

UP, DOWN, INSIDE AND AROUND: ARCHAEOLOGY AND THE TEUSER PLACE LIME KILN

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Investigating a lime kiln using modern archaeological techniques is a task not to be undertaken lightly. As the title implies, the ins and outs of such an endeavor are more literal than figurative. A lime kiln is a complex three-dimensional structure, with an inside and an outside, a thing to be studied in the context of the surrounding landscape, and a structure whose history sometimes lies beneath the ground. It is in all respects a daunting task for the industrial archaeologist. Yet, it was this very type of investigation that was undertaken by a team of archaeologists from Wilfrid Laurier University whose mission it was to excavate, record, study and analyze data generated by the excavation. In a *Time Team* type of schedule the crew accomplished their task over a six day period in August of this year.

The lime kiln (Figure 1), situated on private property in Sandys Parish, was excavated at the request of Brian and Nancy Duperreault at the initiation of Dr. Edward Harris. The



Figure 1 Teuser Place lime kiln on Scroggins Bay, Sandys. Lime kiln charging stack on left and quarried area below.

overall objective of the investigation was to record the feature using modern archaeological techniques and to recover data that might provide dating information, history of use and specific functional details. The project represents the first archaeological excavation of such a structure in Bermuda according to Dr. Harris. As

with any heritage structure the current study is an important and even crucial step in the preservation of Bermuda's built landscape. Although the kiln is not threatened with imminent destruction due to development, as are so many of Bermuda's historical buildings which fall outside of heritage legislation, the structure is in imminent danger of collapse due to the ravages of time. For this reason alone an archaeological investigation represents the first step in the conservation and preservation of this industrial monument.

Presently, not enough is known of the lime-making industry, specifically the kilns themselves, in Bermuda during the 17th to 19th centuries. Past studies have been conducted by the Maritime Museum, for example, oral history on how the kilns functioned, together with research into quarrying and the techniques used for working different types of stone. However, when the archaeological remains of these structures are considered, there remains a great deal of work to be done. For example, the following questions might be addressed using an archaeological approach: an examination of changes in lime kiln technology through time should be carried out by comparing other lime kilns on the island from different periods; the geographic distribution of kilns on the island is a question that can best be answered using a combination of documentary sources – maps in particular – coupled with an archaeological survey; recording differences in structural design should be carried out as these may relate to traditional building techniques transmitted through generations which may be unique to cultural background and ethnicity. Attempting to answer these and many other questions will recapture a piece of Bermuda's industrial history for the benefit of scholars interested in the subject, and, most importantly, the community of heritage-minded people on the island.

The team of eight archaeologists engaged for the current project began work on August 12 in the typically Bermudian stifling hot and humid conditions to which Canadians are unaccustomed. Upon arrival photographs of the as-found state of the kiln were taken (Figure 2) and clearing of the area began immediately following the initial documentation. The local landscape is such that the lime kiln is set back about 15 metres from the shoreline on a raised terrace



Figure 2 Lime kiln prior to clearing for excavation. Unit A opposite the draw hole is visible on quarry face.



Figure 3 Lime kiln after excavation completed showing original surface of blackened bedrock opposite draw hole on bottom, quarry face, partially collapsed stack and charge hole at top.

(Figure 6). These vary in type and style and date to the late 19th to as late as the mid-20th century.

After initial documentation several activities were put into operation. An excavation unit was opened at the base of the draw hole, the purpose of which was to determine the depth of deposits in this area, the date of these deposits, and to expose any features that might be visible in the bedrock floor. As this was taking place, measured drawings showing the various interior and exterior surfaces of the kiln, elevations and plan views, were begun. Finally, a topographic and planometric map of the site was created using a total station laser transit, accurate to within a single millimeter.

Excavation revealed that the quarry floor adjacent to the cliff-face was covered in about one metre of debris consisting of domestic refuse such as container glass, ceramics, food bone, window glass, nails, smoking pipes and almost every other conceivable household or personal item, including bone-handled tooth brushes, and even a pair of spectacles! A

about 3 metres above sea level. The lower section of the kiln where the *draw hole* is still visible has been quarried out of the original stone outcrop (Figure 3). The tall *charging stack*, from where the limestone and fuel were dumped, is located above the quarry floor where it rises to a height of about five metres. The kiln is bee-hive shaped and only the upper two metres are visible above the vertical cliff face of the quarry. At the top of the hill behind the quarry, at the height of the *charging platform* (Figure 4), many stones have collapsed and these could be seen filling the inside of the kiln (Figure 5). The remaining stones around the *charging hole* are in imminent danger of collapse. Prior to arriving on site a collection of bottles had been excavated from a small pit in front of the draw hole

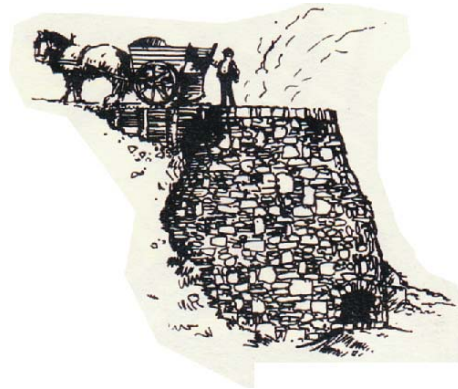


Figure 4 A similar lime kiln built adjacent to a hillside showing how the kiln was charged from the charging platform.



Figure 5 View inside kiln showing debris and collapse that has accumulated on the kiln floor to a depth of between 1 and 2 m.

preliminary analysis of the artifacts suggests that the bulk of items date from as early as the last quarter of the 18th century up to the mid-20th century. Manual excavation by natural layer also showed that the site has stratigraphic integrity; that is, the site has not been disturbed due to recent activity, and is instead an accumulation of sediment and layers from different time periods - the perfect

archaeological site.

The two upper layers clearly date to the late 19th and early 20th century. These are probably best described as a Edwardian-period dumps. Ceramics are ubiquitous within these layers and over 500 tableware sherds representing 291 individual vessels (plates, platters, saucers, teacups, serving dishes, chamber pots, etc.) were recovered. Although dating is based on the ceramics and container glass, a token commemorating the coronation of Edward VII and Queen Alexandra in 1902 (Figure 7) provides some



Figure 6 Sample of bottles collected from a small excavation directly in front of the draw hole prior to the excavation team's arrival.



Figure 7 A token (reverse and obverse) commemorating the coronation of Edward VII and Queen Alexandra 1902 found in the upper layer.

confirmation of when the layer was formed. A mid-19th century layer, sandwiched between the upper and lower layers contained printed ceramic earthenware common for the middle decades of the century. Artifacts found in the lowest layer include a creamware ceramic vessel (manufactured between 1760 and 1820), a wrought iron spike, smaller wrought iron nails, and two wrought copper nails.

At the bottom of the deposits the blackened bedrock surface in front of the draw hole may indicate the initial firing of the kiln. This would be in keeping with the way lime was burned in kilns of this type. After the initial firing, charcoal from the layers of fuel, presumably wood, which were interspersed inside the kiln itself between layers of material containing calcium



Figure 8 Recording the lime kiln from inside and out using the total station and tapes strung across the charge hole. The kiln floor is about 5 metres below the tapes.



Figure 9 The always present danger of collapse during the upper stack mapping necessitated Jonathan Haxell being tied off to a nearby tree while readings were taken with the total station.

carbonate (in the form of limestone, shells or coral), would have been raked from the kiln through the draw hole. When calcium carbonate is burnt at a temperature of 900°C, carbon dioxide is driven off and the calcium oxide is left ($\text{CaCO}_3 = \text{CaO} + \text{CO}_2$). This is known as *quick lime* due its violent reaction when mixed with water in a process known as slaking. The resulting product is calcium hydroxide (Ca(OH)_2) or *slaked lime*. The presence of a burnt bedrock floor in front of the kiln suggests that the charcoal and ash from the fuel would have been left behind and the cooked limestone would have been carted away to be slaked. After slaking, the quicklime was mixed with sand to produce *course stuff* for mortar or rendering coats for plasters.

**Teuser Place
Bermuda (Sandys)
Lime Kiln
Scroggins Bay**

Drawn by John Triggs
August 15, 2007

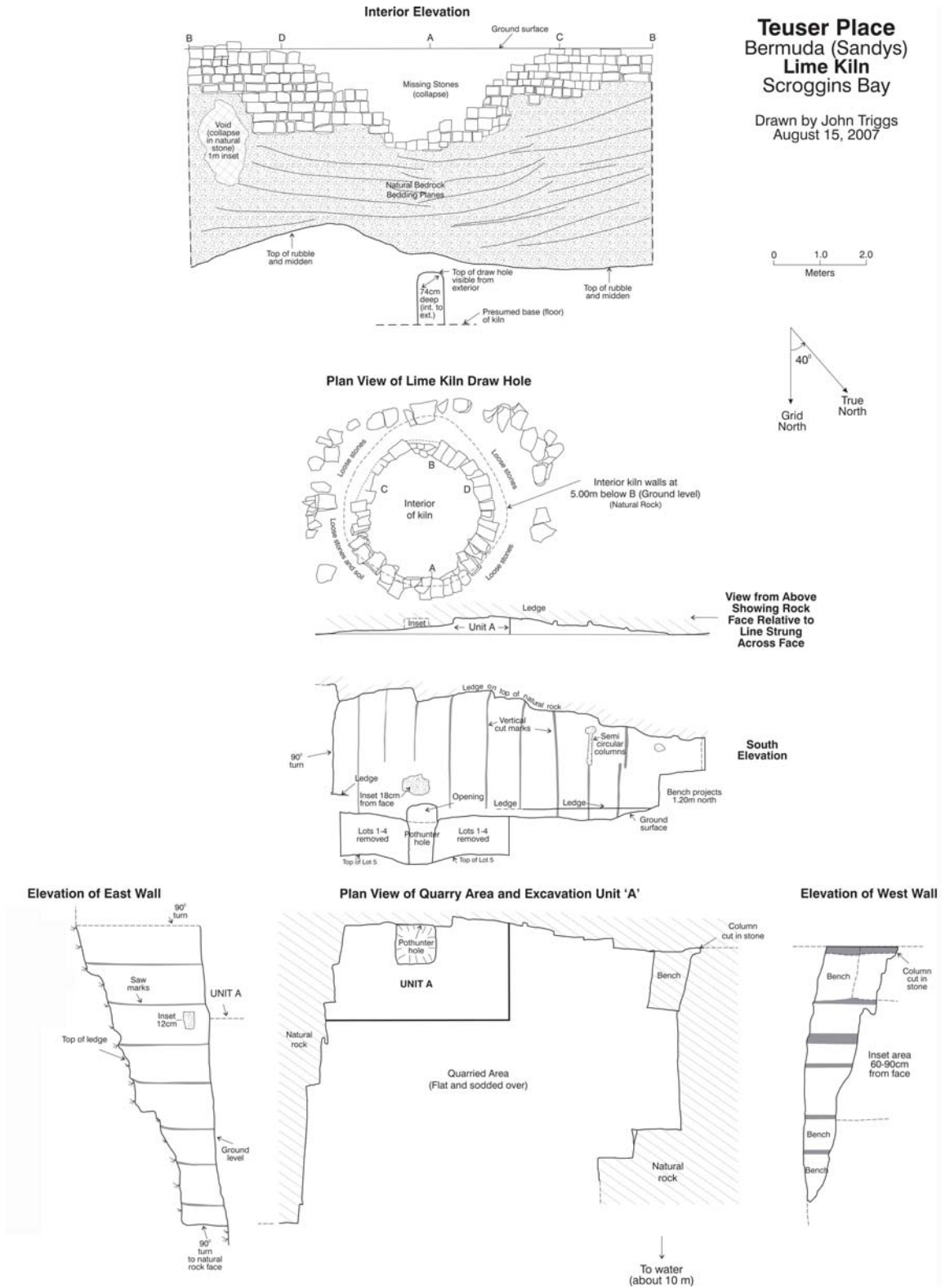


Figure 10 Completing measured drawings, plans and elevations, of the kiln and quarry below was part of the recording process. Finished drawing by Pamela Schaus.

In the final days of the exercise, recording of the lime kiln sometimes became a precarious undertaking as this involved getting close to the charge hole of the kiln – the hole into which the lime and fuel were dumped – which overhung the kiln interior as it ‘coned-up’ five metres above the floor. As if this wasn’t enough to frighten away all but the most intrepid – read foolhardy – archaeologists, the inside of the kiln was clearly undercut due to active and ongoing erosion. Recording inside the kiln, and surveying



Figure 11 An overlapping ‘photogrammetric’ image of the quarry face and kiln after clearing and completion of excavation of unit A.

around the upper surface, required the adoption of safety precautions such as having a ‘spotter’ and extension ladder within reach for inside work (Figure 8) and tying oneself to the nearest tree for the upper exterior work (Figure 9).

All of the work conducted over the six day period should be viewed as a necessary preliminary step towards the conservation of what may be a unique lime kiln constructed in the late 18th century and which still stands today as a monument to a now vanished industry. Documentation of the structure by measured drawings (Figure 10), photogrammetric (overlapping to reduce distortion) digital photography (Figure 11), and excavation using modern archaeological techniques ensures that the feature will be preserved on paper and digital format. The actual restoration or stabilization of the kiln represents the final stage in a conservation project. Before, and indeed if, this is done, however, further study of the kiln should involve additional archaeological excavation and the integration of the findings with documentary sources in order to determine the historical value and significance of the feature through comparative analysis. Although an enormous amount of work was accomplished in a short period of time our thirst for further knowledge of the kiln has not been slaked and we look forward to future work on this challenging and intriguing site.

Acknowledgements

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