

Ferryland Cross



*Arius3D digital model of the
Ferryland Cross*

It was in the fall of 1985, during a short season of excavation at the site of the 17th-century Colony of Avalon, located in Ferryland, Newfoundland, that the unusual iron object was found in the remains of a forge. It was shaped like a cross, but the details were completely obscured by a thick layer of corrosion that had incorporated the gravel and sand of the soil matrix. The director of the excavation, Dr. James A. Tuck of Memorial University of Newfoundland, kept the object wet and brought it to the Canadian Conservation Institute for evaluation.

Preliminary examination revealed that it was indeed a cross, with a complex structure involving at least three different metals: iron; a yellow metal with a bright surface; and a yellow metal with a dull surface. These were analysed by energy dispersive X-ray spectrometry, which confirmed the presence of iron and identified the bright yellow metal on the surface as gold and the dull yellow metal as brass. X-radiography indicated the extent of corrosion.

Treatment of such a complex object is typically extremely difficult and often never completely successful, which proved to be the case for this cross. Not only did it contain three metals, which could interact with each other, but it also contained chloride contamination from the saline soil in which it had been found, which would cause it to react with moisture and oxygen. Chloride ion extraction was attempted but was unsuccessful. Indeed, following its excavation in 1985, the cross underwent repeated examinations and a consolidation treatment in an attempt to stabilize its condition. Monitoring changes in the areas of active corrosion proved to be particularly problematic. Photography and radiography were used to document change, but it was difficult to collect accurate, mathematical measurements in the awkward, three-dimensional (3D) angles and curves.

Despite the best efforts of conservation science and practice, the cross continued to deteriorate. In 2003, when new cracks and breaks were observed, it was decided that the only way to prevent complete loss would be to isolate the cross from water and oxygen. Prior to enclosing it in a dry, anoxic environment, it would be copied as accurately as possible so that its existing state and condition could be captured. An accurate reproduction could also be used to fashion a custom-made support for the original pieces that would hold them together without adhesives. Avoiding the use of adhesives on the breaks was important not only because the breaks were very fragile and could be easily damaged,

but because they had exposed details of construction that would be of interest to future researchers. Keeping the breaks as pristine as possible, both to monitor change and facilitate examination by scholars, was one of the goals of this phase of the conservation treatment.

The first step in making a copy of the cross was to create a high-resolution 3D colour digital record using laser scanning technology. This 3D imaging technology was developed by the National Research Council of Canada and licensed to Arius3D of Mississauga, Ontario, for commercial application. The scanning system consists of a laser with a motion control system to move it. The cross was scanned at the 3D Imaging Centre of the Canadian Museum of Nature in Gatineau, Quebec, using the Arius3D system. Each of the four pieces of the cross was scanned separately, and the scans combined digitally to produce a master version. The 3D scan captured the cross in great detail and stands as a permanent electronic record.



Close-up view of Ferryland Cross

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