

Charcoal

Fuel for Making Iron at Pine Grove Furnace

Iron at Pine Grove Furnace

Making iron at Pine Grove Furnace (1770s-1895) required **iron ore**, **charcoal**, and **limestone**.

These three raw ingredients were loaded into the top of the furnace stack, and the molten iron was drawn off at the bottom twice a day. The resulting “pig iron” was hard and brittle, so at nearby Laurel Forge it was hammered into bars of softer “wrought iron” to be used for blacksmithing. Or, the molten iron could be directly cast in sand molds to become pots, stoves and other household goods. During the American Revolution, this furnace cast cannonballs and other military items, but not cannons.

The Ingredients

Iron ore and limestone came from nearby open-pit mines. The limestone was needed to remove impurities in the ore. The limestone bonded with the impurities, came out of the furnace and hardened into a glassy green, black or blue rock.

This rock is called “slag”. Pieces of this glassy waste product can be seen along trails throughout Pine Grove Furnace State Park and Michaux State Forest.

The charcoal was the fuel to melt the iron ore and it took an especially skilled group of people and a lot of time and work to produce it.



A collier demonstrates “jumping the pit” to push down hollow areas forming inside the huge mound of wood as it slowly smolders into charcoal. Note that he is holding his shovel sideways as a self-rescue tool, just in case he falls into the dangerously hot pit.

(Photo taken at Hopewell Furnace, 1936)

Charcoal

Charcoal is made when wood burns very slowly without oxygen.

Sounds simple, right?

Making charcoal was a long, involved process that took great skill. The charcoal was essential to the furnace operation and the workers who produced it were some of the highest paid employees of the company. These esteemed workers were called **colliers**.

How it's done

To make charcoal, the colliers arranged four-foot lengths of wood into a huge above-ground stack called a “pit.” A typical pit was 30 feet across at the base and 12 to 15 feet high.

The wood was covered with a thick layer of leaves and dirt. Then a small chimney in the middle was lit with embers from a campfire.

The colliers had to watch the smoky pit day and night for about two weeks, throwing on extra dirt from time to time to prevent the wood from burning into worthless ash.

They periodically climbed on top and “jumped the pit” to pack down hollow spots formed as the smoldering wood shrank. One master collier and two or three helpers built and tended 6 or more pits at the same time.

The finished product

When all the smoldering wood turned into charcoal and the pit cooled down, it was raked open. Mule-drawn wagons operated by **teamsters** hauled the finished charcoal to a “coal house” on the hill behind the furnace stack.



Charcoal wagon at Pine Grove Furnace, on the hill behind Furnace Stack, circa 1880

It could not be stored for a long time before use, so the process of making charcoal had to be repeated year after year.

The black color behind the furnace stack resulted from the charcoal used for more than a century of iron making at Pine Grove Furnace.

Charcoal and the forest

The forest you see today looked very different in the iron furnace days.

The wood to make charcoal was cut from hardwood trees in the winter by **woodchoppers**. It took about 1 acre of forest per day to fuel the iron furnace.

All that timber came from the area surrounding the iron furnace, which the furnace company owned. The trees in an area could be cut every 20 years.

This land was sold to Pennsylvania and became part of the Michaux State Forest. This land is now protected for the public’s enjoyment.

Colliers

Making charcoal was a skilled job performed in the spring and summer by workers called **colliers**. The colliers lived in the forest in huts while they tended the wood as it slowly turned into charcoal.

They said it was a sign of experience to be covered in charcoal dust, and would not wash themselves all summer long! Their huts and food became filthy as well. It was rough work, but the colliers were well paid for every bushel of charcoal they produced.



A collier hut

1 acre

= amount of forest needed to fuel the iron furnace for just one day

“During the winter months the woodsman’s axe was heard in every direction, felling the timber and converting it into cord wood. During the summer the smoke of hundreds of charcoal pits could be seen in every direction, making the mountain from base to summit a veritable hive of industry.”

-from Blast Furnaces of Cumberland County by B.K. Goodvear. 1903

More Information

Produced by the
Friends of Pine Grove
Furnace State Park

www.pinegrovefriends.org

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