

**The Cataract Lake Furnaces:
Historic Archaeology in Owen County, Indiana**

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Abstract

Two unusual structures, normally submerged beneath the waters of Cataract Lake in Owen County, Indiana, were reported to be "ancient Indian iron furnaces". Investigation was made possible when the waters of the lake were drained in an experimental fish control program. The furnaces were found to be lime kilns of a type discontinued in Indiana around 1878. A segment of rail recovered from the rubble of one kiln suggests they were in use after 1852, when the first railroad was constructed in Owen County.

Introduction

In the late fall of 1970 the authors heard reports that "two Indian iron furnaces" had been discovered on a point along the west shore of Cataract Lake. The structures, normally under 6 feet of water, were exposed when the lake was lowered to repair a boat ramp. With the assistance of Grafton Longden, an amateur archaeologist of Greencastle, Indiana, and the supervisory personnel of the lake, a preliminary examination suggested the furnaces were of historic origin. There was evidence of prehistoric Indian encampments within the area, but nothing suggested they were related to the furnaces. Two dome-shaped circular structures were observed, whose interior walls had been heated to a degree sufficient to glaze their clay lining. Eroded soil from an overhanging bank, and silt from the lake, covered all but the disturbed tops of the structures.

During the following year the senior author made necessary arrangements with federal and state agencies to excavate the two structures. An opportunity to do so came in the fall of 1971, when the Indiana Department of Natural Resources decided to drain the lake to remove rough fish.

Prior to excavation, there was considerable speculation about the furnaces. Some rumors suggested that prehistoric Indians had used them to extract silver from local sources. Unknown to the authors at the time, a virtually identical situation had been explored in Fayette County, Ohio. In a highly speculative report appearing in a popular publication, the Ohio structures were said to be "natural draft [iron] furnaces of a type invented by the Hittites before 2,000 B.C. . . . Such furnace mounds . . . [are] scattered all over the southern half of Ohio" (3). An 1837 geological survey (4) mentioned discovery of iron ore in the present Cataract Lake area and, indeed, some low grade ore was found near the furnace site. Iron was in short supply among the pioneers, and

since coal supplies are also near, it seemed possible that the two structures were the remains of early efforts to make iron. The belief by some that they were "ancient Indian iron furnaces" was less tenable, since there is no evidence that prehistoric Indians had ever produced or used smeltered iron.

Methods

Excavations that began on October 19, 1971, were continued intermittently, as time and crews from DePauw and Indiana State Universities were available. The weather and a rising lake terminated the field work some 5 weeks later. A permanent datum point was established on high ground, 380 feet N15°E of the northwest corner of the furnaces. Procedural plans anticipated systematically removing sedimentary and erosional fill, isolating and leaving the furnaces as intact as their condition would allow. However, the heavy, watersoaked and sticky clay proved most difficult to remove by standard field techniques. Rather than risk damage to the structures, the plans were altered to run test trenches through the surrounding fill, and the structures. Although the revised plan would provide only a sample view of the structures, it was believed that cross-sections to be seen in the test trench walls would serve to identify the necessary features of the structures.

Before snow and the rising waters of the lake stopped the field work, the mantle of fill over the upper third of the structures was removed. A 30-inch wide trench through the north structure was completed, along with a 48-inch trench into the east side of the south structure (Fig. 1). These trenches reached the original floor at a maximum of 6 feet and 5 inches below the original surface. Some features of the furnace structures were undoubtedly missed, due to incomplete excavation. However, they do remain largely intact, and the several feet of water and silting will preserve them into a distant future.

Results

From the beginning of the excavations the iron furnace theory began to look doubtful. A few random bits of iron ore were found, but there was no slag, and no indication that temperatures high enough to reduce ore had been reached. Within a week the iron furnace theory was abandoned. When fragments of heat-softened limestone, wood ash, and eventually a lime bearing stratum of rubble appeared near the north structure, it became obvious that the furnaces were lime kilns.

Archer, recording the history of Owen County, comments on the oölitic or white quarry limestone near Mill Creek, the major feeder stream for Cataract Lake. "This stone is overlaid with a shelly limestone which is easily burned and makes a very excellent lime" (1). Abundant outcroppings of the shelly limestone occur within a short hauling distance of the kilns. Fragments ranging from pea size to 60-pound slabs were found in and around the kilns, most showing some amount of heating.

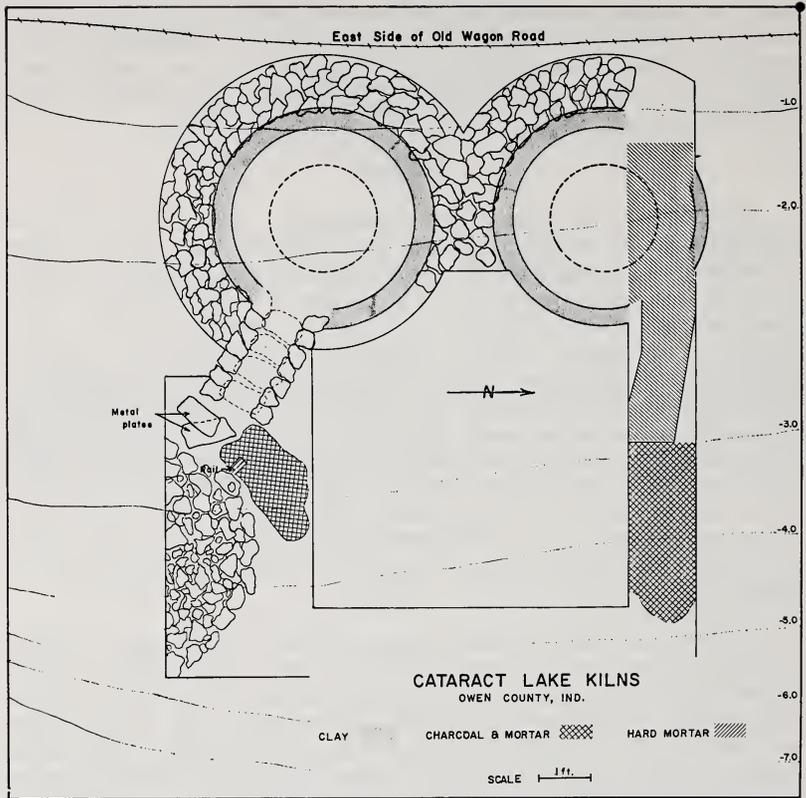


FIGURE 1. Map of surface area cleared from around the tops of the kilns, and of two trenches entering from the east side, dug to the original floor.

The kilns were nested in a bank over a small springfed stream, some 200 yards south of the original Mill Creek stream bed. In preparing for their construction, a vertical cut approximately 20 feet wide and 6 feet 5 inches deep, was removed from the bank. The two kilns were nested into the vertical wall, and the floor that extended some 15 feet into the bank. Walls of the kilns were constructed of local clay, and approached 6 inches in thickness around the middle of the 6-foot high structure. Reinforcing limestone slabs, daubed with clay, were placed around the lower two-thirds of the kilns. From the reinforced wall to the top, 3-4 inch clay walls sloped inward, leaving a 3-foot opening, in contrast to the base which measured 5 feet. The opening in the top served as the access for loading the kilns, and as a chimney in the firing of the load. Fragmented limestone was passed directly from a wagon into the top. These kilns, with their firing flues, must have looked much like the Eskimo igloo (Fig. 1).

Since the test trenches revealed cross-sections only of the kilns, some questions remain about the methods of firing and removal of lime.

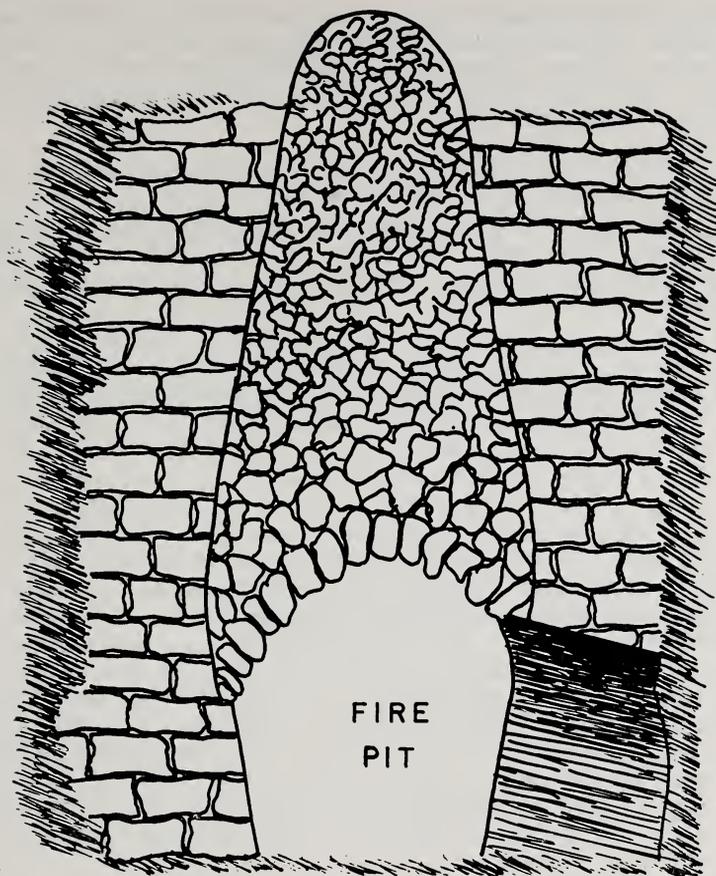


FIGURE 2. A brick-lined temporary lime kiln, of the type commonly used before the 1860's, charged for firing.

The trenches entered the sides of the kilns at different points, and thus revealed different features. A limestone flue, with inside measurements of 19 inches wide, 44 inches high, and 51 inches long was revealed by the trench into the south kiln (Fig. 1). The flue, which extended in a southeast direction from the kiln wall, sloped inward to a 15-inch top, originally capped with limestone slabs. A hard mortar floor in the flue was covered with a layer of loose ashes and lime. The mortar floor continued into the kiln, as did loose lime, but there was very little ash and charcoal in the kiln proper. This suggests that the firing was largely restricted to the flue area, with the heat being drawn into and through the limestone loading.

The trench into the other kiln failed to uncover its firing flue. It did, however, trace a trough of hard mortar to an 8-inch opening in the base of the kiln wall. There was little evidence of charcoal or ash in the 15 to 18-inch wide trough. The trough appears to have been constructed

to remove lime, perhaps to avoid a mixture with ash that would occur around the entrance of the firing flue. Assuming that the two kilns were of similar structure, the firing flue should have entered the north kiln within 2 or 3 feet of the trough. We are, however, without conclusive evidence of the north kiln flue.

In 1903, W. S. Blatchley, Indiana State Geologist, wrote (2) that kilns of somewhat similar structure were among the first to be used in Indiana (Fig. 2). The Cataract Lake kilns differ in that they were constructed of clay walls, used a flue for firing, and probably used a separate lime removal trough. Blatchley described the process of making lime as follows:

These cheaper, temporary or "ground hog" kilns were rudely constructed . . . and were located on the side of a hill, so that the top was easily accessible for charging the kiln with stone, and the bottom for supplying fuel and drawing out the lime. In charging, the largest pieces of limestone were selected first and formed into a rough, dome-like arch with large open joints springing from the bottom of the kiln to a height of five or six feet. Above this arch the kiln was filled with fragments of limestone from the top. . . . A fire of wood was then started under the dome, the heat being raised gradually to the required degree in order to prevent a sudden expansion and consequent rupture of the stone forming the dome. . . . After a bright heat was once reached through the mass of stone, it was maintained for three or four days to the end of the burning. . . . The fire was then allowed to die out and the lime was gradually removed from the bottom. It was in this manner that all the lime used in Indiana for many years was burned. . . . Possibly but one or two kilns were necessary to supply a neighborhood for a year. These were burned in a week or two when required, the kiln remaining idle for the remainder of the time.

Normally, lime kilns in central Indiana are somewhat less than newsworthy. However, the extremely crude nature of Cataract kilns deserves recording. They also suggested a pioneer industry of significant historical interest. Questioning of some of the older local people in the area led to the belief that the kilns must date to the Civil War, or before. No local knowledge was found of the structures; residents of the area were puzzled and curious, and county records failed to reveal additional information.

Although specific historical details of the kilns are elusive, Blatchley reported that the so-called "ground-hog" kilns were for the most part abandoned by 1878 (1). In the process of excavating the rubble near the opening of the south kiln flue, two pieces of cast iron plate and a section of light-gauge rail was retrieved. These pieces were most likely used as supports or draft controls in the flue. Thirty-six years after the first pioneers came to Owen County, an extension of the New Albany and Salem Railroad was constructed in 1852 (1). The short section of rail has not been tied specifically to these first tracks, but it is reasonable to believe that these kilns do not pre-date the first

railroad in the county. It seems likely then that the Cataract Lake lime kilns were in use sometime between 1852 and 1878, when Blatchley reported most of these type kilns had been abandoned.

Literature Cited

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