# IRON MAKING

The iron industry in the United States had its beginning in the 17th Century.

Before we go on with the story, we will take a glance backward into the history of iron in the Americas. Nowhere in that history do we find evidence of iron-making in the ruins of other civilizations in Central or South America. We do find among the Incas of Peru and the Aztecs of Mexico the use of tools made of gold, silver and copper. The fact that no iron tools have ever been found has been explained by the fact that iron ore is never free of oxygen, sulfur, phosphorus, silica, etc. Therefore, to work iron ore required the removal of these elements. By contrast, gold, silver and copper are found in a free state or are almost pure. Naturally, it was easier to make tools out of these metals.

We also know that from the beginning of our Virginia settlements, there was evidence of iron ore. When the Virginia Company of London came to colonize Virginia, it planned to smelt the iron ore to be sold in England. Then even before they got started, it was discovered that tobacco could be grown more profitably than iron could be produced. Using iron ore then for industrial projects was soon neglected for the growing of tobacco with its greater profit.

Then another group from England decided to build an Iron Works in Virginia. Interestingly, with some of their profits, they hoped to christianize and educate the Indians. After the construction of the Iron Works above Jamestown, the furnace was lighted. The Indians took great alarm and massacred the workers and destroyed the plant. So, for about 100 years thereafter, no attempts were made to establish iron works of any kind in Virginia.

Now we move to New England where we learn that the Massachusetts Bay Colony commissioned an agent to begin an Iron Works. Then a couple of entrepreneurs raised capital in England and on coming to America, formed a company called the 'The Company of Undertakers for the Iron Works'. Skilled workers were brought from England and thus began the first iron manufacturing in America. Some of the other colonies soon began to emulate their efforts to lay out what they called 'Plantations.'

A plantation can best be described as a self-contained area of several thousand acres from which all the ingredients necessary to produce iron could be derived. It would therefore have ore, wood for charcoal, and a stream for blast along a hill for a bridge. Also in New England, a home for the owner and other homes for the workers. That idea was probably the parent of what we know as company houses. Our last company houses in Sharpsville are on Water Street.

By 1731 in New England, there were six regional furnaces that made items such as kettles, pots, and pans, and one Nail Works. Most of their ores came from mines in southern New Jersey or northern New Jersey.

While William Penn, our founder, was genuinely interested in the development of iron, he did not do anything about it. Then in 1682, Penn did grant a charter to a group called the 'Free Society of Traders.' Their chief purpose was to begin the manufacture of iron products in Pennsylvania. But it was not until 1727 that anything was done. This was when the Quakers settled along the Delaware and began to make their presence felt.

While it's true that the Swedes and the Dutch were also living along the Delaware, it seems that they and even Penn and his Quakers were at first only in search of gold and silver and therefore neglected the search for other metals, including iron ore.

The plantations were the beginnings of the iron industry in Pennsylvania. The worker's homes were of stone or log cabins with two rooms and a loft above. Cooking was done in the fireplace which also heated the homes in the winter months.

The iron furnaces, like those here in Sharpsville, were built on the side of a hill to facilitate loading. and the stream nearby was necessary to induce the blast. Because it took a number of men and all of the work was manual, there was a need to live in close proximity to the furnace itself. Also, since one must eat. the necessary food stuffs and the animals for slaughter were raised on the plantation as part of this self-contained enterprise.

As we begin to follow the development of the Shenango Valley's Iron Industry, one will see it as the logical extension of plantations with different circumstances peculiar to our area. The Plantation Plan also included the education of children. We know from local history that when Vincent Himrod and McClure built our first furnace, they also built a school for the education of the children of their employees. It was a private school. Even visiting clergymen were invited to speak at the Plantation because rarely did the Plantation folks get to travel to churches that were many miles away.

We know that General Washington was so interested in iron manufacturing that he stopped to inspect the Reading Furnace in Chester County. Later, his troops wintered at Valley Forge (Mt. Joy Forge) which had been burned by the British a few months before the troops stayed in what history described as a cold winter. There, Washington was not far away from Coventry along the eastern French Creek where the first steelmaking furnace in the country was built. Even during the Constitutional Convention, he saw fit to visit Trenton Iron Works, further evidence of his genuine interest in the manufacture of iron.

We must now turn our attention to western Pennsylvania and our early settlers getting over the Allegheny Mountains. Why did they come? Well, we know that Revolutionary War veterans were given land grants in acres of land. The number of acres depended upon their rank. This was the first time in our country that a reward was given to veterans in appreciation of their service to their country. This effort might be called the parent of the modern G. I. Bill which now entitles a veteran to receive help toward a college education.

There were conditions attached to the grants that required the veteran to clear a part of the land for cultivation.. After clearing, the veteran was expected to build a log cabin to live in. The cabin was usually built along the lines of those on the plantations in eastern Pennsylvania.

In order to get to Mercer County, most came by way of Westmoreland County to Washington County, then to Allegheny County, and then on to Mercer County which was created in 1800 out of Allegheny County.

It would have been physically impossible for our first settlers to carry all their farming needs on horseback, in a wagon, or when walking. Therefore, in western Pennsylvania as in eastern Pennsylvania and the other colonies, there was a need for metals. As mentioned earlier, the Aztecs and the Incas and even in biblical times, there was a need for metals, especially for making farm tools and household items.

So we know that the iron industry in the American colonies had its beginning in the 17th century. We also know that iron was produced in many places in eastern Pennsylvania as a result of the plantations. We know that in our area, there was a canal; low-yield ores; great forests for charcoal; and later, black coal. The combination of all these natural resources made possible the start of an infant industry. Then the initiative on the part of brilliant men made it into a great pro-

duction industry. This area became the greatest iron, then steel, producing area in the world. "This area" means Allegheny, Mahoning, Beaver, and Shenango Valley.

Is it any wonder that to satisfy the need for tools and other iron products, and being familiar with what they saw in eastern Pennsylvania and during the Revolutionary War, the early settlers soon began to explore their new surroundings in our county for ore. The abundance of hard woods was evident and so, too, was a river with steep banks. Ore was found here and within a small periphery was the magic formula for making iron. The rest of the problem then was to build a furnace and to make tools and housewares from iron for their own use.

Since we have mentioned the abundance of hardwoods for charcoal, more needs to be said about the charcoal process. The charcoal pit was 30 to 50 feet in diameter. The wood was stacked in conical shape and then covered with damp leaves, earth, and turf with holes in the sides to draw air; then it was lighted. It had to be watched carefully so as not to break into flame. It took 3 to 10 days to clear the whole pile. Later it had to be stored in the charcoal house that was made of thick-walled stone. If left in the open, the charcoal would absorb oxygen too rapidly and not be as heat-intensive. Interestingly, those old blast furnaces would consume, in a 24-hour period, 20 to 24 cords of wood in the form of charcoal.

Since we are trying to describe this industry in its infancy, we must also tell where this local ore came from. We know that most of it came from the vicinity of Greenfield. Therefore, one man with a team of horses or mules could travel 7½ miles to the Shenango Valley and return home for food and rest until the next day. Naturally, as the number of furnaces increased, so too, the need for more ore and more men and teams to carry it to the furnaces.

Perhaps we should tell a little about the early furnaces. Usually at the bottom, they were about 25 feet square, made of stone, and tapering to the top for a height of about 30 feet. Like all things, as time went on, these changed with improvements being made.

One might ask why the expression 'pig iron'. Early in the life of the industry, the main stream of iron from the furnace was likened to a sow, and the little side gutters to contain the iron, as piglets. Later, the piglets were separated from the sow and broken into pieces of iron. As the industry became more sophisticated, that too changed. But originally it was the mother sow nursing her little piglets.

There seems to be no doubt that the first blast furnaces in our area, and maybe the first west of the Alleghenies, was the 'Harry of the West'. It opened in 1837 and was joined in 1838 by the nearby 'Mineral Ridge'; both of these were in Perry Township. These were started by a man named J. G. Butler. Evidently he had discovered here all of those necessary ingredients - the ore, the forests, and the stream. Butler suffered hard times and was sold out by the sheriff in 1847.

Then the whole scenario on furnaces changed with the discovery of 'coal in quantity'. We think that the first coal may have been discovered in the Mercer area in 1825. Then later, we know that more was found on the farm of Peter Simpkins in West Salem Township, where he soon sunk a shaft. In 1835, coal was discovered on the West Hill in Sharon on the Joel Curtis farm. Now those words 'coal in quantity' take on a new meaning. Coal had to prove itself burnable in a furnace and that it was better than charcoal for the intense heat necessary to make iron and that it was easier to store.

The experiment of converting a blast furnace from charcoal to block coal took place at the Henry Clay Furnace in Clay Hollow in Hickory Township. The superintendent in charge was Frank Allen. After many experiments, he had succeeded in the conversion. This was an enormous

'breakthrough' for stoking a furnace and changed forever the iron-making process.

We must now introduce General Pierce into the picture. We know that he came into this area from his home in Swansey. New Hampshire. We also know that he came here selling cloth and later clocks and other goods. We think he may have heard of a fuel that they were calling 'Black Gold' that burned better than charcoal or plain wood.

When Pierce brought his family down from New Hampshire, they first settled in Cranesville in Erie County. He then decided to move to Mercer County and bought land on Mt. Hickory Blvd. and built a house that still stands. The Black Gold was on his mind and he soon acquired the Montgomery Shaft in Hickory Township where he started to mine coal.

The coal mining in the Mt. Hickory area was very successful. Actually, Pierce continued to mine in that area from 1851 until 1871. Pierce decided that because he was producing more coal than he could sell, he would build blast furnaces in Clarksville. As mentioned in the article on coal, Clarksville did not welcome the idea and refused him permission. But at this time, Pierce was selling coal to the Agnew Furnace in Sharpsville which was unable to pay its bill. So Pierce took over the Agnew Furnace in 1855. Maybe it should be said that Pierce backed into the iron business. He immediately remodeled the furnace to make it more efficient.

When a rich vein of Lake Superior ore was discovered in Michigan, Pierce went there and made a purchase of a large ore pit. He also ran a railroad spur into his holdings in order to get the ore to a main railroad and then on to Sharpsville. The first use of Lake Superior ore was at his Agnew Furnace. However, it is questionable how it turned out there. Frank Allen, who had first converted a blast furnace from charcoal to block coal, claimed quite correctly that the first successful Lake Superior ore was the result of his experiments at the Clay Furnace. Mr. Allen's claim seems valid because the key word is **successfully**. General Pierce made no such claims and Frank Allen's reputation as a genius at iron producing is above reproach.

As stated earlier, furnaces were built near a river or stream with 'steep banks' to facilitate the blast. This also allowed for a bridge to be built to store charcoal, then coal, to keep the furnace going through the night. It took some effort to keep the furnace hot enough to melt the ore.

Then the tuyere (French word for valve cap) was developed, an invention which caught the gases at the top of the furnace stack and brought them down for the blast. This, too, was a great breakthrough in the production of iron.

About this time, the 'ship' or bucket was developed in West Middlesex. With these two developments, it was no longer necessary to build a furnace near a river with steep banks. Next, since furnaces had been loaded manually, this backbreaking labor was now eliminated.

Since we are writing about the 1840-1850 etc. period, and Sharpsville at that time, perhaps we should say that there was a greater need for metals in the Civil War, but we did not feel it here. We do know that there was a need for iron metals in the great western movement. Certainly General Pierce played a prominent role in the early development of iron and helped make it a mass production industry.

Originally our first blast furnace was called the 'Blanche', then when it was sold to the Agnew brothers, it became the 'Agnew', and later it became known as 'the old Sharpsville'. Later, more blast furnaces were built on the bend of the river - Mt. Hickory #1 and #2; the Florence, later called the Allen and then Henderson Allen (this was not a Pierce furnace); then the Douglas #1 and #2.; the Mabel #1 and #2; and the Spearman #1 and #2; and then one with the strange

name 'Shoo Fly. General Pierce had an interest in seven of these nine furnaces.

It is difficult from local histories to determine the respective tonnage capacity of the local blast furnaces. It does seem that they each varied upward from 18,000 to 40,000+ tons annually. What seems beyond dispute is that this was the greatest iron-producing area when there was a tremendous need as a result of the country's westward movement.

While it is true that the Pierce's dominated the local iron industry, it is interesting to note that M. A. Hanna was involved with them. Hanna is often referred to as the 'Maker of Presidents.' It should be said he pushed Ohio natives into the presidency. Whether it is true or false, it is said that after McKinley was nominated, Hanna said, "Now you just sit on your front porch and we'll take care of the election."

Then within a few years, the whole iron industry was revolutionized. No longer would the old requisites of low-yield ore, forests of oak and maple, the nearby river with its steep banks, and loading manually be necessary. Instead, a new era had entered the iron industry - furnaces were built inland. A steady supply of high-yield ore, coke made from soft coal, natural gas, the electric for intense heat, and the mixture of other metals came by canal, lake, and railroad to meet the customer's needs.

Here we must pause and ask, then answer, the question, "Why did the Pierce's succeed when so many others failed?" Pierce was not a miner but he successfully mined coal; he was not a furnace man but he ran the furnaces successfully; he was not a railroader but he operated the Sharpsville to Oakland Railroad successfully. Nor was he a banker but he organized and ran the Iron Banking Company, and neither was he a merchant but he managed a General Store owned by the Pierce's.

Pierce was a farmer and a barrel-stave maker. He seemed to have the capacity to look at something new and see its potential for the future. Each of his furnaces were remodeled to modernize iron-making with all the new developments to facilitate iron-making for maximum production. While others were slow to make changes, he made them immediately. Also, Pierce surrounded himself with skilled people. His alliances with Mark Hanna, and that genius of iron-making, Frank Allen, are evidence of his talent for capable associates.

When General Pierce came to town in 1847, there were somewhere between 12 and 20 dwellings at the lower end of Sharpsville, folks probably involved in canal work. When he died as a result of a fall at the mansion, there was a population approaching 3000. It was said that he had plans to build a steel mill but had not set the complete plan in motion. His unfulfilled dream was the beginning of our downfall - steel came to the valley but not through the Pierces.

While it is the intention of this article to place the emphasis on Sharpsville and iron-making, it would be difficult, if not impossible, to isolate our community in this growing and important industry. We must acknowledge that what started out almost as a cottage industry became not only the biggest industry in our country, but also the world. Then we must raise the question of why the industry continued to grow in Allegheny County, but not in Mercer County.

Beginning in about 1847, the usual reasons for failure were bankruptcy, fires, explosions, floods, refusal to accept high-yield ore, failure to modernize with new machinery, and of course, the lack of working capital. Admitting again that even during the Civil War, the furnaces did not run to full capacity. But soon thereafter, they had increased output from 30 or 40 tons per day to several hundred thousand tons annually by 1870.

Then during the 1870's, the Bessemer Process of making steel again revolutionized the iron industry in a 10 to 15 year period. A good example of that here was that we were making iron rails for the railroads in the westward expansion, These iron rails had a life span of 6 to 8 months, but the steel, by contrast, had a life span of 15 to 30 years. There were hundreds of such examples of the increased use of steel and less use for iron.

Meeting this new demand for steel over iron required ten times the amount of pig iron. This in turn, required a a new cylindrical iron blast furnace and in some cases, three or four furnaces were placed side by side for mass production.

Were these changes taking place in Sharpsville or the Shenango Valley? No, they were not. But, Pennsylvania, in 1860, was producing more iron than all the rest of the country put together. It is very interesting to note that from the beginning of the Civil War in 1860, iron production dropped everywhere and did not pick up until the end of the War. Then in 1873, we had an economic panic which also had an enormous effect on our Valley.

As this writer reads history, in 1870 we here were producing more iron than Pittsburgh. Actually, the production tables do not list our area separately, but as western Pennsylvania which included Pittsburgh with Sharpsville. Perhaps because these communities (except Sharon) were not incorporated, the statistics were lumped together. But by 1875, the production in Pittsburg had increased 300%.

Steel was coming into its own largely because of Michigan high-yield ore, superior blast furnaces, and the Bessemer Process. In addition, the Soo Canal was in use, and there were improved railroad links. Unfortunately, most of this passed us by, largely, this writer believes, because of the navigable rivers in Allegheny County. Perhaps too, General Pierce' untimely death was also a blow to our industry.

Time was moving on and other areas that had been behind us were surpassing us in the production of iron and steel, such as Johnstown and Bethlehem, Pennsylvania, and Chicago, Illinois. Some places without an iron and steel background now had access to the technology.

There then began the slow process of the elimination of the unfit and inefficient among the blast furnace industry. Slowly but surely, the furnaces started to fall apart. Here, the fact that the genius of Pierce did not descend to his sons may be one reason. But probably the best reason was the plantation concept formed in a different way. The Companies had their own ore, coal, water, transportation with railroad agreements, and now highly skilled management. All this resembles the plantation plan in its concept of being as self-contained as possible. Surely the best examples are U. S. Steel and Bethlehem Steel.

Here in Sharpsville, the Clara and Old Sharpsville lasted into the 1940's. The Shenango Furnaces were tightly controlled and managed to hold on. Even while their future was dim, World War II allowed the Clara and Old Sharpsville a second wind. When the War bubble burst, they died and eventually were sold for scrap.

Now we must ask why the Shenango Furnaces continued to prosper. The Snyder family bought them in 1906, held and operated them until they were sold in 1985. However, we look at Shenango, we must confront the plantation concept all over again.

The original W. P. Snyder cut his teeth in the 1880's in the iron business. He entered into a partnership with another merchant and then later purchased his partners' holdings. He then expanded into iron ore mining and started to develop iron ore mines at Mesabi in the Lake Superior

area in Michigan. He then entered into the coke business and was president of Clairton Steel. All this time he continued to develop Shenango Furnace Company.

With his own iron ore, Snyder also developed a fleet of ore freighters which complemented his purchase of the Shenango Furnace Company from Pierce-Kelley, which now rounded out an integrated iron company. He also purchased, in Sharpsville, the Spearman and the Mabel blast furnaces when he bought the Pierce-Kelley Shenango Furnace.

There are many reasons why the iron and steel business gravitated toward Pittsburgh despite our having had an early start and having pioneered in the great changes that revolutionized the whole business. It was water transportation.

Unlike the canals, the rivers did not freeze over and this provided Allegheny County with year-round transportation for heavy products. It was the railroads that followed the canals into the Pittsburgh area. The railroads came because Pittsburgh, too, was becoming an iron and steel-producing area.

Because of this plantation concept, the Snyders had a self-contained industry with their four local furnaces, their own lake steamers, and their own iron ore. The Snyders remained competitive in an iron and steel- conscious world that was changing the face of America.

It was the Snyder genius and dedication that kept Sharpsville an iron-producing area. One by one, the Pierce furnaces lost business and had to be dismantled and sold for scrap. Only the Snyders and their Shenango Furnaces survived. Survival in a highly competitive industry was directly related to being as self-contained as possible.

In the development of the iron and steel business, it must not be overlooked that originally, the steel companies did not have their own blast furnaces and therefore, their own iron. Even the iron companies had to change as they learned to ship molten metals in ladle cars to foundries. Sharpsville then benefited by Shenango's purchase of Penn Mold and Manufacturing Company in 1926 and moving the operation to Sharpsville to begin manufacturing molds and stools.

Fortunately for Sharpsville, the Snyders hired very capable people as managers. Once again, with keen competition, with millions of dollars at stake, and hundreds of jobs in jeopardy, these men had to be razor-sharp in their skills.

While the emphasis of this article is on Sharpsville, the Snyders could not stand still and thus opened the plant at Neville Island with its advantage of river transportation to supply the Pittsburgh steel companies. They also opened a plant in Bethlehem, Pennsylvania, to satisfy that market.

While we know, and pointed out earlier, the Civil War saw no increases in the iron business, the same was not true of World War I and even more so of World War II. As war became more sophisticated, the need for iron and steel and better mechanical machines to wage war grew. Even a cursory look at a World War II tank gives evidence of this truth.

A free society is always in a state of change. After World War II, Shenango reduced itself from three blast furnaces to two and installed 'electric' furnaces. Even later, they reduced to one blast furnace.

What was happening to this industry? With continuous casting becoming large over the

iron industry, separate blast furnaces were becoming unnecessary. There would therefore be little or no market for their products. We were so proud of our pioneering and great breakthroughs in the iron industry. Now continuous casting nullified completely our breakthrough and changed it forever.

In 1985, Shenango Furnace Company sold out to the Aelo family, also of Pittsburgh. After operating a short time, for reasons not easily obvious, the Aelo's took Shenango into bankruptcy in 1988. After much litigation, the plant was sold to a combination of joint ownership of employees and other interested groups, and was redesignated Sharpsville Quality Products. It is their hope to return some of the old mold needs and exceptional needs of the steel business, and then to go forward in the development of new iron products.

Somehow, they are thankfully holding on. They are constantly on the lookout for any new business and keep between 80-100 men employed.

It is beyond this writer's competence to tell fully the Shenango story and what they meant to us for 80 years. There were, over the years, four William Snyder's involved in their history. Their contributions to this town are inestimable and deserve a book rather than a once-over-lightly, as in this article. They were more than just an employer. They were a family firm with a social conscience that greatly benefited this town for 80 years.

For some of us who remember the age of the blast furnace, there is a great loss. Something that was part of our skyline for 140 years has disappeared. Those stacks that reached over 250 feet into the air are no more. The flue dust that blessed our town no longer falls - we thought it was tinsel and hoped it would fall forever. That bend in the river that housed our furnaces - and yielded thousands of tons of iron - is now just a curve as water follows the path of least resistance.

Was that our golden age when brawny men carried pig iron and stacked it along the tracks? Or when men rammed cores and left work dirty but with dignity? Unfortunately, the iron business in our town cannot tell its own story. Thus, this feeble effort.