Munch’s “The Scream” Is Losing Its Yellow Paint Due To Humidity

Eva Amsen  Contributor  
Science  
Writing about the overlap of science and art

In 2004, masked men entered Oslo's Munch Museum in broad daylight and stole Edvard Munch's 1910 painting "The Scream". This painting is one of several paintings, pastels and prints that Munch created between 1893 and 1916, all referred to as "The Scream". For two years after the robbery, the 1910 painting was believed to be lost forever, until Norwegian police mysteriously recovered it in August 2006. However, even though it survived the theft, “The Scream” is not safe yet. This time, it's not threatened by burglars, but by its own paint and by moisture in the air.
Certain areas of the painting where Munch used cadmium yellow paint have started to lose color and flake off. To protect the piece, it has been kept in a climate controlled space at the Munch Museum and has rarely been on display since its return in 2006. Recently, an international team of chemists, led by researchers from the National Research Council (CNR) in Italy, have come a step closer to understanding what is happening to the paint and how best to preserve the painting.

Munch used a kind of cadmium sulfide–based yellow paints that were popular with several other artists of the time as well. From studying the decay of the paint in several other paintings, researchers and art conservators believed that cadmium yellow reacts to light. However, there are different types of cadmium yellow paint and to fully understand the process, the scientists first wanted to know exactly which type Munch used to paint “The Scream”.

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To do this, they used various spectroscopy and X-ray techniques to study the yellow areas of the painting as well as tiny fragments of the flakes where the paint had come loose. Some of the work was done at the Munch Museum in Norway, while smaller samples were taken to France to be analysed at the European Synchrotron Radiation Facility (ESRF) in Grenoble. They also created a few samples with similar paint to see how it would react under an accelerated aging process. In a recent article in *Science Advances* they showed the results of these experiments which suggest that the damage was the result of the oxidisation of sulfur in the paint - but that this wasn't caused by light exposure!

The traditional way to preserve cadmium yellow damage in paintings was to protect the paintings from direct light, but these experiments even showed the decay process when samples were kept in the dark. Instead, the moisture in the air appeared to make the most difference. If the relative humidity was kept below 45%, the cadmium sulfide in the paint was less likely to turn into cadmium sulfate.

Meanwhile, the painting is still at the Munch Museum, at a relative humidity of about 50%. (And you can watch it on a livestream during the museum’s opening hours.) However, it is about to go on another small journey in a few months when the museum moves to a new location. Representatives of the museum have indicated that they will consider the results of the research to determine the best way to store and display “The Scream”.

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Eva Amsen

I'm a freelance science writer, focused on stories behind the research. My writing about the intersection of science, art and culture has appeared in Nautilus, The...