QUESTIONS OF ORIGIN

Vikings, Vinland, and the veracity of a map

BY JESSICA GORMAN

Scientists lined up on opposing sides of a decades-old controversy this month, after the publication of two new studies concerning the authenticity of one of the world's most famous maps. If it's not a forgery, the Vinland Map contains the first known cartographic representation of the Americas. The world map, which surfaced in the 1950s, identifies a region called Vinland that resembles coastal Canada. Latin text on the map describes Vinland's discovery by the Vikings.

Both archeological evidence and ancient Viking sagas suggest that Norse explorers reached the New World around A.D. 1000, long before Christopher Columbus' voyage in 1492. Historians have wondered whether medieval Europeans were familiar with these Viking travels, and there's evidence that a scribe may have made the Vinland Map for the Council of Basel, a meeting of bishops in Switzerland in the 1430s and 1440s.

OH, CANADA — This controversial map may be the first record of Vinland (arrow), now part of North America.

"We always assume Columbus set out on his voyages without any knowledge" of the Western Hemisphere, says Garman Harbottle of Brookhaven National Laboratory in Upton, N.Y. "Had he had a look at the Vinland Map, he would have seen it on there."

The two new reports appear to be on opposite sides of the debate but don't actually contradict each other. The authors of one report claim that the map's inks contain a 20th-century substance, making the map a modern forgery. The authors of the other say that the map's parchment dates clearly to the time of the Council of Basel.

The map could be a convincing fake drawn on old parchment. Yet the studies have renewed 4 decades of hot debate.

INK AND PARCHMENT To investigate whether the map is authentic, Robin J. H. Clark and Katherine L. Brown of the University College London used a technique called Raman microprobe spectroscopy to look for signatures of certain molecules in its ink.

Yellow lines run under the map's flaking black ink, as they do in many documents from the Middle Ages. A widely used medieval ink called iron gallotannate can leave behind similar yellow stains containing anatase, a type of titanium dioxide.

In the Aug. 1 *Analytical Chemistry*, Clark and Brown report that the Vinland Map's yellow lines do, in fact, contain anatase. Yet they found no iron, only carbon, in the black ink. From these results, Clark and Brown suggest that the map's ink is carbon-based and so would have been incapable of producing anatase naturally. In an attempt to give the map authentic-looking yellow stains, a forger probably applied anatase lines before laying down carbon-ink ones, says Clark. Synthetic anatase first became available in the 1920s.

"The Clark results agree almost completely with our results, which indicate that the ink is 20th century," comments chemist Lucy B. McCrone of the McCrone Research Institute in Chicago. Her late husband Walter McCrone studied the map during the 1970s and published micrographs of seemingly synthetic anatase crystals in the ink.

Other researchers couldn't disagree more. The new ink work is "a rather austere little study from which there were a lot of conclusions drawn," comments Thomas Cahill of the University of California, Davis, who examined the Vinland Map in the 1980s. For example, the technique used by Clark and Brown wasn't sensitive enough to detect iron, Cahill asserts.

Jacqueline Olin of the Smithsonian Center for Materials Research and Education in Suitland, Md., says that although the map's ink might contain carbon, "I think it's an iron [gallotannate] ink."

Harbottle is more blunt. "I think the London people are wrong," he says. "There are 30 meters of writing on the Vinland map, and you mean to tell me that a person could have done all that, with the dips and twists and turns of his pen, and he did it twice and had almost no errors to something like a hundredth of a millimeter? It's preposterous."

In the second new study, published in the August *Radiocarbon*, Olin, Harbottle, and Douglas J. Donahue of the University of Arizona in Tucson report that the map's parchment dates to about 1432. To determine this, the researchers cut a small strip from the bottom of the map and determined its content of carbon-14—an isotope that decreases predictably with time in material from a living organism.

The researchers acknowledge that this parchment date can't prove the map is legitimate. However, "the hypothesis of a forgery is requiring more and more cleverness and insight on the part of the forger," says Cahill.

McCrone disputes this. "The Council of Basel has a known date, and that would have been known to a 20th-century forger," she says.

What's more, blank sheets of old parchment are easy to obtain in Europe, adds Clark. The carbon-14 dating is "a good piece of work," he says, "but it's not particularly relevant."

Yale University, which owns the map, takes no position on its authenticity, says Robert G. Babcock, the university's curator of rare books and manuscripts. "We preserve the manuscript, make it available for research, and that's our job," he says. ■

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