Structure Sixteen of the Longdale Mining Complex
Alleghany, Virginia

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Longdale Mining Complex has been the site of the Washington and Lee Archaeology Department's Early Industries Archaeological Project. The project has consisted of the excavations of two structures identified as structure sixteen and structure nineteen.

The Longdale Mining Complex is located approximately twenty-two miles west of Lexington, in Alleghany County, Virginia. Iron was mined from this area from the Nineteenth into the early part of the Twentieth Century. The industry in western Virginia began with the construction and operation of the Lucy Selina furnace by John Irvine and Colonel John Jordan, an illustrious citizen of Lexington. The iron ore was mined from veins in the surrounding mountains.¹

In 1870, William Firmstone, the inventor of the hot blast furnace, purchased the Lucy Selina as well as 22,000 other acres in Alleghany County. Firmstone established the Longdale Mining Company in 1871 and made many changes to Lucy Selina. His first change, upon renovating Lucy, was to change it from a cold to a hot blast furnace.² His next change, in May of 1874, was exchanging coke (bituminous coal) for charcoal as the fuel of the furnace. This was a first for Virginia. With the vanguard use of coke, the Longdale Mining Company went on to make Alleghany

¹ Upchurch, Thomas C. Two Ironmaster Families in Alleghany County, Virginia: A Study of the Jordan's Lucy Selina, and Australia Furnaces and the Firmstone's Longdale Furnaces. (Virginia: Washington and Lee University), pg.2.

² Upchurch, pg. 9.
County the top iron producing county in the state.\(^3\) Although Alleghany County had the lead in Virginia, it was unable to compete with the larger iron industries in the North. This led to the end of the Longdale Mining Company and the eventual abandonment of structures sixteen and nineteen.\(^4\)

The research goals of Washington and Lee's Early Industries Project stated in the preliminary assessment by Kurt C. Russ and John M. McDaniel include, "establishing the chronological affiliation and function of individual structures...".\(^5\)

Throughout the past six weeks of excavations at the site of structures sixteen and nineteen, structure nineteen has been identified as having a domestic function. On the other hand, the function of structure sixteen has been puzzling to all those involved in the project. The purpose of this project is to make an attempt to expand upon the theory that structure sixteen may have functioned as a blacksmith's shop serving the surrounding domestic sites.

This project will be assembled in four sections. The first section will consist of background information on the blacksmith trade at the time the shop would have been functional; the mid-

\(^{\text{19}}\text{t}^{\text{h}}\text{ to the early }\text{20th}\text{ centuries. Besides the}

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\(^3\) Upchurch, p. 10.

\(^4\) Upchurch, p. 14.

blacksmith's role in the community this first section will also discuss the tools used and the articles made. In the next section this project will examine two other blacksmith shops that were operational during the Nineteenth Century. The first shop to be examined will be the blacksmith shop of Cyrus McCormick. This is the very shop in which the famous McCormick Reaper was built in 1831. This shop has been preserved by the McCormick Historical Society. The second shop examined, however, is not preserved. It is left over from the Low Moor Iron Company which operated in Low Moor, Virginia at approximately the same time as Firmstone's Longdale Company. The third section of this project will consist of analysis of the artifacts that have been unearthed at structure sixteen. This section will draw some comparisons between what was found and what types of artifacts, according to the literature, would have been present at a functional shop. It will also attempt to interpret some of the more "interesting" finds. Finally, in the last section, this project will examine structure sixteen itself and, using the evidence obtained in the other three sections, attempt to reach a concrete answer to the intriguing function of structure sixteen.

The Blacksmith's Trade

(Nineteenth to early Twentieth Century)

In the Nineteenth Century the blacksmith was an integral

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part of the community. In an iron society, the blacksmith was considered the "cornerstone of civilization depended upon for the making of tools and machines". Although this quote may sound biased, it is. (The author makes blacksmithing his hobby.) None the less, if one was to sit back and think for a moment - what would Americans have done without the blacksmith? What tools would they have used? If they happened to have iron tools, who would repair them when they broke? The blacksmith's function was to provide the "tools of civilization and war". Besides the obvious need for tools for building, the blacksmith was also vital to transportation. It was he who fitted the wagon tires, shoed the horses, made all the iron parts for horse-drawn carriages and buggies. The blacksmith also served a domestic purpose with the making of articles involved in the cooking process such as, spoons, ladles, and spits for roasting. He also made equipment for the fireplace like pokers, tongs, iron bars and "S" hooks for the convenient hanging of utensils.

The image of a large, powerful man, with a soot coated face hammering away on a piece of glowing iron is what comes to most peoples minds when they think of a blacksmith. Yet, surprisingly, the blacksmith was not all brawn, he also had brains. Since all iron does not have the same quality the

9 Bealer pg. 21.
blacksmith had to use his brains in order to figure out the correct heating temperature for the type of iron he was using.\textsuperscript{10} Sometimes the blacksmith became an inventor in order to create a tool to perform a special purpose that was not possible before. This sometimes also involved the inventing of new tools in order to make the new item.\textsuperscript{11} It was the combination of both brain and brawn that made a successful blacksmith and earned him a respected and vital position in the community.

The tools of the blacksmith were as important as pen and paper to a writer. They allowed him to create, and without them he could do nothing. Lee Tippett, a blacksmith, in discussing the value of tools, said:

\begin{quote}
My father took care of his tools. He never threw them down in the dirt, or on a rock. They're scarce. My daddy'd give me a going over if I threwed a tool down in the dirt or rock. And I'm glad he did. You have to respect tools. Good sharp tools are the name of the game.\textsuperscript{12}
\end{quote}

Of all the tools found in a blacksmith's shop the anvil is the most important. It was placed on a wood block or a couple of feet into the ground. The heated iron is placed on the anvil and "drawn out, punched, bent, or cut" with an interesting variety of tools.\textsuperscript{13} The anvil was normally close to the forge so that when working with articles little heat was lost in transporting the

\begin{thebibliography}{99}

\bibitem{Bealer23} Bealer, pg. 23.

\bibitem{Bealer12} Bealer, pg. 12.


\bibitem{Wigginton1150} Wigginton, pg. 1150.
\end{thebibliography}
iron from the forge to the anvil. In the case of larger articles the anvil can be moved further away because the larger item holds heat longer and the blacksmith would also have more room to work with it. Some other general categories of tools include cleavers to cut the iron, hammers to bend and "draw out" the iron, chisels, tongs to hold the item, and punches to make holes in the heated iron. Besides the hand-held tools there is also the forge where the iron was heated. It was made of either brick or stone. The bellows were responsible for blowing air into the forge to keep it hot. The tuyere was the air pipe that connected the bellows to the forge. There was also the slack tub which was simply a tub of water in which the hot iron was cooled so it could be tempered. The following sketch is of a forge used around 1909.

14 Bealer, pg. 70.
15 Wigginton, pg. 115.
16 Bealer, pg. 47.
17 Wigginton, pg. 109.
The trade of the once vital blacksmith has become all but extinct. Most blacksmiths now just light their forge as a hobby.¹⁶ The trade, once the cornerstone of the community has become little more than a tourist attraction. The blacksmith helped civilization advance yet in doing so he left himself out. The following epitaph to David Davis, a blacksmith, also describes the death of a once respected trade:

My sledge and hammer lay reclined,
My bellows, too, have lost their wind,
My fires extinct, my forge decayed,
And in the dust my vice is laid;
My coal is spent, my iron gone,
My nails are driven - my work is done.

From Godey's Magazine and Lady's Book, April 1954⁺⁺

The Blacksmith Shops

In attempting to identify the function of structure sixteen numerous books were searched to learn about the actual physical structure of the blacksmith's shop, and to see how it correlates to the ruins of structure sixteen. Besides the books, there were two blacksmith shops still standing that were believed to function at the same time the Longdale complex was in operation. These were examined in person, mapped, and photographed.

Just as nowadays, for example, there are certain

¹⁶ Bealer, pg. 1.

requirements for a successful mechanic's garage. It must have hydraulic lifts, large doors, and a plethora of tools. There were also requirements for a successful blacksmith shop. As in any workshop, the blacksmith must have adequate light. He also needed a large enough shop for adequate working room, tools, raw materials, as well as finished items. If everything was crowded together the blacksmith would not have ample room to work. The blacksmith shop also had to have a fireproof floor such as dirt. The shop needed work tables to neatly store the blacksmith's array of tools as well as to hold finished items or those in need of repair. The most obvious requirement of the blacksmith shop was the forge. The diagram on the next page shows the general layout of a country blacksmith shop that may have been similar to the layout of a shop at structure sixteen.

Of the two blacksmith shops still standing the first one examined belonged to Cyrus McCormick and was the very shop in which the illustrious McCormick Reaper was conceived in 1831. Although the shop was built approximately forty years earlier in the 1790's by Cyrus' father, Robert McCormick, it was still functioning in 1831. The shop continued in operation in its original form until it caught fire in 1846.
punches, a horseshoe, and a pair of tongs. The slack tub, the bottom half of a barrel, is situated just to the right of the anvil for cooling the iron. There are two workbenches in the shop which are laden with assorted tools and iron articles. With the inclusion of the packed dirt floor, this shop has all the requirements of a successful shop mentioned earlier. It has good lighting, ample room, a fireproof floor, workbenches for tools, and the forges and their bellows.

The second blacksmith shop that was examined was located in Low Moor, Virginia in the backyard of Mr. Bobby Potter. It was involved with the Low Moor Iron Company whose first furnace was built in 1873, just after the Longdale Mining Company was chartered by William Firmstone. The blacksmith shop was probably built at about this time in order to assist the mining process or simply to service the workers who lived in the houses nearby.

Low Moor was an ideal location for an iron industry. Ore was transported from nearby Rich Patch mines by railroad. The rails ran parallel to Mr. Potter's property and their remains can still be found beneath the underbrush across from his home. Another advantage to the location of Low Moor was that there was a limestone quarry conveniently located just one-half of a mile

\[\text{Morton, G.F. Centennial History of Alleghany County, Virginia. (Dayton: J.K. Ruebush Company, 1923), pg. 71.}\]

\[\text{Discussion with Mr. Bobby Potter of Low Moor, Virginia May 25, 1993.}\]
Photographs of Cyrus McCormick's Blacksmith Shop

May 19, 1993
away. Coke was also easy to obtain from nearby West Virginia. 27 The remains of the coke ovens have been made a historical landmark. At one time the Low Moor Iron Company's furnace was producing seventy-five tons a day. The iron was used around the world such as, Egypt and England.26 However, like the Longdale company, Low Moor iron could not compete with the industry up North and its furnace was shut down for good in 1926; the last in the South.29

According to discussions with Mr. Potter, local lore has it that the blacksmith shop was used by the iron company to make repairs on their rail cars. Next to the blacksmith shop there is a larger structure that has a pulley system on the roof as well as large wheels one which belts were run. These were probably used to make repairs on the carts easier. The railroad tracks used to lead right up to the back door of the structure from the opposing mine shaft on the other side of the creek.30 The blacksmith shop has two large double doors on the side facing this neighboring structure which were probably used to bring the cars into the shop for needed repairs.

The shop itself is twenty feet and four inches in length and


29 Corron, pg. 8.

sixteen feet in width. An interesting feature to this shop was its ventilation system. Besides the chimney of the forge, the top of the roof was raised approximately a foot and a half to allow the smoke created in the shaping and cooling process to exit through the roof. As was mentioned earlier, this shop has not been preserved. Mr. Potter, with his interest in the history of his own property, has done his best to make some needed repairs to the roof. Still, the interior of the shop is bare, save the forge. There is one wooden table along the Northwest wall, but it is impossible to determine if it was used in the shop or served a much later secondary purpose. Two artifacts were found hanging inside the shop on square headed nails. One was a washer, hanging on the forge, that was identical in appearance and diameter to two washers found at structure sixteen. The second artifact resembles an actual tool. It can be seen in the photographs on page seventeen. It is called a traveller and was used by the blacksmith for measuring the circumference of a tire. Coupled with discussion with Mr. Potter about the suspected function of his property this tool was most likely used in servicing the rail cars. However, since the shop has not been preserved it is not possible to determine if this tool was used during the period that the shop was functional or if it was placed in the shop years later. Although the rest of the shop was bare it still had the characteristic dirt floor and adequate lighting through four large windows and two doorways. The forge itself is approximately three feet wide and made of
brick. As the photographs illustrate the Low Moor forge is more advanced than the one found at the McCormick farm. The chimney at Low Moor is specially designed to draw the smoke in the forge out. The remains of the tools, anvil, and bellows are no longer present. They were probably taken by the blacksmith or by various "pot hunters" over the years that the shop has been abandoned.

Artifact Analysis

As the excavation of structure sixteen has evolved there have been many artifacts unearthed. If one was to ask one of the excavators what they had found they would respond, "slag and nails". There have been ziploc bag after bag full of slag deposited in the Washington and Lee Anthropology Lab. Slag is the name given to the waste product when iron is burnt. One of the photographs of the McCormick shop shows the presence of slag in the forge. The immense concentration of slag was one of the factors which gave rise to the theory that structure sixteen was a blacksmith shop.

Nails were the other articles dominant in the artifacts of structure sixteen. The nails recovered measured from approximately five inches to small, tack-like sizes of 7/8 of an inch. The widths also varied. The nails found can be categorized into three groups. According to the "Chronological Development of Nails" (a supplement to Blacksmith's and Farrier's

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31 Richardson, pg. 44.
Low Moor
Blacksmith Shop - Interior
Low Moor, Virginia

Scale
2 sq. = 1 ft.

Key
F - Forge
T - Table
Photographs of the Low Moor Blacksmith Shop

May 25, 1993
Tools at Shelburne Museum) the majority of nails were categorized as machine cut nails used as early as the 1820's. This type of nail was the most common. Another type of nail recovered was the common wire nail. This was easily identified by the small grooves at the top of the nail. Another category of nails, and least plentiful, were the large seven to eight inch spikes. The two most common nails are machine cut. A nail cutting machine was invented in 1790 and made nail making much less time consuming for the blacksmith. Their are obvious differences between machine and hand cut nails. The shank of hand wrought nails taper on both faces while on machine cut nails, only the side face tapers. Another difference is that most hand wrought nails have beveled heads while the machine cut nails have uniform, flat, square heads.

Besides the "slag and nails" there were bits of clear glass, probably from windows or bottles, not a large amount. There were also the two washers recovered that were mentioned earlier to be identical to the one found in the Low Moor blacksmith shop. One of the more interesting artifacts unearthed was an iron ring, still attached to a square piece of iron which had four holes on its back. These holes were probably used for

32 Bealer, pg. 92.


interior walls. This find allowed the supervisors to date the interior walls as "terminus post quem" the dime.¹⁶ There were no other finds that helped to identify the structure as of May 16, 1993.

Thanks to the dime found in the third week, the structure of structure sixteen closely resembles the dimensions of the three blacksmith shops discussed earlier. The average dimensions of the three shops were twenty-three by twenty-six feet. Although a bit smaller, the Low Moor shop, the smallest of the three, brought the average down. With the discovery of the dime, the interior walls have been found to be of a secondary nature. This is advantageous because none of the other blacksmith shop had any interior walls, probably because they would have taken up valuable room.

The high amounts of slag recovered from the site must have been from some sort of iron heating process, but that is all it is able to tell us. The lack of any conclusive artifacts found, save the wrench are probably due to the fact that the blacksmith, like Lee Tippett said earlier, valued his tools and would not have left them lying around. They also passed them down through their family. Manly Brown of the Village Blacksmith Shop, Lexington, Virginia, still possesses tools that his grandfather made as a blacksmith during the Civil War.³⁷ Another reason why

³⁶ Sackett, Christopher and Matt Willis "Field Notes, Longdale Mining Complex, Structure 16", 5-16-93, pg. 6.

no tools were found could be attributed to "pot hunters" like those who may have taken any remaining artifacts at the Low Moor shop. Thus, the lack of conclusive artifacts such as tools does not necessarily mean that structure sixteen could not have functioned as a blacksmith's shop.

Although, this evidence in inconclusive and circumstantial this project has still concluded that structure sixteen did not function as a blacksmith shop because of one, important missing feature - there are no remains of a forge. Of the two blacksmith shops still standing, the one thing they both had in common was that they each contained a semi-preserved forge made of brick and mortar. However, structure sixteen has no such remains. Even at structure nineteen a hearth was present whose base was still in fair condition. This hearth was made of brick and concrete just as the two other forges found in the other shops. If the hearth of structure nineteen is still in some sort of shape, so should a forge if it existed at structure sixteen.

Through the research in literature and interviews with blacksmiths and historians this project has attempted to supply evidence on why it has concluded that structure sixteen was not a blacksmith shop. Although its physical structure and abundance of slag and nails has given rise to the theory that it may have functioned as a blacksmith shop it is missing the most important element that without the shop would have no way of heating the iron, the forge. Although, with the discovery of the 1924 dime it is obvious that the structure may have served a secondary
function after 1911, the forge would have required intense work with a sledge hammer or jack hammer to be so completely demolished that there is not a trace of it at structure sixteen today. Thus, the primary function of structure sixteen eludes us once more. Perhaps with increased excavation or the discovery of new written evidence the question of structure sixteen's function may be laid to rest.
Bibliography


Sackett, Christopher and Matt Willis. "Field Notes, Longdale Mining Complex, Structure Sixteen". Virginia: Washington and Lee University, 5-10-93, 5-16-93.


