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A Window into the Emerging Anthropocene...Through Art

Wheat Fields After the Rain (The Plain of Auvers), *1890, Vincent van Gogh. Oil on canvas. With a scientist's eye, a painting enthusiast can marvel not only at van Gogh's brushwork but also at the shifting landscapes. Although the painting has nothing from the built environment, the scene nonetheless shows the stamp of human influence: farmland.*
Credit: Carnegie Museum of Art; acquired through the generosity of the Sarah Mellon Scaife family

Anyone can wax poetic about a museum painting: Look at those brushstrokes! That composition! The artist's use of light and shadows! The feelings evoked by the color! But how many people can look at a painting and extract information about a landscape's geology or see an Earth that humans have begun to change, for better or worse?

Enter Albert Kollar, a geologist and collection manager at the Carnegie Museum of Natural History in Pittsburgh, Pa.

Scientists love to insert themselves into artistic conversations. For example, did volcanic ash or mother-of-pearl clouds give rise to the sky's vivid colors in Edvard Munch's *The Scream?* What can Frederic Edwin Church's *Aurora Borealis* tell us about the role science played in inspiring art? Kollar is no different. A geologist by training, Kollar recently became interested in what 19th-century landscape paintings—specifically, the landscapes hanging in the nearby Carnegie Museum of Art—can tell us about how the Anthropocene has evolved.

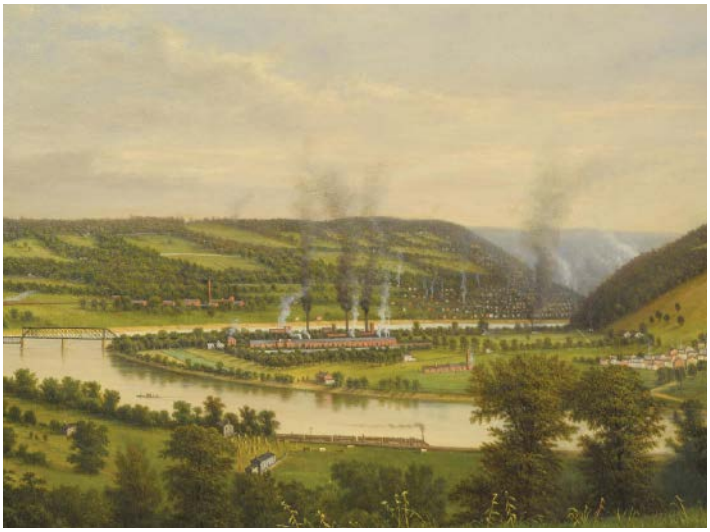
"Landscape paintings that were done in the 19th and early 20th centuries are recording information that modern scientists can extract out," Kollar said. "We can look back 150 years and see that what started out as just a landscape that an individual saw was also the beginning of the Industrial Revolution."

Many scientists note that atmospheric concentrations of greenhouse gases began to rise significantly during the Industrial Revolution, which spanned the mid-18th century to the mid-19th century. This was a time when major economies shifted from agrarian to machine manufacturing.

But what can art show about these transitions? *Eos* caught up with Kollar after his talk on the subject (see http://bit.ly/GSAKollar) at the Geological Society of America's annual meeting held last October in Seattle, Wash.

Here are five works from the Carnegie Museum of Art's collection that were painted during the Industrial Revolution, paired with Kollar's discussion of the geological features and Anthropocene effects captured by the artist. Tour with us, as we delve into some art appreciation with a geoscience lens.

The Pittsburgh Bessemer Steel Company



The Pittsburgh Bessemer Steel Company, *circa 1884, William Coventry Wall. Oil on canvas. Credit: Carnegie Museum of Art; bequest of Charles J. Rosenbloom*

This painting shows sedimentary rocks eroded by a "river during the Pleistocene," Kollar said, which formed a cutbank, sandbar, and floodplain of deposits from the Holocene age. Carbon dioxide and nitrogen dioxide pour from the riverboats' exhaust stacks.

Steamboat on the Ohio

Steamboat on the Ohio, *circa 1896, Thomas Pollock Anshutz. Oil on canvas. Credit: Carnegie Museum of Art, Patrons Art Fund; gift of the A. W. Mellon Educational and Charitable Trust*

Anshutz, perhaps without even knowing it, painted modern-day sedimentary rocks and river rocks around 10,000 years old, Kollar said. But the real focus here is all the emissions sources. The black smoke rising from the steel mill contains "emissions from combustion," which include carbon dioxide, he explained. Once again, Kollar noted that the river seen here is a source of methane. A steamboat in the foreground also burns coal, releasing carbon dioxide.

Pittsburgh Fifty Years Ago from the Salt Works on Saw Mill Run

Pittsburgh Fifty Years Ago from the Salt Works on Saw Mill Run, *circa 1884, Russell Smith. Oil on canvas. Credit: Carnegie Museum of Art; gift of the Howard Heinz Endowment*

Here Kollar sees a floodplain born of Holocene deposits less than 10,000 years old. He highlighted the salt factory, "where salt or brine water was extracted from subsurface Pennsylvanian-age sandstone." Brine was then boiled using heat from burning coal, which released carbon dioxide. You can also spot a tugboat burning coal and more coal burning in the background—all sources of carbon dioxide. He also pointed out that the river is a natural source of methane "when vegetation from land enters the water and decomposes."

Le Grand Pont, Rouen

Le Grand Pont, Rouen, *circa 1896, Camille Pissarro. Oil on canvas. Credit: Carnegie Museum of Art*

Pissarro also painted emissions, Kollar noted. Black, carbon dioxide–filled smoke rises in the background. White smoke from wood-burn riverboats also contains carbon dioxide and nitrogen dioxide. But the story here is that of humans harnessing a river. You have "floodplain deposits and river channeled to control flooding and raise [the] river level for river commerce," Kollar said.

The Lucy Plant, Carnegie Steel, Pittsburgh, *circa 1935–1936, Ernest Fiene. Oil on canvas. Credit: Carnegie Museum of Art*

The Lucy Plant, Carnegie Steel, Pittsburgh

This painting shows Andrew Carnegie's first steel mill. Kollar sees how the mill was built on the floodplain of the Allegheny River. The furnace releases carbon dioxide from its billowing black smoke, as does the tugboat. Coal mining also releases methane, and power generation for electricity and heating releases carbon dioxide.

The colors here are stark: black, white, and brown; the industrial building dominates what would otherwise be a quaint landscape of a town. There's a contradiction here, Kollar noted. All the while the greenhouse gases loft high into the sky, the "winter landscape [reflects] sunlight, thereby keeping temperatures cooler," Kollar said.

By **JoAnna Wendel** (@JoAnnaScience), Staff Writer