

AMERICAN CHARCOAL MAKING

Adapted from National Park Service

Timber Requirements for Charcoal Production

- ◆ 1 acre of timber yields about 30 cords of wood.
- ◆ 30 cords of wood will produce about 1,200 bushels of charcoal.
- ◆ 1,200 bushels of charcoal will fuel about 6 2/3 tons of pig iron.
- ◆ A furnace producing 1,000 tons of iron per year would consume approximately 150 acres of timber per year.
- ◆ A 20-year regeneration cycle would require that a furnace have approximately 3,000 acres of timberland.

Wood was usually cut during the winter months and allowed to season until the coaling operations began in late spring. Because of high winter and spring winds and other unfavorable weather conditions, the pits were fired only during the months from May until late October. Colliers often became *woodchoppers* during the winter in order to receive a full year's wage.

The Woodchoppers

The area of woodland to be cut off for coaling was divided among the woodchoppers into narrow strips of about 20 ax handles apart and extending the full length of the tract. The woodsmen then attempted to fell their trees so that the tops would come together along these dividing lines.

Lap-wood and *billets* are the names given to the two sizes of wood used by the colliers to set up their charcoal pits. The lap-wood ranged in size 1½ inches to 4 inches in diameter, while the billets varied from 4 to 7 inches. All wood was cut in four-foot lengths. The billets were split out of the main trucks of the trees, and the branches provided most of the lap-wood. The ends of each billet and pieces of lap-wood were cut purposely on a bias so that in setting the pit a rounded top or head could

be formed more easily to keep the leaves and dust, which were used as a smudge blanket, from rolling off the structure.

The woodchopper ranked his wood as he cut it, separating each cord by upright poles so that the owner, in computing the chopper's wages, could readily count the number of cords. The wages were based on the amount of wood cut.

The Woodhaulers

The man who brought in the billets and lap-wood from the woodchopper's ranks to the hearth was called the *woodhauler*. A mule, a horse, or even an ox was used to drag his rustic wood sled which, when loaded would carry perhaps a half a cord. The haul from the ranks to the hearth was made as short as possible and always down hill.

The hearth, or base, of a charcoal pit was simply a flat space 30 or 40 feet in diameter and free of all brush, roots, and stumps. An open level spot was chosen, and much care was taken that the surface of the hearth was hard and smooth so as to afford good shoveling and ranking of the coal. If one side of the chosen site slanted down hill, the opposite side was dug enough to make the fill on the lower side absolutely level. The hearth had to be level to assure uniform burning. Hearths were placed so that they were at the bottom of a rise.

The road leading to the pit always went right through the center of the hearth so that the hauler could unload easily and drive out at the other side on his way for another load. The hauler, not the collier, filled the hearth. Driving his sled to the center of the hearth, the hauler, who always walked beside his mule, placed each billet and piece of lap-wood on its end, starting at the outer ring of dust and working toward the center. The first few loads were of lap-wood only. It was laid crosswise on the top of the ring of dust in order to give a substantial support for the billets and other



lap-wood to lean against. Another reason for hauling lap-wood first and placing it on the ring was the next operation of setting the pit. Here work was begun at the center of the hearth and the pit built out to the circumference, thus leaving the small wood to lap-off the outside. When the hauler had filled the hearth with wood, his job was finished. The wood waited for summer.

The Colliers

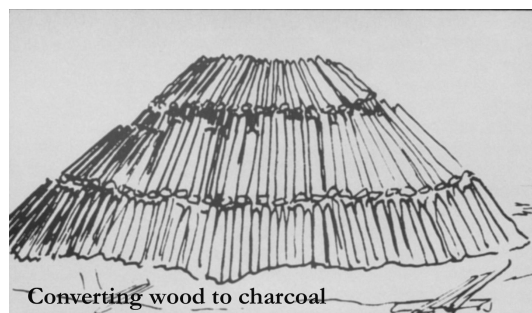
At the start of the following summer the *collier* and helpers stepped into the picture. He first cleared the hearth of all vegetation which had grown there since the last time the tract had been coaled – possibly 30 years before – and raked out all the old dust to its edges. His next move was to locate the center of the hearth and to throw back enough of the lap-wood to enable him to get down to the surface.

The *fagan*, a green pole some 18 feet long and three or four inches in diameter, was driven in at this center point so that it stood upright. A helper handed down to the collier the lap-wood that had been thrown back on the pile, and these pieces were used to construct the three-cornered chimney about the fagan. The chimney had an opening of about eight inches and was constructed by laying lap-wood triangularly, using each piece as a leg. In this way the chimney could be built as high as necessary.

After the chimney was about five feet high, the helper handed to the collier the billets that the latter carefully leaned against it, allowing each piece to protrude slightly at the base. When the first ring of billets had been placed, another ring was begun, the base protruding a little more each time, so that when the ring of charcoal dust finally was reached there would be enough slope to the sides of the pit to enable the final covering of leaves. Lap-wood was fitted in whenever possible to take up the air spaces. Each billet and piece of lap-wood was placed so that the biased cut of the chopper's

ax sloped upwards to the chimney. That helped to form the final rounded top and sloping sides of the finished pit.

After this first tier of billets and lap-wood, which was called the *foot*, had been set out from the chimney far enough to give the collier a footing, he climbed on it, built the chimney up another four feet or so, and then started to set the second tier of billets and lap-wood, called the *waist*. Setting the foot and waist out together, he and his assistants worked until all the billets were used up and just enough lap-wood was left to construct the *shoulders* and *head*.



Standing on the waist and again building the chimney upward another three or four feet, the collier set the remaining wood, not on end this time, but in a horizontal fashion radiating from the chimney as a center point. Building up shoulders and head in this way to the full height of the chimney, and shortening each layer of radiating lap-wood until the top of the chimney was reached, he fashioned a rounded structure. Throughout the entire operation, great care was taken to set and fit the pieces substantially together to prevent the whole from *reeling* or twisting. A pit hastily slapped together was certain to reel.

Lapping-off was the last move in completing the construction of the pile. This consisted merely in using what lap-wood was left to fill in all possible air spaces and cracks on the sides before the final covering of leaves and dust was spread on.

The *pit* refers to the structure as a whole, including the hearth and the pile of wood. The pit was now set, the collier and his helper busied themselves in notching out a crude ladder from an eight-inch log long enough to reach from the ground to the head. Enough chips and fine kindling were cut to fill the chimney within a foot so of the top, and a *bridgen* of three billets and several pieces of lap-wood to cover the chimney made the pit ready for leafing and dusting.

A crude wooden rake, consisting of six or seven 6-inch teeth places about two inches apart on a small head, was used to gather up the scattered leaves on the forest floor. They were carried to the head of the pit in the collier's basket, and scattered uniformly over the pit to a depth of several inches.

The collier made collier's baskets during the dull winter months. Weaving thin strips of lath or reeds together around an oval hoop made the baskets. When heaped over the brim, they held from two and one-half to three bushels of charcoal.

The long-handle collier's shovel was used to spread on the dust which had been raked to the circumference of the hearth in a ring during the early preparation of the site. A slight twist of the wrist in manipulating this tool spread the dust in a scattered spray so that all parts of the pit were covered evenly. Several inches of dust were required for the sides and at least a foot on the head and shoulders.

The pit was then ready for firing. This was done by carefully moving back enough of the dust and leaves from the bridgen, and two of the bridgen billets themselves, to allow a shovelful or so of red-hot coals from the collier's cooking fire to be placed on top of the kindling in the chimney. Care was taken that no dust or leaves fell back into the chimney when the bridgen and covering were replaced.

The lighting of the pit usually was done toward evening in order that the collier might have at least one more good night's sleep before the constant watching began; for it was not likely that the pit would "burn through" or need "dressing" until the following afternoon. Before turning in that first night, the collier made certain there was ample dust on the head. This dust usually was carried to the top of the pit and raked around at least one foot deep. It was considered necessary to have one bushel of head dust for every cord of wood in the pit.

If a charcoal pit was not watched and tended constantly, fire broke through the covering of leaves and dust and might destroy the entire pile. A burning flame was the dread of colliers, for coal could be made only by the charring action of a "dead fire."

"Jumping the pit" was a dangerous job. The collier, holding his long-handle shovel in a horizontal position, mounted his crude ladder to the top of the pit and stepped gingerly around the head and bridgen to learn whether there were any soft spots or *mulls*. Finding these, he jumped up and down on the more substantial parts of the surface, working his way carefully toward the mulls. Air spaces in the pit caused by shrinkage of the charring wood thus were closed in part. Soft spots then were dressed by digging them out a little and placing new wood, leaves, and dust in the resulting cavities to preserve the original shape of the pit. The pit was tended in this manner every evening in order to prevent, if possible, its burning through during the night.

The phrase *give 'er fire*, the task of providing draft vents to increase the fire within the pit, should be distinguished from *firing the pit*, the operation of lighting the original fire. The burning was governed by means of holes made in the foot on the side where more heat was desired. In order to learn the location of the fire, and to see whether it had reached the surface of the

hearth, the collier used the fagan as a poker, the bridgen first being removed carefully to prevent leaves or dust from falling into the chimney.

Since the pit was lighted from the top, the fire had to char downward. Ramming the fagan down through the loose coal at the head, the collier eventually struck a hard surface, either uncharred billets which the fire had not reached or the surface of the hearth. As it was a part of the collier's training to recognize the various surfaces struck by the fagan, he could calculate readily the direction in which the charring was proceeding and thereby provide the proper drafts or foot holes that were needed to effect uniform charring on all sides of the pit. When the surface of the hearth was not absolutely level, the lower side always "came to foot" first. In the early stages of burning, holes were placed about two feet up from the foot. Later, as the pit came nearer "to foot" the holes were made lower.

When the pit was burning evenly and well, a characteristic blue smoke puffed from the vents at lazy intervals, giving off a pitch tar odor that the colliers considered to be the cause for their tremendous appetites. White smoke was an indication of a poorly charring pit and usually resulted from rapid burning due to too much draft, or to the use of old dry wood. Heavy winds caused the pit or burn unevenly, and rains often made it become too hot. When a pit crackled and sputtered, it was a certain indication that dry chestnut wood was being employed.

The number of days required for a pit to "burn off" varied greatly with the size of the hearth and the kind of wood. For the average hearth, which held 30 cords or so of partly seasoned wood, it normally took from 10 days to two weeks for the pit to come to foot, that is, for all the billets to char.

After it had come to foot and before any of the coal was removed, it was

necessary to have the dust dry enough to run off the sides like sand. Accordingly, more foot holes were made so that the pit would heat up, char the leaves, and dry the dust.

Once the pit had charred down to the foot, it might be assumed that the fire was out and that the process of raking out the coal would be simple. Charcoal carries fire for a long time, however, and the raking was a tedious and painstaking task because only small amounts could be removed at a time.

The collier chose a side of the pit where the dust was driest and with his shovel dug out a portion, starting at the foot. This opening acted as a draft hole and soon there were signs of fire. At that point he stopped his digging and threw back enough of the dry dust to reseal the pit and allow it to cool.

The long iron-toothed collier's rake then was used to draw back into the ring the pile of charcoal that had just been dug out. A few sparks often remained in the coal and the entire ring became ablaze. As the hearths were usually far from water, dry dust was the only means of extinguishing the fires.

When the collier and his helper worked around the pit, digging out a little coal here and there, each portion was kept in a separate ring so that a single fire might not destroy the total. The collier always refused to ring out more coal on his hearth than would fill the charcoal wagon because of the extra attention required attending it. On the day when the wagon was to come for the first load, the collier and his men were up and ready to start work at dawn. They spent several hours in ringing out the coal and the remainder of the morning seeing to it that no fire remained in it.

The same collier's baskets that were used to carry leaves to the head of the pit were employed to fill the wagon with charcoal. The teamster carried the basket on

his head after the collier had raked it full and helped him to swing it into position.

Charcoal wagons varied in size. All were drawn by six-mule teams and equipped with high side boards and a bottom that would pull out. When the teamster reached the charcoal house, he unhooked his lead team from the “spreaders” and fastened their whiffletree to a coupling connected to the sliding floor of the wagon. In that way the load was dumped without effort to the teamster or damage to the brittle charcoal.

Charcoal Making Glossary:

billets – Wood that is from 4 to 7 inches in diameter about 4 feet long.

brands – Partly charred billets which remain after the pit has been coaled.

butt – The final remains of a burned-off pit.

coaling out – Act of digging and raking charcoal from the pit.

collier – The person who prepares the pit and burns the wood into charcoal.

dressing the pit – Refilling a mull, where the fire had burned through, with new wood, leaves, and dust so that the exterior of the pit was restored to its original shape.

fagan – the green pole that is about 18 feet long and 3 or 4 inches in diameter that is placed in the center of the pit.

foot – The first layer of billets and lap-wood in the pit.

head – The uppermost layer of lap-wood forming the rounded top of the pit.

head dust – Old charcoal dust placed on the top of the pit to form a smudge blanket.

lapping off – Placing lap-wood on the outer surface to make the pit as tight as possible.

lapping-off – The process of filling in all possible air spaces and cracks.

lap-wood – Wood that is 1½ to 4 inches in diameter about 4 feet long.

mull – soft spots found in the structure during burning.

piece – The pit after some of the coal has been removed.

pit will blow – Gases generated by the charring wood often causing the top of the pit to blow off.

pit.—The whole structure including the hearth and the pile of wood.

shoulder – That part of the pit where the second tier of billets meet the top layer of lap-wood.

shoulder and head – The upper layers of billets and lap-wood in the pit.

waist – The portion of the pit where the first tier of billets and lap-wood meet the second tier.

woodchopper – The person whose job is to chop down the trees.

woodhauler – The person hauls the cut wood from the forest to the hearth.

Buckeye Furnace is operated by the Ohio Historical Society, a nonprofit organization that serves as the state’s partner in preserving and interpreting Ohio’s history, archaeology, and natural history.