

WHAT LIES BENEATH THE FURNACE

BY SUSANNA KUO © 2008

For four weeks this fall visitors to George Rogers Park had a chance to observe an archaeological excavation at the Oswego Furnace. The unusual activity provoked many questions about bones, arrowheads and buried treasure.

The primary goal of the investigation was not to collect artifacts but to explore the foundation of the furnace. This was the first step in the project to preserve the iron furnace, the only one of its kind still standing on the West Coast. The project engineer, Tom Fowler of Miller Consulting, needed to examine the foundation before completing the stabilization plan. A three-person team from Heritage Research Associates of Eugene, led by Senior Archaeologist Rick Minor, conducted the excavation.

Two long trenches were dug through the east and south arches of the furnace. At its deepest point outside the east arch, the excavation went twelve feet underground and required a backhoe for the final seven feet.

The process of screening the excavated soil prompted some to ask if the archaeologists were looking for gold. But iron was the metal of interest at this site. The soil around the furnace is so full of it that a magnet laid on the ground will immediately be covered with clinging particles like iron filings.

ARCHAEOLOGY IN THE PARK

Among those who visited the park specifically to observe the work were two history classes from Lewis and Clark College. Because excavation inevitably destroys a site, archaeologists painstakingly map and record every layer as they dig down through time. Differences in soil strata are recorded for what they tell about the past. Artifacts are bagged and labeled as to their location. Over the coming months these items will be analyzed in a lab and many of them will eventually go to the Oregon state archive.

Fieldwork can be hot and dusty or cold and muddy. Fortunately the weather gods smiled and conditions during this project were ideal. But the site presented hazards from diseases carried in bird droppings. So the archaeologists wore respirators while they were working inside the furnace, which was littered with owl pellets and tiny rodent bones.

The top layers of soil contained the usual remnants of twentieth century culture, broken beer and pop bottles. There



Bob Wenger of Heritage Research Associates works on the trench running through the east arch of the Oswego Furnace.

was also evidence of landscaping work done in the 1950s: broken terra cotta flowerpots and torn paper bags that may have held cement mix for a former reflecting pool. Deeper down, square nails, crockery, and pieces of nineteenth century window glass began to appear. The most frequent materials encountered were slag, iron dribbles called 'spew', basalt fragments left over from stack construction, and firebricks from the furnace lining. Most of these bricks were imported from England and Scotland and are stamped with the manufacturer's name.

The most interesting discoveries involved the structure of the furnace itself. Iron furnaces had to support tremendous weight so their foundations were laid on bedrock. A furnace was a complex piece of equipment with a water-cooling system as well as massive cast iron pipes for delivering the hot blast. The nozzles that injected air into the furnace had to be cooled by constantly circulating water in a hollow jacket to prevent them

MYSTERY FEATURE

Of all the features uncovered during the excavation the most intriguing are two channels running across the top of the foundation and disappearing under the hearth. The current thinking is that they have something to do with the water cooling/ drainage system. Both channels slope downhill toward the center of the furnace. Their crudely made brick walls and stone floors are not watertight. Both are capped with rough plates of cast iron.

In a previous excavation in the summer of 2005, part of the channel running into the south arch was uncovered. One of the cast iron plates was lifted to see what was inside.

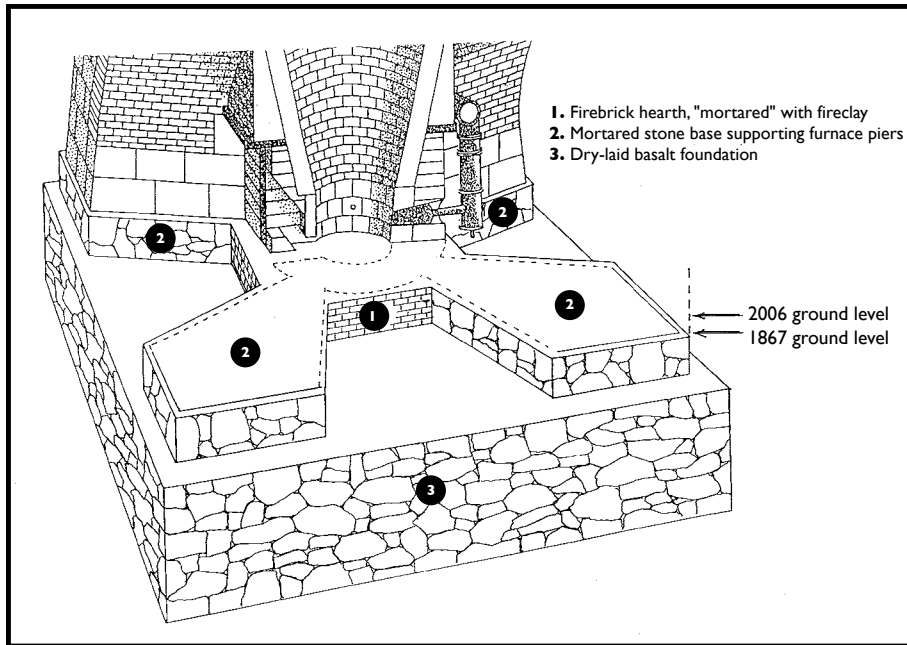


Diagram of iron furnace foundation

from melting. The archaeologists looked for evidence of all these features as they worked. Here's what they found.

TWELVE FEET UNDER

Instead of one monolithic structure, the foundation appears to consist of three distinct parts. At the bottom resting on bedrock is a rough platform of dry-laid stone approximately 35 feet square and seven or eight feet tall. On top of this are four individual foundations that support the four corners of the furnace. These smaller platforms are about thirty inches high and their stonework is grouted.

Sitting in the center is the furnace hearth. The firebricks of the hearth are held together with red fireclay rather than mortar. The clay in the lower part of the hearth is still moist and pliable. But higher up, it has been baked hard by the furnace.

Firebrick is practically the only material that can withstand the corrosive action of molten iron and slag. But even firebrick eventually succumbs to the penetrating power of iron as the remains of the crucible show. Molten iron inevitably wormed its way into the brickwork of the hearth as well. When the buildup of solidified iron threatened to block the tap hole, it had to be removed. This mass of iron is known as a 'salamander;' two are on display in the park. The foundation was designed so that the hearth stood on top of the lower platform making it easy for furnace workers to dig out the dirt floor inside the arches to remove a salamander and rebuild the hearth.

Nothing but clean sand filled the interior. Unfortunately, it was not possible to open the channels discovered this fall because the covers were partially buried under the wall of the trench. So the question of whether they contain water pipes or have some other function will have to await future investigation.

In spite of the unanswered questions, this excavation was one of the most extensive explorations of a furnace foundation on record. The information gained will benefit our restoration project as well as anyone else interested in the design of historic iron furnaces.



Tom Fowler of Miller Engineering inspects the east side of the foundation from the safety of a shoring box.