A forensic petrological study of granite blocks from the Sambro Lighthouse

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The Sambro Island Lighthouse was built in 1758-60 and is the oldest operating lighthouse in North America. The lighthouse was the focus of a major restoration program by the Canadian Coast Guard in 1998. The lower part (13.1 m) of the lighthouse, representing the original construction, was built with granite blocks of uncertain origin. Several sources for these blocks have been postulated, including: ballast from a vessel from Massachusetts; one of the five granite quarries on early geological maps of the Halifax area; a quarry in the Duncan's Cove-Chebucto Head area; or possibly from Sambro Island itself. Another suggestion was that the granite blocks were salvaged from the fortress of Louisbourg after the defeat

of the French army; however, Louisbourg was constructed from sandstone and is not a possible source. In 1998, the authors began a forensic petrological study of the granite blocks to establish their origin with field assistance from the Nova Scotia Lighthouse Preservation Society.

Granitic rocks of the Halifax area were studied extensively in 1985, as part of a mapping project under the 1984-1989 Canada-Nova Scotia Mineral Development Agreement. Specifically, work included 1:10 000 scale geological mapping, whole-rock geochemical analysis, and mineral chemistry studies to establish compositional variations within the granitic rocks. The database generated during this study provides an excellent framework for forensic petrological work on the Sambro Lighthouse granite blocks.

Three chips were collected from separate granite blocks in the Sambro Lighthouse along with a large representative sample of granitic outcrop on the island and representative samples from coastal exposures between Sambro and Chebucto Head. Petrographic inspection and microprobe analysis of biotite grains from these samples were compared to data from the major granitic rock types of the Halifax Pluton. The petrographic work reveals that the Sambro Lighthouse granitic blocks show mineralogical features consistent with some granitic rocks of the Halifax Pluton. Consequently, these blocks: (1) are not considered to have originated as ship ballast from New England; (2) were not quarried from the biotite monzogranite on Sambro Island; (3) do not resemble fine- or coarse-grained leucomonzogranite of the Halifax Pluton and, therefore, did not originate from the Brookfield quarry on Terrence Bay; and (4) were probably quarried from either the Harrietsfield or Sandy Lake monzogranite units. The exact location of the quarry site has not yet been confirmed; however, the forensic petrology supports the documented quarry in the Chebucto Head area as a possible source for the Sambro Lighthouse granite.