

A History of the Eliza Furnace

The Eliza Furnace, also known as Ritter's Furnace, was the first of three furnaces constructed in the Blacklick Creek Valley. The other two furnaces were the Buena Vista and the Blacklick or Wheatfield Furnace.

David Ritter and Lot Irvin built the Eliza Furnace in 1846. During the late 1830's and early 1840's David Ritter and his business partner George Rodgers of Ebensburg purchase several thousand acres of land in the Blacklick Valley. They chose to build the iron furnace near the forks of the North and South branches of Blacklick Creek. Thomas Deveraux, a stone mason from Cambria Township, constructed the furnace in 1846. Two Irish immigrants from Vinco, John and William Gillin, also claimed to have completed the stonework. Before completion of the furnace, George Rodgers sold his share of the furnace to Lot Irvin (Irwin), a farmer from Centre County.

The furnace is a pyramidal structure constructed from unmortared sandstone. Eliza stands thirty-two feet high and its hollow interior or bosh measures nine feet in diameter. At the top of the furnace sits the hot blast heat exchanger, which was protected by a brick chimney. The furnace was driven by a water wheel that powered a leather bellows. By the mid-1840's, most furnaces had replaced bellows with blowing cylinders.

The furnace was one of the first in the region to use the hot blast method. In a hot blast furnace the furnace was fired and after being stoked for several days, the furnace was ready to be charged. During the charging process, iron ore, charcoal and limestone were hauled across a wooden charging bridge and loaded into the furnace by workers, known as "fillers". Eliza's charging bridge no longer exists, but it was located on the east elevation of the furnace, next to a hill. The raw materials were layered on top of each other until the furnace was filled, and then charcoal was ignited. Water powered bellows pushed a blast of hot air up to the heat exchanger coils where it was heated by the exhaust gases of the burning charcoal. The hot blast air was then recirculated back down to the bottom of the furnace where it was piped through a tuyere, into the hearth. This process was supposed to increase the temperature and smelting process. But this method only raised the air temperature between ten and fifteen degrees. The hot blast method worked better with anthracite coal rather than charcoal because the coal burned at a higher temperature and less of it was needed to fuel the process.

During the smelting process, the molten ore gathered at the bottom of the furnace hearth and flowed into a dam. When the smelting process was complete the slag was removed from the ore and dumped. Then the dam was removed and the iron was tapped into molds on the sand floor of the casting house. After the iron cooled it was ready to be shipped for sale. The iron was

hauled by wagon to Ninevah or Johnstown, then transported on the Pennsylvania Canal to Pittsburgh. In 1848, Eliza manufactured 1,000 tons of ore out of a rated capacity of 1,800 tons. But by 1849 the furnace was out of blast.

It required an incredible amount of raw materials to produce one ton of iron. A furnace like Eliza would need approximately two to three tons of ore, one to one-half tons of charcoal and twenty-five to one hundred pounds of limestone. The charring process, which was the conversion of wood into charcoal, was prepared in open piles, thirty to fifty feet in diameter. Several charring pits were necessary for one furnace. The timber, either hickory or oak, was cut to lengths about three to four feet in length and piled around a center pole. The pile was covered with sod to prevent the free and uncontrolled combustion, and had to be monitored day and night. It required three to ten days to complete the charring process.

The wood was charred immediately after being cut and only a short period before it was needed. The charcoal could not be stored without shelter because it would soon become unfit for use. The charcoal house usually stored a one to two month supply. The amount of charcoal needed for one furnace was enormous. An average furnace used from 800 to 1,000 bushels of charcoal per day; the equivalent of one acre of forest.

Eliza was an average sized western Pennsylvania operation. The furnace employed ninety men and boys and used forty-five horses and mules. Little is known about the work force of Eliza except the number employed and the typical work engaged in at an iron furnace.

The work force at the Eliza Furnace probably included the following: the iron master, the office clerk; the founder, who maintained day to day operations; fillers; guttermen, who prepared the sand bed on the cast house floor; molders, who cast the iron; miners, who dug the iron ore and sandstone; colliers, who made the charcoal; teamsters, who hauled the materials with horses and wagons; woodcutters; and laborers. Workers were often paid in-kind rather than in cash.

According to County deeds, a section of the furnace operation encompassed 231 acres of land, although David Ritter and Lot Irvin owned a much larger tract of land in the area. Besides the furnace stack, the property included: a bridge house; a casting house; wheel and bellows houses; a frame stove house; an office; a smith shop; twenty-one log-hewed houses; a wagon maker shop; a smoke house; a log stable; and a charcoal house. Court records also show that taxes were paid on a sawmill in 1845. A boarding house and store also may have been present on or near the property.

Although the Eliza Furnace was an impressive operation, the furnace ran at a financial loss from its beginning, and was never able to turn a profit. The

furnace's financial failure was due to several reasons, including: the cost of shipping pig iron overland to Johnstown and Ninevah; the poor quality of local iron ore; the failure of the Pennsylvania Railroad to go through the Blacklick Valley; lowered tariffs on imported iron; the use of outdated technology; and the discovery of the Mesabi Iron Ore Range in Minnesota.

David Ritter was in dire financial need in June 1848 and Ritter's former partner George Rodgers sued him for \$350 dollars because of Ritter's failure to pay off past debts. Ritter was unable to pay the debt, so the sheriff deeded a parcel of property in Armagh to Rodgers. During July, 1848, the Cambria County sheriff seized the furnace property and the property was auctioned. At the Sheriff's sale, Solomon Alter and Joseph Replier, both of Philadelphia, bought the land.

The acquisition of the furnace property by Alter and Replier sparked the beginning of a period when several individuals purchased the former furnace property. The Eliza Furnace real estate and surrounding region were not further developed until the 1890's. Subsequent owners of the Eliza property included the Blacklick Land and Improvement Company, the Vinton Land Company, the Vinton Colliery Company and the Pennsylvania Railroad. The furnace was conveyed from Manor Realty (Pennsylvania Railroad) to the Cambria County Historical Society in 1965. Indiana County Parks now leases the furnace and surrounding ground from the Cambria County Historical Society.

Source: A Master Plan for the Eliza Furnace, Indiana County Parks, 1995. A list of references for this article is available by contacting Ed Patterson at Indiana County Parks.