Schoolcraft Blast Furnace

Pictured Rocks National Lakeshore
National Park Service
U.S. Department of the Interior

With surveyor William Burt's discovery of iron ore near Teal Lake in Marquette County in 1844, Michigan's Upper Peninsula suddenly became a hub of activity. The discovery led to construction of a vast mining and manufacturing industry using forges and blast furnaces. When the Civil War ended, many of the South's furnaces had been destroyed by the war. Westward expansion was occurring across the plains and demand for iron boomed. It was during this era that many of the Upper Peninsula's furnaces were constructed.

There were advantages to smelting iron ore from charcoal fires. Iron produced in this manner was low in carbon content, making it highly fusable, strong, malleable and able to withstand shocks without cracking. The iron made fine wagon rims, horseshoes, and railroad wheels. Before the boom times were over, 29 separate furnaces were located on the peninsula, though not all operated simultaneously.

The business of iron making required more capital than was readily available in the area and financing and management of the operations was often complex. The first group of investors were from Philadelphia. They wished to develop a resort village on Munising Bay's east shoreline in 1850.

Some 87,000 acres of timber were purchased for $.85 an acre. A village was platted on the east shore of Munising Bay, lots were sold, and a dock was built. Henry Mather and Peter White acted as agents for the group of investors who created the Schoolcraft Iron Company in 1866. The furnace stack was built on Munising Creek, about 1,100 feet from Munising Bay. Sandstone for the stack was quarried on Grand Island.

A prosperous small community grew up around the furnace. W.A. Cox managed a thriving general store. About 500 people were employed at the furnace or cutting cordwood. The town of perhaps 1000 people boasted a boarding house, church and brick schoolhouse.

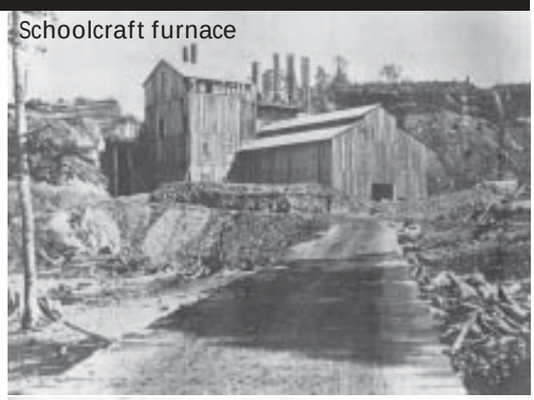
Much of the furnace's machinery was transported from Newburgh, New York. On June 28, 1868, the furnace was first put into blast. A large steam engine was used to supply the hot air and a smaller steam engine operated the ore crusher. Another powered a water pump, used to fill the 8,000 gallon tank perched on the hill in case of fire. The equipment included a water balance system used to raise ore and limestone to the top of the stack for charging.

Ore used at the Schoolcraft furnace was shipped by rail from the mines at Ishpeming and Negaunee, then carried the final 40 miles by ship to Munising. The price of ore ranged from $20 to $70 per ton with an average of $40 to $50.

Four groups of charcoal kilns were built within a few miles east and south of the furnace to supply fuel. Circular remains of over 17 kilns have been located. Kilns were often 25 feet in diameter, tapering to 10 feet at the top. Most were about 20 feet high. Openings were located at the top for loading wood, and the bottom for removing charcoal. Small holes were located on the sides to help regulate air and combustion. A kiln held four cords of wood and produced 2,000 bushels of charcoal. The normal burn time was seven to eight days. Nine brick kilns at the Schoolcraft furnace were augmented by the use of charcoal pits - depressions in the ground where vegetation was piled on stacks of wood, then fired. Maple, birch, beech, and ironwood were used for cordwood charcoal. Each piece was four feet long and no less than six inches in diameter. Charcoal sold for about $.10 a bushel.

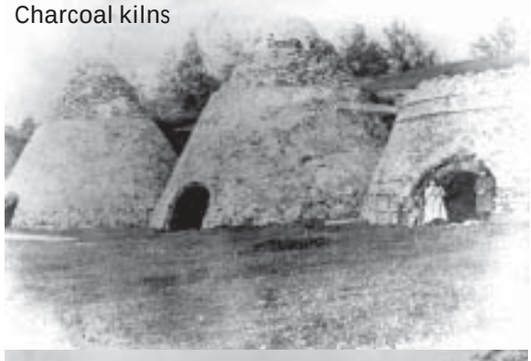
Limestone, used as a flux to concentrate impurities, was shipped here from the Lake Erie region. Though limestone occurs in the Upper Peninsula, no roads were available to transport the large quantities needed. In 1868, 155 pounds of limestone were used for each ton of pig iron.

When the furnace began operations, problems involving damp charcoal slowed output for a time. By fall, it was turning out 100 tons of pig iron a week. In 1869 the furnace treasurer was quoted as saying that the furnace was turning out 15 to 18 tons of pig iron a day with plenty of supplies on hand including coal. By the opening of navigation on Lake Superior, some 3,000 tons of pig iron would be ready for shipping. Despite two shutdowns during 1869 due to shortages of ore or charcoal,



Schoolcraft furnace

Old Munising, ca. 1870



Charcoal kilns

W.A. Cox store

Furnace ruins

the furnace generally produced pig iron at a steady rate of up to 20 tons a day. In 1870 furnace superintendent John Downing had over 25,000 bushels of charcoal on hand. Some 665 tons of iron were stockpiled on the dock.

Lack of capital seemed to be a recurring problem. In 1870, only two directors were from the area when the board agreed to sell $125,000 worth of bonds to pay off outstanding debts. The decision to move the company's main office from Marquette to Philadelphia was made that year as well, having a direct bearing on subsequent events which mired the company in debt. By October, the company collapsed.

Later that year, Peter White formed the Schoolcraft Investment Pool that bought the bankrupt company in 1871. Under White's direction, the furnace resumed production and continued for a year before a lack of charcoal shut it down. During the 12 months, the furnace produced nearly 2,500 tons of pig iron.

The furnace was shut down in the fall of 1872 to add a hopper and bell to the stack, making it more efficient. Six more kilns were also constructed nearby. By May 1873, when the furnace was in full production, iron prices were expected to reach $70 a ton. Only four months later, the Panic of 1873 began and prices tumbled.

The panic was blamed partially on too rapid expansion of the western railroads, financed by European money. Then the loans were called in, and railroad construction virtually stopped. The blast furnaces of the Upper Peninsula, dependent on railways to buy their product, were sharply affected.

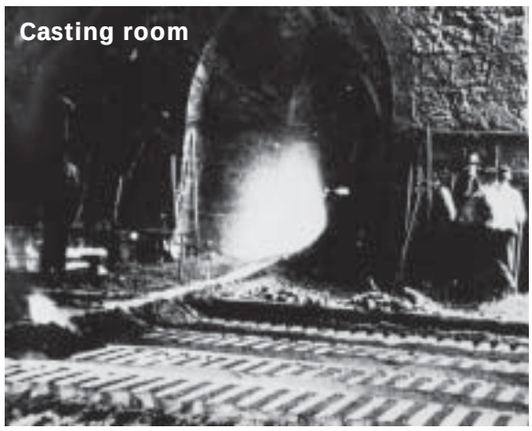
Munising's prosperity was directly tied to the furnace's fortunes. When the Schoolcraft was running, an early resident recalled the town was a busy one. "Horses with dump cars were plying back and forth from the dock to the furnace carrying ore" she said. "Other teams with wagons carried the pig iron to the dock; still others carried cordwood which was sold to the boats for fuel."

During the 24 weeks the furnace operated in 1875, it produced over 4,634 tons, including a single day's high of 35.5 tons. But on September 7, with its supplies of ore and charcoal exhausted, it shut down. In the summer of 1876, Major Henry Pickands of Onota leased the Schoolcraft and put it back in production, operating it until November 1877 when it was leased to Daniel Rankin. Rankin intended to refire the furnace the following spring, but the plan never materialized.

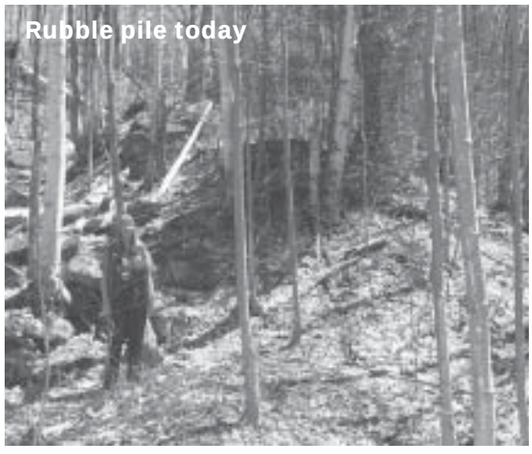
The end of the furnace operations hit the town hard. Many of the residents left to seek work elsewhere. In 1901 the idle machinery was purchased by the Lake Superior Iron and Metal Company of Hancock, with much of it melted down and recast for use in the Keweenaw copper mines.

The Schoolcraft/Munising furnace was listed on the National Register of Historic Places in 1977. Presently, the stack and furnace ruins are difficult to see. They are located across the creek on a level area near the beginning of the trail to the falls. Ruins of what may have been a corduroy road can be seen in the creek as can a large flat deposit of slag angling into the creek. As you walk north on the North Country Trail and cross the creek notice that the soil is black with charcoal. The kilns once stood on the high ground above the old road trace, now used as a hiking trail.

The smoke and din of a busy iron town are gone now. All that remain are piles of rock rubble, a few flakes of slag, and memories of a distant enterprise.


Casting room


Stack rubble


Rubble pile today

The blast furnace extracted iron from a mixture of ore, charcoal, and limestone. These ingredients are added at the top. The temperature is raised by the injection of an air blast. The less dense impurities float above the molten iron and are tapped off as slag. The molten iron sinks to the bottom of the furnace and is tapped off into moulds referred to as pigs, also known as pig iron.

Recipe for Pig Iron

Pour
900 pounds iron ore
30 bushels of charcoal
155 pounds of limestone
Inject hot air
Boil at 800F (1500 C)
Draw off slag
Tap molten iron into damp sand casting room
Yield: 1 Ton
Ship via lake vessel