory.org.au/articles/floods.html> [cited 22 April 2011].
110. The Hawkesbury Historical Society, The flood of 1806, URL: <http://www.hawkesburyhistory.org.au/stubbs/1806flood.html> [cited 22 April 2011].
111. U.S. Department of Agriculture – Weather Bureau, Monthly Review of the Iowa Weather and Crop Service, May 1893 – December 1894.
112. United States of America War Department, Monthly Weather Review for 1877, Washington D.C., 1878.
113. United States of America War Department, Monthly Weather Review for 1885, Washington D.C., 1885.
114. United States of America War Department, Monthly Weather Review for 1887, Washington D.C., 1887.
115. United States of America Department of Agriculture, Monthly Weather Review and Annual Summary for 1895, Volume XXIII, Washington D.C., 1895.
116. United States of America Department of Agriculture, Monthly Weather Review and Annual Summary for 1894, Volume XXII, Washington D.C., 1894.
117. United States of America Department of Agriculture, Monthly Weather Review and Annual Summary for 1893, Volume XXI, Washington D.C., 1893.
118. United States of America Department of Agriculture, Monthly Weather Review and Annual Summary for 1896, Volume XXIV, Washington D.C., 1896.
119. United States of America War Department, Monthly Weather Review for 1890, Washington D.C., 1890.
120. United States of America War Department, Monthly Weather Review for 1889, Washington D.C., 1889.
121. United States of America War Department, Monthly Weather Review for 1888, Washington D.C., 1888.
122. United States of America Department of Agriculture, Monthly Weather Review and Annual Summary for 1898, Volume XXVI, Washington D.C., 1898.
123. United States of America Department of Agriculture, Monthly Weather Review and Annual Summary for 1899, Volume XXVII, Washington D.C., 1899.
124. United States of America Department of Agriculture, Monthly Weather Review and Annual Summary for 1900, Volume XXVIII, Washington D.C., 1900.
125. United States of America War Department, Monthly Weather Review for 1880, Washington D.C., 1880.
126. United States of America War Department, Monthly Weather Review for 1884, Washington D.C., 1884.
127. On the River Front, The New York Times, 29 May 1896.
128. Chronology of Public Events and Remarkable Occurrences within the Last Fifty Years or from 1771 to 1821, London

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