DETERMINATION OF THE RADIOCARBON AGE OF PARCHMENT OF THE VINLAND MAP

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ABSTRACT. The Vinland Map, drawn on a 27.8 × 41.0 cm parchment bifolium, is housed in the Beinecke Rare Book and Manuscript Library at Yale University. In the northwest Atlantic Ocean, it shows “the Island of Vinland, discovered by Bjarni and Leif in company.” Skelton, Marston, and Painter (Skelton et al. 1965, 1995) firmly argued the map’s authenticity, associating it with the Council of Basle (AD 1431–1449), that is, half a century before Columbus’s voyage. Nevertheless, vigorous scholarly questioning of the map’s authenticity has persisted (Washburn 1966; McCrone 1974; Olin and Towe 1976; Cahill et al. 1987; McCrone 1988; Towe 1990). We have determined the precise radiocarbon age of the map’s parchment by accelerator mass spectrometry (AMS). The one-sigma calibrated calendrical date range is AD 1434 ± 11 years: the 95% confidence level age range is AD 1411–1468.

INTRODUCTION

If the Vinland Map (Figure 1) is authentic, it is the first known cartographic representation of North America and its date is important in establishing the history of European knowledge of the lands bordering the western North Atlantic. It also raises the deeper question of Columbus’s own possible awareness of that earlier knowledge (Washburn 1995). The map’s account of the Norse voyage of discovery also differs significantly from that of the sagas (Magnusson and Palsson 1965) in that Bjarni and Leif are said to have voyaged together rather than separately.

These questions point out the significance of scientific evidence in this case. They are questions of historical consequence. In undertaking the measurement of the radiocarbon content of the parchment, we were aware that dates from the 16th century onward would suggest the map to be a forgery. A 15th century date would be less conclusive, but would constitute a major contribution to the known facts concerning the authenticity of the map. Obviously, a 15th century date per se neither refutes nor proves authenticity, but is necessary for authenticity.

In 1972, Yale commissioned microscopist Walter McCrone to examine minute samples of ink from the Vinland Map. McCrone reported (1974, 1988) that the ink contained very substantial quantities of titanium dioxide in the anatase crystalline modification. Because precipitated anatase only became commercially available about 1920, its presence in the ink satisfied McCrone that the map must be a 20th century forgery. Yale announced in 1974 that the map “may be a forgery”.

Two very different rebuttals have been made to McCrone. First, Cahill et al. (1987) at the University of California in Davis published in-situ analyses of the map ink at 159 locations by PIXE (proton induced x-ray emission). They demonstrated that titanium is only present at trace levels—orders of magnitude smaller than McCrone’s estimates but very much in line with the levels found in numerous other medieval inks tested (Cahill et al. 1987). The paper by Cahill et al. prompted a reply from McCrone (1988): a valuable summary of this response compiled by Cahill and Kusko appears in the 2nd edition of Skelton et al. (1995).

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Figure 1 The Vinland Map. Reprinted with permission. © 1965 Yale University Press. All rights reserved.