

ARCHAEOLOGY WRAP-UP 2019

by

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This year's final phase of archaeology on Lansdowne Iron Works was aimed at investigating an area on the east bank of the river, where we had been prevented from digging previously by large pieces of machinery from the 1881 brick flour mill. We began site preparations in early August. In the first week of August I built a new gangplank over the washout, which has grown since our first attempt here. A tall section of the stone mill foundation had developed a pronounced lean to the south, over the site where the pits were proposed. In the second week, with the help of Zane Kelman and Michael Whittaker, we rigged a system of planks and ropes anchored to a tree on the north side of the foundation, to hold tension against any movement of the wall. Then in the third week we took advantage of the services of a boom truck from G. C. Hudson Supply in Brockville (solicited by Dave Johnson) to bring the old machines up to the level of Ormond St. This required extracting the machines from the rubble, where they were entangled in masses of tree roots up to three inches thick. Jack Harvey, Dave Johnson and myself moved tons of brick and stone rubble and chopped roots and shoveled soil to free them. The lowest one was badly broken by the others falling on it, and in the end we removed it by further breaking and cutting it to pieces.

Archaeology began on August 26<sup>th</sup>. Despite our previous efforts, staff from Past Recovery Archaeological Services (PRAS) and volunteers had to penetrate another 4 feet of brick rubble to reach the pre-1967 grade. The main pit (#1) was marked out at 2 x 3 meters on the slope down to the water. A second pit (#2) 1 x 2 meters was located outside the mill foundation, corresponding to the location of a cross wall inside the foundation. This was to establish whether the cross wall continued through the mill wall, which would prove it to be part of a structure predating the mill. A third pit of 1 x 2 meters was dug inside the foundation to expose both sides of the curious cross wall.



**Top photo by Jack Harvey shows the boom truck from G C Hudson Supply that removed the machines where we needed to dig. Lower photo by Michael Whittaker shows one of the reels from a flour bolter being hoisted effortlessly to high ground by the boom truck. Note the braces to stabilize the foundation wall.**



**Under 4' of brick rubble in Pit #1, these huge pieces of quarried granite were found on top of the smelter residue.**

Pit #1 produced large amounts of slag and smelter by-products, some of which were highly magnetic still, indicating that the smelting process was unable to completely refine the ore. Some of the slag was shiny black or blue, indicating it formed at a higher temperature than what we found on the west side last year. The residue and waste from the smelting operation would have been strewn around the blast furnace while it was in operation, so it's presence is thought to indicate an area that was outside the actual furnace structure. In the next pit, higher up the slope, there was no residue, probably indicating that that area was within the furnace structure. The waste deposit was overlaid with the granite boulders that are everywhere, the same ones that prevented us from getting down to undisturbed soil in 2017. They were obviously deposited after the furnace by-products were deposited, but before the mill was built in 1881. Could they be the stone that the furnace was made of, deposited as the structure deteriorated? That would seem a logical explanation, except that the bear that we extracted in 2017 had sandstone embedded in one side, which we concluded was the material from which the furnace was made, or at least the firebox of the furnace. Also, why is the granite strewn all the way across the river, upstream half way to the dam, and on the west side of the river as well?



**This layer of ash near the lower edge of Pit #1 is believed to be from the fire that consumed the casting house in 1811.**



**This charred timber nearby could be further evidence of the fire from 1811. Note the yellow sand layer which was assumed to be undisturbed soil where digging was discontinued.**

On September 4<sup>th</sup>, the last day of the dig, as recording was winding up and backfilling was under way, we extended the upper edge of Pit #1 to investigate what appeared to be a stone set in mortar. We had found mortar in large chunks mixed with the soil in this area, but nothing “in situ”. If it is a clue, its interpretation is as baffling as every other aspect of the site. The stone sits at a steep angle from horizontal and seems to lean against a shovel full of mortar. There is nothing that resembles masonry that could be built upon, but then again, there are no “masonry units” anywhere on the site, only irregular blocks of quarried granite bedrock that are hard to imagine as parts of a structure. Could the walls of the furnace have been granite, and the interior sandstone, where the shape of the interior cavity would have required masonry units regular enough to form the compound curves of the interior cavity and firebox?



**In the upper edge of Pit #1, this piece of granite appears to be bedded in a mass of mortar. Could this be how they stabilized the massive and irregular granite blocks to form the furnace structure, rather than cutting the stone into regularly shaped masonry units?**

Pit #2 was positioned outside the mill foundation but corresponding to the location of a retaining wall inside the foundation, which was founded on granite but built up in sandstone to the height required. We hoped to prove that it was the remains of a wall structure from before the mill was built, in which case it might continue outside the foundation. Old photos showed that the grade when the mill was built, was close to the sill of the door opening in the foundation, which is intact. At the level of the door sill, we found granite blocks that were used as stepping stones for access to the door. They were much spattered with tar that had dripped from the roof during waterproofing of the sheet-iron batten roof. The granite was proven to continue on the outside of the foundation, but there was no identifiable wall structure. The lower end of

Pit #2 was only a meter from the upper end of Pit #1, but there was no slag or smelter byproduct in Pit #2, indicating that it may have been inside the perimeter of the furnace structure.



**Pit #2 revealed stones that had been exposed to foot traffic (and roof tar) after the mill was built, and layers of granite below that extended under the mill wall, but did not exhibit signs of a wall structure. Photo by Jack Harvey**



**Pit #3 inside the foundation, followed the retaining wall which was seen in 2017. The retaining wall was founded on granite blocks and built up with sandstone. Here again, the granite blocks in the floor of the pit extended under the mill wall, but did not show any organized placement.**

Very low water this year afforded an opportunity to investigate the stream bed and observe magnetic slag from the ironworks period as well as bits of machinery from the subsequent mills. The door from the mill safe was exposed and salvaged, and team members enjoyed their lunch seated on boulders in the stream, usually surrounded by water. It also gave a rare opportunity to photograph the entrance to an early flume on the west side near the dam, which probably served the saw mill there that burned in 1897.





**Lunch time, low water.**



**This pre-1897 flume on the west side, usually under water, is almost filled with silt.**

Except for large quantities of smelter waste, no artifacts from the iron works period were found. Nineteenth century litter, and remnants from the 1881 mill, constituted the bulk of the material sent to the lab. Fragments of china figurines and clay pipes were the “exciting” finds, except for a lone flake of chert produced by an indigenous knapper long before the iron works.



Feather-edged china, a broken china figurine, bones, glass, nails, and black glassy slag were typical of the material sent to the lab in 2019.

## In Retrospect

We had assumed that the blast furnace looked like all the precedents that have survived in the United States, in other words solid stone structures built of cut masonry units laid in mortar. The fact that these structures survived, and Sunderlin’s did not, is probably evidence that the furnace here was not built that way.

Not only did the furnace not survive the ravages of the two centuries since it was built, it was already gone by 1818. In November that year, Peter Howard wrote: “... *this is to certify that the situation where the ironworks and furnace was erected on what was called the Great Falls of the Gananoque under the firm of Sunderland and company, is now destitute of any works of any kind on it, the forge being consumed by*

*fire upwards of seven years ago, the furnace all fallen down and rendered useless entirely...”*

In March 1815, William Jones made the comment, in reply to an inquiry regarding the feasibility of reopening the iron works, that “...*but for the want of property (capital) and proper management the said works was not sufficiently built...*”

Why did the burning of the surrounding buildings affect the stone blast furnace to the extent that it was “all fallen down” only seven years later, and in what way was the hasty construction a factor? The following is my hypothesis, and it is nothing more than a hypothesis, but without conflicting with what is written, it explains a few things that were not written, and a few things that were observed during our investigation.

What if the furnace was held in shape in some way by timber that was burned in the fire, resulting in it's collapse? It could have been as simple as a log crib of the dimensions given (22 feet square), with a sandstone fire box, combustion chamber and chimney in the center, 26 feet tall, surrounded by random blocks of granite that were tumbled into the crib, with or without mortar to fill the gaps.

The short time it took to erect the furnace is almost as surprising as the short time it took to fall down. Sunderlin was given permission to start work on September 13<sup>th</sup>, 1800, and by May 15, 1801, after he himself had been in Vermont much of the winter, his men had built a saw mill, a bridge over the river, “a furnace stack and arches of stone” 22 feet square and 26 feet high, a frame bellows house 50 x 18 feet and a casting house 50 x 30 feet. Those are huge accomplishments considering that the stone for the furnace had to be quarried and cut, and that 5 of those 8 months would have been too cold to lay masonry. A stone-filled wooden crib, on the other hand, could have saved much precious time, and its construction could have proceeded in colder weather.

It is hard to visualize how the slag tap and the iron tap could have functioned through a log wall, and a crib would not fit the description “arches of stone”, so there must have been an arch occupying at least the lower portion of the south façade to facilitate those functions, and conform to the description.

The upper end of Pit #1, where we saw the stone laid in mortar, is our best guess for the location of the west wall of the furnace. If that is the case, the east wall (22' away) is under the embankment (eight to ten feet of overburden) which we were not equipped to penetrate. The south wall may have been very close to the same stone laid in mortar, in which case the center of the structure, where the firebox would have been located, was inside the 1881 foundation and very close to the east wall thereof, which at this time is too unstable to dig around, and would have to be removed to investigate further.

In conclusion, over the three years we made several important discoveries. We recovered the “bear”; the 350 kilo block of melted iron, ore, flux and charcoal that remained in the firebox after the furnace cooled. Sandstone, adhered to the side of the bear, reveals what the firebox was made of, and further study of the pattern in which the liquified iron and remaining ore are stratified in the bear, may yet lead to theories of why the furnace did not perform according to expectations. We recovered many different kinds of slag from the furnace, which may also yield clues about the temperatures produced and the composition of the ore and flux. We proved that iron was smelted on the west side of the river, and recovered many more examples of slag and waste with the potential to reveal the same information about the process that took place there. We expect that the evidence is sufficient to convince Parks Canada to enlarge the boundaries of the designated historic place. We found evidence that the furnace was farther up the hill from the water than previously thought, and that it was not built by conventional masonry practice, but consisted of randomly broken quarried slabs rather than cut masonry units. We may also have proven that the main objective of our quest, the stone footprint of the furnace foundation, no longer exists.

If anything survives, it is deep under the overburden east of our pits, and requires heavy excavation equipment, and demolition of parts of the south and east walls of the 1881 mill foundation, for which we had neither the financial resources nor the owner’s permission. That will be left to the next generation of archaeologists, hopefully with financial help from Parks Canada, whose decision to enlarge the limits of the National Historic Site is still anticipated.

Thank you to the public for your support, and congratulations to everyone who took part in this awareness raising, community building endeavor over the past three years, from the volunteers who worked in the pits and in the lab, to those who generously donated to the costs. Over three years, your donations totaled \$39,511. Special thanks to John Sideris and Ruth Howard for permission to work on their property, for providing their Outdoor Education Center to house our lab, for the use of their garage for equipment storage, for coolers full of ice water, assistance with application for permits, and exceptional cooperation in every way. Thanks also goes to Jeff Earl and his professional crew from Past Recovery Archaeological Services, and Marian Clark who supervised the lab. PRAS will deliver the full report of their findings in 2020. Thanks to staff and successive councils of Leeds & 1000 Islands Township for their support and permission to work on their land, especially deputy treasurer Jackie Jonkman for being the “banker”. The balance remaining when all the bills are paid is expected to be about \$1,500, which we plan to hold in reserve to contribute to a future interpretive exhibit in Furnace Fall Park. Files and news clippings will eventually be deposited in the Township Archives.