BUFFALO FORGE

By: Lawrence J. Fleenor, Jr.

Big Stone Gap, Virginia
Dec. 2018
Coauthor: Jerry Fraley

If Tara of "Gone With the Wind" is one's model of slavery in the United States, Buffalo Forge of Rockbridge Co., Virginia will blow your preconceptions away. It was, in fact, the second largest iron forge in Virginia in the quarter of a century leading up to the Civil War, eclipsed only by Tredegar Iron Works at Richmond. It was manned entirely by slaves, many of whom were leased from their owners. Nevertheless, it was also a full-fledged agricultural plantation in the tradition of Tara whose production fed the industrial workers. Workers were given the opportunity to earn cash money ("overpay") for choosing to produce beyond their assigned output quotas ("overwork"). They were allowed time off to visit their off plantation families.

Located on Buffalo Creek, a tributary of the Maury River, which runs from the mountains north of Lexington to join the James at Glasgow, it is situated in rolling limestone hills in landscape which would make one have to think hard to discern which century he is in. The plantation, itself, is mostly unchanged by the passing century and a half. The complex was started about 1819, was gradually enlarged until the Civil War, and ceased operations in 1868. Bought by Pennsylvanian William Weaver about 1840, it was turned into an economically viable enterprise over the ensuing years. The 'big house' was named 'Mount Pleasant', a name scarcely used in reality.

The plantation / forge remains in the family today, and is a private residence, and is not open to the public. In the days before the blast furnace the production of iron consisted of placing the mined ore into a stone furnace mixed with charcoal and limestone. Charcoal production was a major limiting factor, and required massive amounts of hardwood hand hewn and then burned in an airless 'pit'. After having been set on fire, liquid iron of high carbon content was drained out the bottom of the furnace along small trenches in the ground, which ended in a network of concavities that filled with the liquid iron, and which cooled into 'pigs'. This 'pig iron' was brittle, and could not be reshaped; retaining as it did the form into which it had been 'cast'.

Cast iron could be used to make pots and skillets, but little else. To make it workable the carbon content had to be lowered. The process consisted of reheating the cast iron, and of beating that red-hot iron with a hammer until the excess carbon came out of the iron as flakes. As early as the Twelfth Century the Chinese had

learned to mechanize the process with heavy trip hammers (also called angle hammers) powered by water wheels. Europe soon followed suite. The forgeman was a highly skilled labor, as there were no testing instruments to tell him when just the right amount of carbon had been removed. The resulting iron had to be just the right consistency so that a blacksmith could reheat it, and form it into useful items, such as nails, wagon wheel tires, threaded rods, hinges, gun barrels, etc. The purchasers of this commercial iron had high regard for the iron produced by the forgemen at Buffalo Forge.

Weaver's evolution as an industrialist is interesting. He came to Virginia in 1814, and began with the iron industry as a smelter. The War of 1812 provided an excellent market for his iron, but the typical post war economic recession drove the price of pig iron down until it ruined many furnace people. This end of the iron business also was subjected to the problems of exhaustion of local forests for the making of charcoal, and of the sudden exhaustion of the iron ore deposits. He saw more economic stability in the forging business, which allowed him to buy pig iron from any smelter at the prevailing price, and to stockpile it pending an improvement in the economic cycle. Therefore, he bought the failed forge on Buffalo Creek, and began to revive it by implementing good management practices. A major innovation he instituted was to grow the food for his workforce rather than to buy it on the market. This would be viewed today as 'overhead control'.

Weaver understood the practices of good labor management of that time and at that place. White labor was problematic because any energetic white man could move to the frontier and get free land, which he could work industriously to his own advantage. That left the available White work force to be those who were shiftless and alcoholic. This reality is well documented by the experience of the railroad that was building its way westward in the Great Valley of Virginia. Weaver began to buy slaves as his profits allowed. Much has been written about the unprofitability of slave labor in the South, but Weaver had a knack for getting his Black slaves to work productively. It may seem odd, but these practices could be characterized as being 'good treatment' as human beings, and the basic precepts of capitalism. He gave extra money for extra production. It seems so simplistic, but it worked.

The fundamental dynamics of slavery in Virginia in the period between the Revolution and the Civil War were not what the average person of today might think. The large tobacco plantations of the colonial period were largely exhausted. There were no concepts of crop rotation, nor of fertilization. The land of the Tidewater and of the Southside (south of the James River), where those plantations had existed, was 'thin', or sandy. The soil of those plantations was irretrievably exhausted by the early 19th century, and the slave economy which these plantations supported had become so uneconomical that many Virginian plantation owners had become antislavery. George Mason of Fairfax County, who largely wrote the Constitution of the United States, led an antislavery movement that attempted to make it unconstitutional. He failed due to pressure coming from the New England slave merchants. He did succeed in getting a clause put into the Constitution that

made it illegal to import slaves into the United States after 1809. This had a profound effect on the dynamics of slavery in Virginia, and in the nation. This Virginia based antislavery movement, fed by economics, resurfaced in 1830 when a bill to outlaw slavery in Virginia failed to come out of committee in the General Assembly by only one vote.

Two things happened that 'saved' the institution of slavery in Virginia. The first was the invention of the cotton gin, which made possible the institution of the large cotton growing plantations of the Deep South where the climate allowed cotton to be grown. Massive numbers of slaves were needed. As the importation of slaves was by that time illegal, the only sources of this labor supply were the smuggling of slaves into the Gulf Coast directly from Portuguese Africa to the American Gulf Coast, and by the selling of the economically excess slaves of Virginia. The plantations of the Tidewater and of Southside turned into slave breeding and exporting institutions. From about 1830 until Emancipation this unintended consequence of the Constitutional prohibition on the importation of slaves actually supported slavery in Virginia.

Another unanticipated process developed in Virginia. Canal, railroad, and turnpike construction projects sprang up all over western Virginia where the shipping using the tidal rivers of the East could not penetrate. And then there was the iron industry that surprisingly was the largest in the South. Massive numbers of slave industrial workers were suddenly needed within the Commonwealth itself. They felled the forests to make charcoal. The dug the iron ore and smelted it. They were teamsters who hauled the pig iron to the forges, and the purified iron from the forges to the blacksmiths and factories of the cities. Mixed crop plantations that grew food for this workforce grew up in the Great Valley where this iron industry was located, and themselves required massive amounts of manpower. A three sided industrial labor management process developed without anyone having given it any forethought. For example, Weaver's need for extra labor was seasonal, being largely summer oriented. He owned his own basic workforce of slaves, but leased slaves on the open market from the economically defunct plantations of the Tidewater and of the Southside, as the season and market factors required. During his off-season in the winter, the heavy work of digging railroad right-of-ways and of canals resumed, and these slaves were then leased to those endeavors. All in all, this provided an economically viable paradigm for the use of slave labor. The slave owners could also sell the 'excess' population of slaves that natural events produced to slave drovers who toured the back country lanes picking up a slave or two at every plantation, and take them 'down the river' (the Mississippi that led to the Deep South) to the cotton plantations.

The demand for slave labor was so great that the slave, himself, could and did dictate to his owner which slave leaser he was willing to go to. Weaver was wise enough to treat his slave work force well enough that the slaves more often than not requested their owners to send them back to him. It seems so obvious a set of practices that it is amazing that so few Whites thought of it, but it was these labor

practices were a major factor in Weaver's success, even through times of economic recession when his competitors were failing.

Weaver started out with White labor, but soon learned better. He began to buy a few slaves as he could afford them, and to lease the rest. By the time he died at age 82 in 1863 he owned 70 slaves, and continued to go to the slave markets to lease more. His labor force was stable, productive, and profitable. His iron masters were known by name and reputation by the iron merchants of Lynchburg and other cities down the James, which was the avenue of shipping of that iron. The descendants of his slaves still live in the area, and consider Weaver to have been "basically a decent man."

The remaining portion of the plantation / forge is 38 acres, and contains most of the core structures. The 'Big House' was started about 1819, and has been added onto several times. The latest structure is the car garage, built in 1940. The last person to live there is the current owner's grandmother, who died about 2015. The estate is undergoing renovation. The artifacts there represent examples of normal living for about a century and a half. What follows are some interesting photographs along with some text to highlight their place in the history of the estate.

This is a picture taken of William Weaver at about the time he came to Virginia. He came from Pennsylvania, and was of German Pietist heritage. The original spelling of the name was Weber, which translates directly as Weaver.

William Weaver at about the outbreak of the Civil War, approximately three years before his death.

This is the front, or southern face of the Big House at Buffalo Forge. The various additions render the architectural blend of basic Federal and Gothic Revival. There is a frame wing added to the right rear, and a kitchen was added to the left in the early twentieth century. There is a guesthouse out of sight to the west (left) of the kitchen. All the roof drains via the guttering through a rock lined tunnel that empties into the millrace that is directly behind the photographer.

Below are the household slave quarters. Each structure appears to have been a duplex. These buildings lie to the rear of the mansion house. The frame addition to the Big House's northeastern corner is visible to the left. The industrial slave dwellings lay scattered about the larger plantation.

This structure is the permanent out door toilet. It lies to the northeastern corner of the mansion house, or up the hill a little from the white frame addition. Behind it lies the road to the slave cemetery, which curls up the hill toward the north (left). It may be a fairly modern structure, as there is no door in the back of the foundation to clean the pit, as one can see in the serpentine garden toilets on the Grounds of the University of Virginia, which is of the same era of origin.

This is the view to the south from the front of the mansion. The small building to the left is of unknown usage. The building closest the camera is the spring house. The horse barn is in the center background, and the two smaller buildings to the right are corncribs. The row of trees in the background is a creek, which is the origin of the buried millrace seen in the right middle ground. It feed the flourmill. Behind the barn one can see traces of Buffalo Creek and its road. The circular object at the southwest corner of the barn is a watering trough. The driveway loops its way up to the mansion house through these buildings.

The spring house below is built of unworked limestone fieldstone, which are mortared together with a mix of quick lime and sand. The entirety was once covered with stucco, which has pealed off in places. The '5V' roofing is more modern. The ditch to the south (left of the picture) is the buried piped millrace that has its intake to the right rear of the building. The building is located next to the driveway and horse barn. The horses were led by halter leads to the feeding / watering area, tied to a hitching rack that is no longer there, and harnessed for the day's work.

The horse barn is a treasure trove of artifacts stored in both the overhang on its lower eastern side, and in the loft. The next several pictures will feature these items.

The modern portajohn is there due to the renovations currently going on at the mansion house. Note the hay maw with its overhanging roof. The '5V' roofing in modern. The next artifacts to be shown are stored in the space behind the portajohn. What this space was originally used for is not obvious. The items currently stored here are not all related to the barn. Some of these items will be pictured and discussed below.

This magnificent mill belt wheel likely from either the forge or the flour mill is entirely hand made of wood except for the factory made mandrel and the cut nails that fasten the wooden pieces together. Even the circumferential belt drive surface is made of tightly fitted small boards. The wheel is part of the power train that conveyed torque from the water wheel to either the millstones or to the trip hammers at the forge. This wheel was likely preserved either when the forge was washed away in a flood, or when the flourmill building collapsed.

Below are pictured pieces of the gear wheel that also was part of the power train in one of the mills. Note the cast iron retainers that held the wooden teeth. This is a rare example of technology that was transitional between an all-wooden gear apparatus, and one that was all cast metal. White's Mill in Abingdon, Va. is an excellent example of all wooden gears. Bush's Mill in Nicklesville, Va. is an example of all metal gears. These wooden teeth likely meshed with the cast iron gear teeth,

which were attached to the wooden circumference of a wheel similar to the one pictured above.

Below is pictured a four pronged hay maw fork, one of whose tines can be seen in the photo of the gears above. It was suspended on a track attached to the underside of the loft ridgepole, and travelled the length of the hayloft. The apparatus will be shown in a following picture. It lifted loose hay from a hay wagon that would have been parked beneath the hay maw overhang seen in the picture of the outside of this mule barn. This four pronged fork was from the mid twentieth century, and was a proud advancement on the two pronged fork that would have been used on the same track apparatus, but dating to about the World War I era. In its time, ownership of a four-pronged hayfork gave its owner bragging rights among his neighbors. These forks, along with its hay load, were powered by horses pulling ropes channeled through pulleys on the other side of the barn. They could lift 3,000 lb. of hay into the loft, where they were dumped by an attendant in the loft who jerked on a rope that caused the mechanism to open. This fork was replaced by the one currently hanging in the loft, and which was used to lift square hay bales.

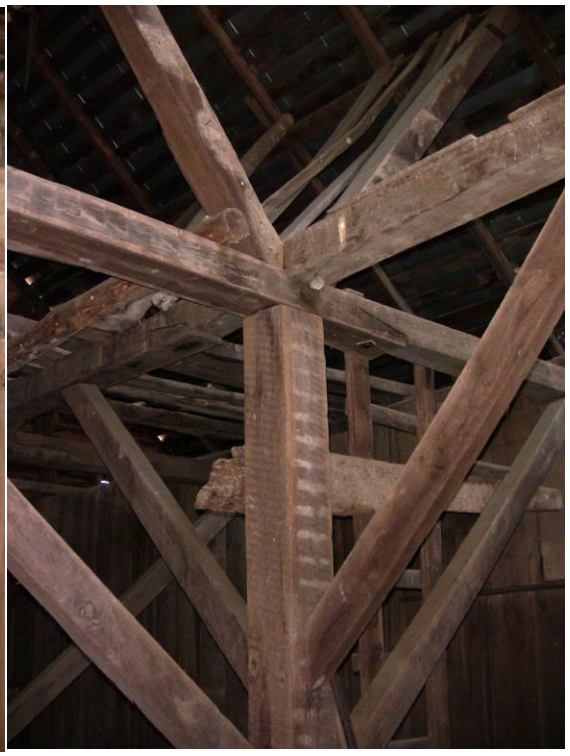
This is the apparatus described above. There is a track attached to the ridgepole, which extends outside the barn roof through the hay maw door. Note the carriage that moved along the underside of the track. Next note the rectangular two-pronged hayfork that was used to lift square hay bales. This was the last incarnation of the hayfork. It came along with the small square hay baler after World War II, and was replaced by the hay bale escalator.

The rope hanging down from the apparatus is the trip rope that caused the forks to open and to dump wherever the person controlling the process within the loft wished. By this means the hay was evenly distributed within the loft.

The trusses that are pictured are mixed hand-hewn beams (note the lower horizontal one with the marks of a broad ax or adz on it), and the sawed beams of a later era.

The truss work within the barn loft and roof are works of lost craftsmanship. Note the carved joints and dowels that hold these hand-hewn beams in place.

In the two photographs below continue to note the carved joints that fasten the smaller beams into the larger ones, and the dowels that are driven into gimlet (old name for a hand auger) bored holes. From the angle of the hewing marks on the larger beams one can tell that the worker was right handed. The degree to which the carpenter understood the distribution of stress supported by these angled beams is truly admirable.



In the photo above, note the remarkably designed and masterfully executed joint that held two trusses of the top plate of the side wall framing, and which supported the horse barn's roof. Not seen, these two beams were held together by dowels. This joint was immune to stress applied from any angle. Its cultural origins are in Finland. One can watch one being made on a film produced by the Finnish Government's cultural division on YouTube.(6)

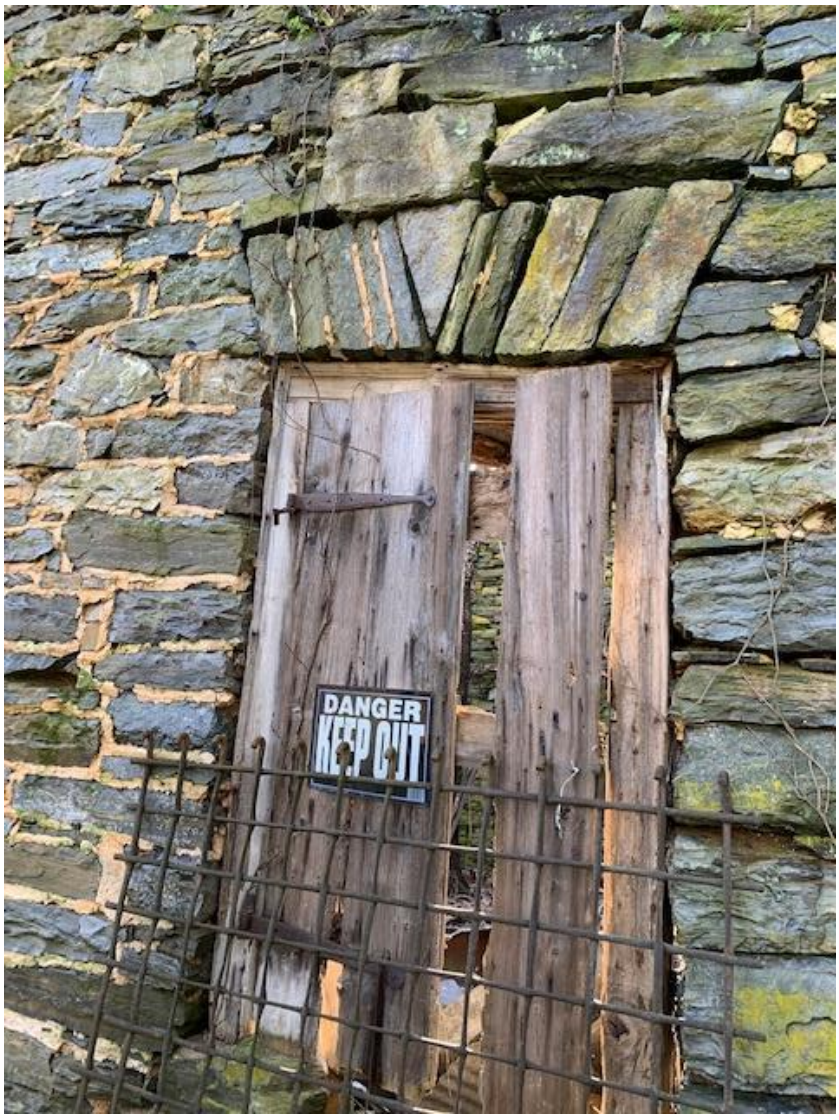
This remarkable chain that was hanging in the horse barn loft is blacksmith made, with each individual link independently sized and joined. It likely was made on the place.

This separator of some sort is located in the overhang space of the mule barn along with other odds and ends that were obviously valued by their owners. It is shown because it proudly proclaims that it was made by 'O. G. Vanderhouwen Manufacturers of Knoxville Tennessee. A similarly named company is still located in Knoxville, but makes electronics.

Below is a picture of the concrete feeding troughs for the mules located on the southern side of the barn. Note that the structure was designed to provide the mules with protection from the weather as they ate. The circular concrete watering trough previously seen in the picture on page 7 is in the left foreground in this picture. The individual stalls for the mules are located in the enclosed lower floor of the barn to the north of the feeding troughs. There is a small creek just to the south of the feeding troughs, and which supplied the water for the flourmill that is located to the east. There is no record of it, but the brick used in the bottom floor was likely fired on the plantation. Again, note the hand-hewn beams.

The author is standing on the filled in ditch that contains a two-foot diameter rolled and riveted iron culvert millrace that carried water from the creek above the mule barn to the flourmill. This pipe entered the stone masonry of the second floor and fed the water wheel which was entirely enclosed within the lower floor. Note the lighter colored stone in the building's wall, indicating that it had once fallen in, and was rebuilt.

This novel stonework above a door in the eastern wall of the flourmill is unique in the author's experience. In other openings in the building either home made crude iron lintels or stone Greek arch lintels are used. This structure at first glance looks like a poorly executed Roman Arch, but in fact it bears no structural stresses, and is only decorative. It is held up by the wooden lintel of the doorframe itself, and the stonework above it will collapse when the wood rots. The stonemason who designed and built this structure did not adequately appreciate the architectural features that were necessary to support such a large structure of uncut fieldstone. Undoubtedly, this is the cause of the building's partial collapse, followed by the extensive rebuilding noted in the western wall seen in the picture on page 16.



Note that some of the stone joints are held in place by quick lime mortar, and some are necked.

The company store building has been sold off of the remainder of the estate. However, it still stands facing the road up Buffalo Creek on the eastern boundary of the current estate. The size of the building gives a good indication of how many mouths Weaver had to feed. Provisions not grown on the plantation were likely brought up the Maury River extension of the James River and Kanawha Canal from either Richmond and Lynchburg, or down from Buchanan, just as the finished iron was sent down it.

The site of the forge hammer mill is still very obvious up the creek a little, and between the road and the water. All that remains is the stone foundation, the rest seemingly has been removed by floods. The site of the forge is connected to the dam up steam about 50 yards by a millrace, which is still very visible. Records indicate that the dam was washed out from time to time, and constituted a major economic problem for Weaver, who not only had to repair the dam, but lost production of his marketable iron. This picture of the dam does not do justice to the huge size of the cut stones that were used in it. The sloped concrete upstream facing is a surprisingly modern like feature, and constituted a major investment of capital and labor in the early 19th century.

There are no existing hammer mills left of the Buffalo Forge. Below are two photographs obtained from Google Images of period tilt hammer mills that would have been very similar to those used here. Note the huge wheels on the machines, such as the one shown on page 9.

Note the cams on the axil of this double hammer machine, which tripped the two hammers closest to the camera. Not seen in this lower photograph are the two anvils under the hammers, but the single hammer machinery seen in the upper picture does show the anvil. The belt in the upper picture is driven by a water wheel.

Bibliography:

1 – two interviews with the current owner of Buffalo Forge, Susan Brady, who is a relative of William Weaver

2 – Wikipedia – "Buffalo Forge"

3 – Dew, Charles B. – Bond of Iron – Master and Slave at Buffalo Forge

4 – the photographs, except as noted, are by the authors

5 – the course in Virginia History taken by the author at the University of Virginia

6 - https://www.youtube.com/watch?v=HNTfLGt59qo
the relevant section is approximately 12 minutes into the video