

# Do You Know What Lightning Really Looks Like?

Paintings by artists over centuries have consistently underestimated the number of root-like veins in a lightning strike, researchers found.

**By Steph Yin**

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Here are paintings that incorporate lightning made by artists at various points through history. Which do you think looks most accurate?



“The Great Day of His Wrath” by John Martin, circa 1851. via Wikimedia Commons



“Horse Frightened by Lightning” by Eugène Delacroix, circa 1825. Museum of Fine Arts Budapest



“The Shipwreck” by Claude-Joseph Vernet, 1772. Patron's Permanent Fund and Chester Dale Fund, National Gallery of Art

Below is a photograph, which comes closer to capturing lightning in reality.



Algermissen, Germany. Julian Stratenschulte/DPA, via Agence France-Presse — Getty Images

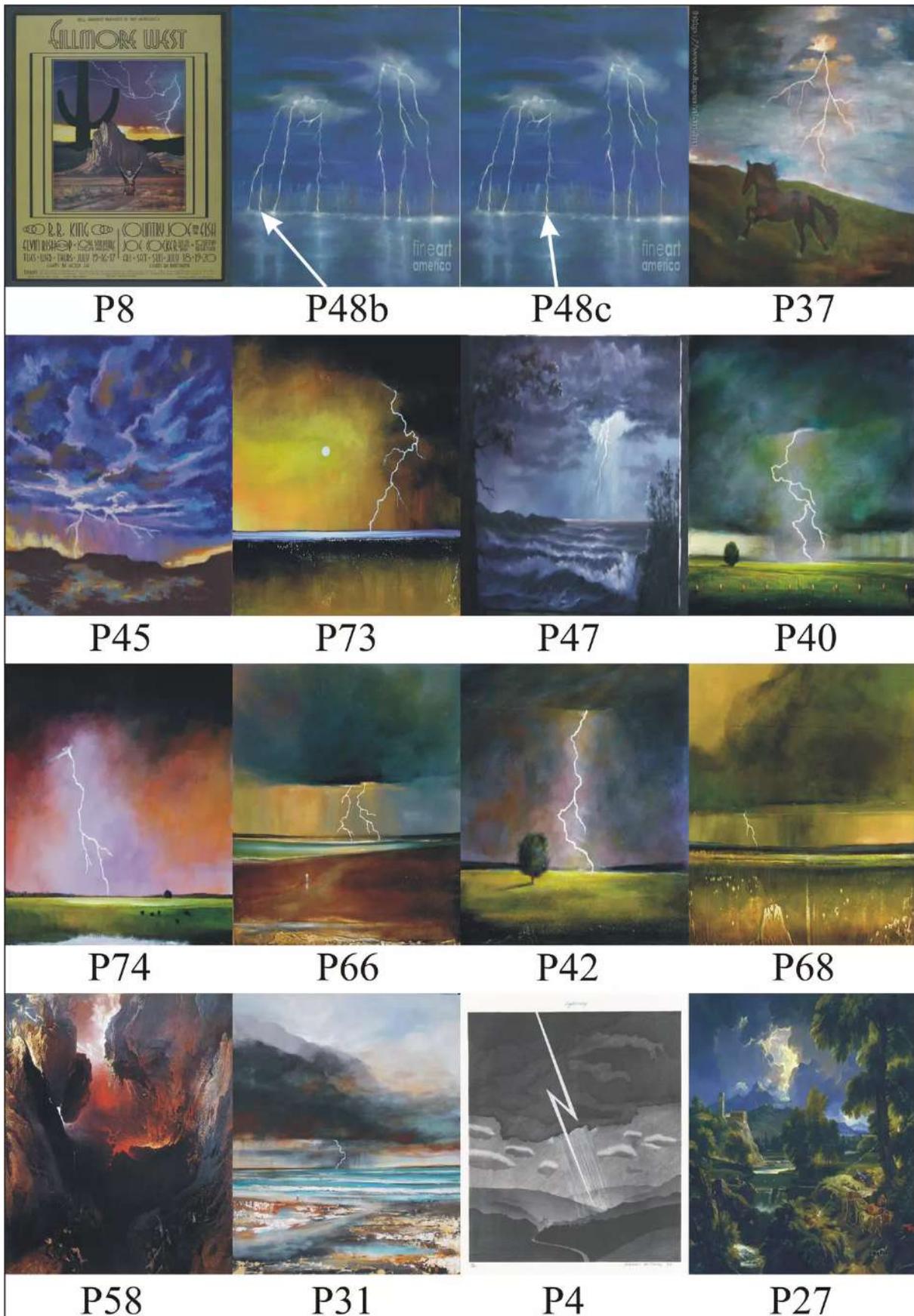
Notice the difference between the imagined and actual renderings: There aren't enough veins of electricity in the paintings.

This is a consistent pattern, according to a study published Wednesday in Proceedings of the Royal Society A. Hungarian researchers found that artists tend to paint lightning with fewer branches than the bursts of electricity actually have.

Their research points to how cultural legacies can distort our perceptions of natural phenomena, even those that we encounter with our own eyes.

Using a computer program, Gábor Horváth, head of the environmental optics laboratory at Eötvös Loránd University in Budapest, and his colleagues examined 100 paintings and 400 photographs of lightning. They found the pictures and paintings differed mainly in the number of root-like offshoots, which occur when charged particles try to carve the path of least resistance through air.

While painted lightning strikes had 11 arms at most, photographs showed lightning splitting into as many as 51 fingers. Actual numbers could be even higher, the authors noted, because some tendrils may be too dim for cameras to register.



Gábor Horváth et al.

In a follow-up experiment, the researchers asked ten people to rapidly evaluate 1,800 photos each. They found that participants could accurately gauge up to 11 lightning branches. As the number of branches increased, people strongly underestimated the number of branches, with an exponentially growing gap between actual and perceived figures.

The finding is consistent with the ways humans are known to assess numbers, the authors noted. Below five, we're able to subitize, or rapidly judge numbers of items without counting. Between six and ten, we count. Above ten, we estimate, with decreasing accuracy. This could explain why artists rarely portray lightning with more than 11 strands, Dr. Horváth said.

Simplified, zigzag images of lightning are also culturally ingrained (think of the lightning emoji or the common symbol for electricity). The imagery originated with ancient Greek and Roman depictions of Jupiter's and Zeus's thunderbolts, Dr. Horváth said.

The new work fits into a long history of scientists drawing a boundary between artistic and photographic representations of lightning — and an even longer history of scientists and artists pitting their fields against one another, said Jennifer Tucker, a history professor at Wesleyan University who was not involved in the study.

In the mid-19th century, meteorology was a new discipline, and its practitioners struggled to move people's understanding of weather away from superstition and folklore.

"They wanted to replace what they derisively called 'weather fallacies' with 'weather truths' or 'facts,'" Dr. Tucker said. Among such myths was the idea that thunderbolts were material objects that fell from the sky.

Around the same time, the first photographs of lightning were taken. One of the first people to pull off this feat, a photographer from Philadelphia named William Nicholson Jennings, explicitly set out to prove the inaccuracy of the conventional lightning zigzag.

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Meteorologists embraced this new medium as a more objective way to catalog the sky. They exhibited lightning pictures at scientific meetings and shared standardized methods for photographing lightning. At the same time, they blamed landscape artists for "spreading false rumors" about weather phenomena, Dr. Tucker said.

While Dr. Horváth sees value in debunking "the scientific errors of well-known artworks," not everyone believes art always needs to be scientifically accurate.

Lorraine Daston, director of the Max Planck Institute for the History of Science in Berlin, said that scientific accuracy and artistic goals of "what a painting should do" are moving targets.

Both “are constantly mutating through time,” she said.

**Correction:** June 11, 2018

*An earlier version of this article misattributed a quote about meteorologists and landscape artists. It was said by Jennifer Tucker, not Turner.*