

The Year Without a Summer



In 1816, half a foot of snow fell in New England. That would be completely unremarkable. Except that it was in one day—in June.

That same summer, Mary Shelley spent a chilly vacation holed up indoors—and used the time to write *Frankenstein*. Crops failed around the world, plunging Thomas Jefferson into serious debt for the rest of his life. Oats became scarce in Germany, making horse travel expensive—and leading to the invention of the bicycle. Struggling farmers in China began raising opium, giving rise to a drug trade that has lasted to modern times. And famine in many areas led to widespread disease, including a cholera outbreak that killed millions.

What was the cause of all this chaos? A year earlier, a volcano erupted in Indonesia.

Larger than Krakatoa, Vesuvius, or Mount St. Helens, Mount Tambora erupted for 2 weeks straight. Around it, nearly 100,000 people died, buried under thick layers of ash like in Pompeii.

Greenhouse-gas emissions from the eruption, which could have warmed the atmosphere, were offset by particulates and sulfur dioxide gas. Ash and dust blocked out the sun temporarily, darkening skies around the world. The sulfur dioxide was longer-lasting, becoming aerosols that reflected the sun's heat for 3 years!

This turned 1816 into “The Year Without a Summer,” as it was called, with long-term global effects. The good news? The atmosphere recovered within a decade, and life went back to normal.

Mount Tambora, an active stratovolcano that is a peninsula of and the highest peak on the island of Sumbawa in Indonesia.

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BACKGROUND

Synopsis: The April 1815 eruption of Indonesia’s Mount Tambora lasted almost 2 weeks and caused the following year, 1816, to become known as the “Year Without a Summer.” Tambora’s eruptions were worse than those of Krakatoa, Mount St. Helens, and Vesuvius. As at Vesuvius’s Pompeii, victims of Tambora were found frozen in their homes below 10 ft of pyroclastic deposits in this “Pompeii of the East.” Around the world, the eruption brought weather disasters, famine, and disease, as well as the invention of the bicycle and the novel *Frankenstein*. Mount Tambora is still active, with its last eruption in 1967.

The below information is adapted from “15 Facts About ‘The Year Without a Summer’” by Dennis Mersereau on MentalFloss.com.

- During the April 1815 eruption, the volcano ejected billions of tons of gas and debris into the atmosphere for nearly 2 weeks. Much of the heavier ash and debris fell on the islands around Tambora, but a significant amount wound up in the atmosphere, spreading around the world and partially blotting out the sun for months after the event. The eruption itself killed tens of thousands—if not hundreds of thousands—of people in the resulting pyroclastic flows, choking ashfalls, and tsunamis.
- Tambora registered a VEI-7 on the Volcanic Explosivity Index, a metric that measures the size of volcanic eruptions on a scale from VEI-0 (nonexplosive) to VEI-8 (megacolloidal). Krakatoa measured a VEI-6, while Mount St. Helens and Vesuvius both rated a VEI-5.
- The eruption of Tambora caused a volcanic winter. Particulates ejected by volcanoes can act to reflect sunlight, allowing less solar radiation to reach the surface, keeping global temperatures lower than they would be under normal conditions. But far more important is the sulfur dioxide that also comes with eruptions. Sulfur dioxide gets converted into sulfuric acid, which then forms aerosols high up in the atmosphere that also serve to block incoming solar radiation for several years after the eruption.
- The volcanic winter that followed Mount Tambora’s historic eruption devastated communities around the world. Ironically, the volcanic winter effect was most heavily felt during the summer months, especially in eastern North America. Residents reported heavy snow falling as late as the middle of June in the northeastern United States.
- The sudden drop in temperatures wreaked havoc on agriculture around the world. In addition to heavy frosts and freezes all but destroying crops in the United States, cold and wet conditions also killed the harvest in Europe and Asia. The widespread crop failures around the world led to famine in many regions of the world, costing countless lives.
- Not only did the eruption leave weather disasters and famine in its wake, but the combination of the two effects also produced an undesirable result: disease. The cholera epidemic that became the scourge of the 19th century likely began in the wake of Mount Tambora’s eruption, killing millions of people, but it also helped bring us much closer to modern medicine.
- The gloomy weather in Europe during the Year Without a Summer prevented tourists from enjoying a quiet vacation during the usually warm months. One group of literary legends—including Percy Shelley and Mary Wollstonecraft Godwin (later Mary Shelley), Lord Byron, and John Polidori—took a trip to Lake Geneva in the summer of 1816 and wound up indoors most of the time because of the chilly, rainy conditions. It was during this outing-turned-staycation that Mary Shelley started what became her classic novel *Frankenstein; or: The Modern Prometheus*, and John Polidori was inspired to write *The Vampyre*, which later influenced Bram Stoker’s *Dracula*.



Year Without a Summer References

[15 Facts About ‘The Year Without a Summer’ | MentalFloss.com](#)

[Year Without a Summer | Wiki](#)

[Mount Tambora | Wiki](#)

[1883 Krakatoa & 1815 Tambora | LiveScience](#)

[1258 Mysterious Medieval Eruption | Science](#)

Contributors: Dennis Mersereau (MentalFloss), Juli Hennings, Harry Lynch



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- One of the more unusual effects of the temporary climate change brought about by Mount Tambora's eruption is that it may have indirectly led to the creation of the Mormon religion. Mormon founder Joseph Smith's family was one of thousands that left Vermont during the freakishly cold summer of 1816. The Smith family subsequently settled in New York, where a teenage Joseph would go on to experience the events that led to his publication of the *Book of Mormon*.
- When crops failed as a result of the extreme weather in 1816, it wasn't only humans that suffered without food. The failed harvests sent the price of oats soaring, making it harder and more expensive for individuals to afford to keep horses for transportation. Looking for a new way to get around, Karl Drais invented a device called a "Laufmaschine," or a "running machine." The contraption is very similar to the bicycle we know and love today—instead of using pedals, however, you operated it with your feet Fred Flintstone-style.
- Extreme weather in 1816 caused Thomas Jefferson's crops to fail for several years afterward, heavily contributing to the Founding Father's already-considerable debt. Jefferson never recovered financially, and he lived the waning years of his life in debt that would equal millions of dollars in 2016.
- Weather exists as nature's way of trying to balance out the atmosphere. When one part of the world experiences extreme weather, somewhere nearby is often experiencing the opposite weather to balance it out. When much of the world experienced a cool-down in the wake of Mount Tambora's eruption, the Arctic warmed up, and it warmed up enough that it cleared the sea ice and [allowed British explorers to map out the area](#) and hunt for the Northwest Passage.
- One of the major causes for the drug trade around the world is poverty—when there's no other way to make money, selling drugs is a profitable draw for many people. After the crops failed in 1816, farmers in places like China [were forced to begin growing opium](#) in order to make money. This opium production led to a boom in the opium trade that still exists today.
- Thankfully, such a dramatic change in global climate didn't last very long. The effect of the global cooldown only stuck around for a couple of years after the eruption. Once the particles in the atmosphere began to mix out and settle back to the surface, the amount of solar radiation reaching the surface began to return to normal, allowing weather to mostly return to normal around the world.

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