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## How cat hair brought down a pair of art forgers

By [Lizzie Wade](#) Feb. 14, 2016 , 3:30 PM

**WASHINGTON, D.C.**—When a curator at Yale University started digging through his gallery's storage space, he wasn't expecting to find anything special. But within the piles of mediocre works, a 1.5-meter-tall canvas caught his eye. Called [The Education of the Virgin](#), it depicted a very young Virgin Mary being taught to read by her parents, St.

Anne and St. Joaquim. Its surface was badly damaged, with cracked paint and parts of the image worn away. Even still, the curator thought he recognized the hand behind the painting: The 17th century Spanish master Diego Velázquez.

But how to know for sure? Today at the meeting of AAAS (publisher of *Science*) here, researchers [discussed](#) how scientific analysis can help identify the artist behind a painting, even when his or her identity has been lost for centuries or millennia.

In the case of Velázquez, researchers had previously identified certain quirks that show up again and again in his paintings. Although green pigments and dyes were available in 17th century Seville, where he worked, Velázquez preferred to create his own greens by mixing blues and yellows. When researchers analyzed the material used to create St. Joaquim's green robe, they found a mixture of calcium carbonate (yellow) and the copper-based pigment azurite (blue). The cracked surface of the painting also revealed the fine lines that the artist sketched on the canvas to guide his hand while painting the image, a technique that Velázquez is known to have employed.

"If the top layer [of paint] were completely undamaged, it would be impossible to see this," says Ian McClure, an art conservator at Yale. (He wasn't the one who found the painting, but he helped lead the team that analyzed it.) And when his team took an x-ray photograph of *The Education of the Virgin*, they saw that an earlier version of St. Anne's face had been scraped off and redone. Lesser imitators (or outright forgers) of Velázquez were very unlikely to show that attention detail, McClure told the audience. "This painting is very unlikely to be a copy ... This is very much the artist in process."

"Taken on their own, these materials and techniques are not unique fingerprints to Velázquez," says Anikó Bezur, a conservation scientist at Yale who worked with McClure. But taken as a whole, she says, all the evidence "knits together" and "adds considerable force to the attribution of this painting to him."

Meanwhile, another mystery was brewing. When Marc Walton, the senior scientist at Northwestern University and the Art Institute of Chicago's Center for Scientific Studies in the Arts in Illinois, set out to identify the hand behind a set of three portraits found with mummies from Egypt's Roman period, he didn't have a famous name in mind. These paintings—known as the [Tebtunis mummy portraits](#) after the site where they were found—had been buried in tombs for over 2000 years and are unsigned. But Walton at least though he might be able to tell if one artist had produced all three, or if were produced by different hands.

By examining the 3D structure of the work at a micron-level, Walton could tell in which order the layers were painted. In each case, the background was laid down first, followed by the face and neck, the tunic, the objects the subjects are holding, and last of all, the subject's hand.

These techniques could have been the result of a standardized workshop, with several artisans working side by side and trained to employ the same techniques. But Walton also discovered that the pigments used to create all three portraits were so similar that

they likely came from not just the same region or even workshop, but from the very same pot of paint. Plus, the hands in each portrait were drawn in the exact same style. “That is getting into the specific individual artist that was able to produce that,” Walton says. All those clues together convinced him that the Tebtunis mummy portraits were produced by a single artist.

Investigations into the artist responsible for more modern works often have a specific goal: To figure out if the work in question is a forgery. Bonnie Magness-Gardine manages the Art Theft Program at the Federal Bureau of Investigation in Washington, D.C. For many years, she and other investigators had seen innumerable forgeries of the work of [Clementine Hunter](#), a self-taught and incredibly prolific African-American painter from Louisiana. Many people tried to copy her distinctive folk-art style, but only two regularly succeeded: William Toye and his wife Beryl Ann Toye, a couple from New Orleans. They were so good at imitating Hunter’s style that “they got away with this for years,” Magness-Gardine says.

In 2009, the Federal Bureau of Investigation finally gathered enough evidence to confiscate the Toyes’ supposed Hunter collection, and during the raid they noticed that “they lived in a very modest house with approximately 30 cats,” Magness-Gardine says. When forensic investigators analyzed the seized works, they found cat hair embedded in the paint—a characteristic not shared by Hunter’s authentic work. “That’s essentially what brought them down,” Magness-Gardine says. William Toye pled guilty to art fraud in 2011.

Bezur, the Yale conservation scientist, says she was envious of such a definitive test. But she doubts she will be able to employ similar methods. “Unfortunately, we don’t know of any cats or dogs owned by Velázquez.”