

## **APPLICATION OF THE MINI C14 COUNTER TO AN ARCHAEOLOGICAL PROBLEM: THE FROBISHER BLOOM**

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The "Frobisher Iron Bloom" at the Smithsonian Institution (Accession No. 49459) was found by the American explorer C. F. Hall on Kodlunarn Island in Frobisher Bay, Baffin Island, Canada, in 1861 (Hall, 1865). Since Hall also collected there relics of the Elizabethan explorer Sir Martin Frobisher, he assumed that this iron bloom (and several others, now lost) pertained to the Frobisher expeditions in the years 1576, 77 and 78: local Inuit oral history confirmed this supposition.

The discovery of unmistakable Viking remains at L'Anse aux Meadows, Newfoundland, by the Ingstads in 1960 reoriented peoples' thinking about the reality of Viking expeditions to the New World, and around 1967 curators at the Smithsonian Institution began to discuss the possibility that the "Frobisher bloom" might in fact be of Viking origin. Frobisher Bay lies almost directly on the presumed Iceland — Greenland — Newfoundland Viking route. It was decided to attempt a carbon 14 dating of the bloom — actually of the iron carbides in the iron, using the technique of Van der Merwe (1969). Unfortunately, the carbon content of the bloom was only ca. 0.05 %, and for this reason the Smithsonian Institution contracted with Brookhaven National Laboratory (Sayre, Stoenner and Harbottle) to develop a proportional counter capable of dating 10 mg of carbon (Harbottle et al. 1979, 1983; Sayre et al. 1981). When this had been done, dates (calibrated) of  $1293 \pm 133$  and  $1262 \pm 107$  AD were obtained for two separate iron samples, taken from the bloom (Sayre et al. 1983).

Stimulated by these findings, dates well within the Viking period in Greenland but probably too early for Frobisher, the Smithsonian Institution sponsored an expedition to Kodlunarn Island in the summer of 1981 with William Fitzhugh as leader. Three more "Frobisher" blooms were found: these are now being conserved for museum presentation in Canada. Adhering to the rough outer surface of one of the new blooms were bits of charcoal which appeared to have remained there from the time of smelting. These charcoal bits now have been dated using the proportional counter. The correction (calibration) procedure of Stuiver (1982) yields three possible dates, 1392, 1322 and 1337 AD, all  $\pm 150$  years: these seem consistent with the iron carbide dates from the Smithsonian bloom.

Although these dates might still refer to possible smelting operations by the Frobisher expedition using driftwood as a source of charcoal, the extensive written records of those three Elizabethan expeditions contain no mention of any such metallurgy.

What remains then is a mystery which has so far only partially yielded to archaeological research. What does seem sure is that the Frobisher bloom and its companions are among the earliest smelted-iron artifacts to occur in the New World.

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