

A GUIDE TO THE OLD STONE BLAST FURNACES IN WESTERN PENNSYLVANIA

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PART I

IRON, the second most plentiful of the useful metals, has been known and used since the beginning of recorded time. With the exception of the deposit of pure iron at Ovifak on the west coast of Greenland, it is almost always found in combination with other elements. To be useful the ore has to be "reduced" or separated. This is done in a smelter or blast furnace. The first metallic iron probably was made accidentally, either by lightning striking some ore or by a wood fire burning on a deposit of ore. In this way men also learned that wood or charcoal helped to refine the metal. At first this was done in shallow depressions in the ground; but, as the centuries passed and each generation added its additional knowledge, the blast furnace, as we know it today, was evolved.

Tubal-cain, who was only seven generations removed from Adam, is described in the Bible as "an instructor of all artifices in brass and iron."

The Egyptians, Babylonians and Assyrians all knew of and used iron. Their literature is full of references to it.

When Caesar invaded England, he found iron money in use but not iron weapons. Fabricated iron was rare in England and Scotland because the natives did not know that iron could be smelted without charcoal. For many centuries they frowned upon its manufacture because the burning of wood to make charcoal exhausted their limited forests. As a result, until they learned to make iron with coal or coke, they encouraged the importation of iron from Spain, Sweden and Russia.

In America the situation was different. The early European settlers had seemingly unlimited supplies of wood in the forests in the eastern part of the continent and people were anxious to have the

Myron B. Sharp, a chemist, and William H. Thomas, an engineer, became acquainted through their mutual interests in photography and history. Having to do with the construction and operation of a blast furnace, it was only natural that they were interested in the old stone furnaces that abounded in Western Pennsylvania in the early days. Locating and photographing these relics of a bygone era allowed both avocations to be indulged at the same time.—Ed.

forests cut so that the land could be farmed. Because of this, and despite the fact that we had coal available, almost all iron produced through the middle of the nineteenth century was charcoal iron.

The first iron works erected in America were at Falling Creek, near Richmond, Virginia. Here, in 1620, iron was made by the Virginia Company, but after a short time the works were destroyed and the workmen massacred by Indians.

The first successful iron works in America were located on the Saugus River near Lynn, Massachusetts. In 1643, John Winthrop, Jr., son of the governor of Massachusetts, and ten other Englishmen built the works now known as the Saugus Iron Works. This furnace and forge have been rebuilt in recent years as a monument to the early iron industry.

Iron perhaps was first made in Pennsylvania in 1692. "Forty pounds" were reported by Richard Frame in that year, probably processed in a blacksmith's forge. The first iron works established in Pennsylvania was a bloomary forge built by Thomas Rutter, a smith, on Manatawny Creek, probably about three miles above Pottstown. According to Watson's *Annals*, the first iron furnace in Pennsylvania was built in 1720 in Berks County and was called Colebrookdale Furnace. In the next fifty years or so many furnaces and forges were built in eastern Pennsylvania. The most famous of these was Valley Forge, and its fame is not due to its iron-making activities, but to the fact that the Continental Army wintered there in 1777.

The first furnace in Western Pennsylvania was the Alliance, built on Jacobs Creek in Fayette County in 1790. Other furnaces were established in Fayette County, and then the infant industry spread to other counties in Western Pennsylvania.

By the middle of the nineteenth century the trend was to use coke instead of charcoal, hot blast instead of cold, steam for power instead of waterwheels and steel shell, fire brick lined stacks instead of stone stacks. Stoves were added to heat the blast, and as these stoves were made larger and larger, the furnaces became larger. So the modern blast furnace evolved. It was all a matter of economics, supply and demand, technology, etc.

Many of the early furnaces in eastern Pennsylvania were built and operated by members of a few families whose names became well known in the iron industry. There were the Rutters, Potts, Nutts, Grubbs, Colemans, Birds, Eges and others. These eastern ironmasters and their families lived like royalty in their manor houses, but that

way of life was not true in Western Pennsylvania except for a few isolated cases, such as the Measons and the Shoenbergers. Blair County, however, was an exception, probably due to the fact that it was close to the eastern counties. Henry Spang's house at Etna Furnace, Edward Lytle's house at Rebecca Furnace, the Royer house at Springfield Furnace, and the ironmasters' houses at Sarah and Frankstown Furnaces were quite large, well-built houses. The ironmasters' houses at Springhill, Redstone and Little Falls Furnaces, all in Fayette County; Hickory and Etna in Butler County are more modest homes, although probably very elaborate in the eyes of the workmen of those days. The workers mostly lived in log or stone cabins of one or two rooms. Log houses having second floors were luxuries that not many workmen enjoyed.

Examples of the old log cabins still may be seen. Near Etna Furnace, Blair County, there is a row of four or five cabins that still are in use. At Little Falls Furnace, Fayette County, is a log house which still is occupied. Near Union Furnace, Fayette County, are two or three log houses which have been covered with clapboard and tarpaper. At Rebecca Furnace, Blair County, is a stone cabin that at one time housed a worker and his family. A brick house at this same furnace served as a store and a hotel for visitors to the furnace.

Although actual operations at a blast furnace probably required fifteen to twenty men around the clock, other jobs connected with the furnace, such as cutting wood to make charcoal, hauling the charcoal, raising food for the employees and the horses, hauling ore, limestone and pig iron, increased the number of workers to between sixty and eighty. Also from thirty to fifty horses were needed for the many hauling jobs.

Hard liquor was in great demand by the workmen. It was almost as necessary as food or so it seems. Because most furnaces were built far from towns, adjacent to raw materials and water power, there was little or no opportunity for recreation; and as a result men resorted to drinking as a way to pass their leisure time.

Most stone furnaces were rectangular, tapering from the base to the top. A few had offsets, so that the furnace seemed to be built in three or four tiers. Blair County had one round furnace. Venango County had at least two that were round and one that was square at the bottom and octagonal at the top. The one furnace in Forest County seems to have been square in front and round at the back.

Almost all furnaces were built beside hills having flat areas at the

level of the furnace tops. Materials were taken to these "benches" for charging into the furnaces. Bridges between the tops of the stacks and the "benches" were used for this purpose. The Juniata Furnace at Williamsburg, Blair County, had a long flume of water going to the furnace top. A rope with a bucket at each end passed over a pulley. Ore, coke or limestone was shoveled into the bucket on the ground and at the same time water was run from the flume into the upper bucket. When the weight of the water became greater than the weight of the charge, it would start down. By repeating this process the raw materials would be lifted to the top of the furnace.

Lawrence Furnace, Lawrence County, was different from any of the others. It was built by digging a hole straight down, near the edge of a cliff, tunneling through to the face of the cliff and lining the entire area with brick. This furnace was charged from ground level.

In the early years, the blast was powered by water turning a wheel which in turn either worked a bellows (early furnaces) or pushed pistons in and out of tubs to create the blast. After the middle of the nineteenth century, most of the new furnaces used steam engines to produce the blast. Many of the old furnaces converted from water wheel to steam engine. The "Old" Furnace in Erie was dependent on a blind horse walking in a circle to turn the drive wheel, which in turn operated the pistons to compress the air.

Bellows used in the early furnaces were made of wood and leather and looked like bellows used to start fires in our fireplaces today, except for size. The furnace bellows were quite large, some of them twelve feet long, four feet wide and four feet deep.

Sometime after 1820, the use of bellows was discontinued and two pairs of wooden tubs were used. Each pair consisted of one tub inside another with suitable leather gaskets. As the inner tub of one pair was descending and sucking in air, the inner tub of the other pair was ascending and compressing the air. By means of leather valves the flow of air to a storage tank was regulated.

Many of the furnaces are in beautiful locations. Liberty Furnace, Venango County, is just below a small water fall. Rockland Furnace, in the same county, is below a large water fall. Springfield Furnace, Mercer County, is at the foot of a good-sized water fall. Porterfield and Victory Furnaces in Venango County, New Laurel and Center Furnaces in Fayette County, and Lawrence Furnace in Lawrence County are all far from passable roads; and the surrounding land has kept its natural beauty. Many of the others are also in wild, beautiful locations.



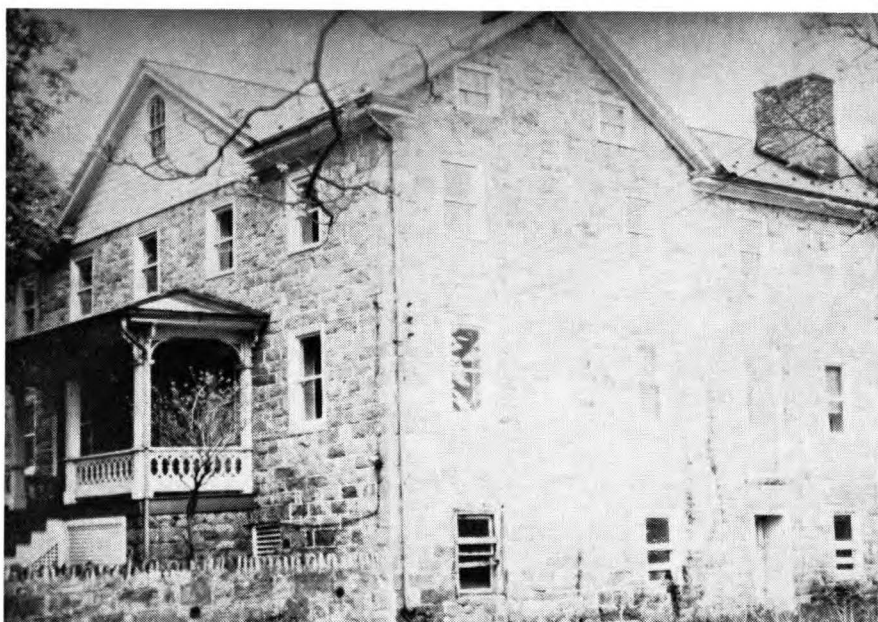
Left: Bassenheim Furnace, Beaver County

Right: Hopewell Furnace, Bedford County



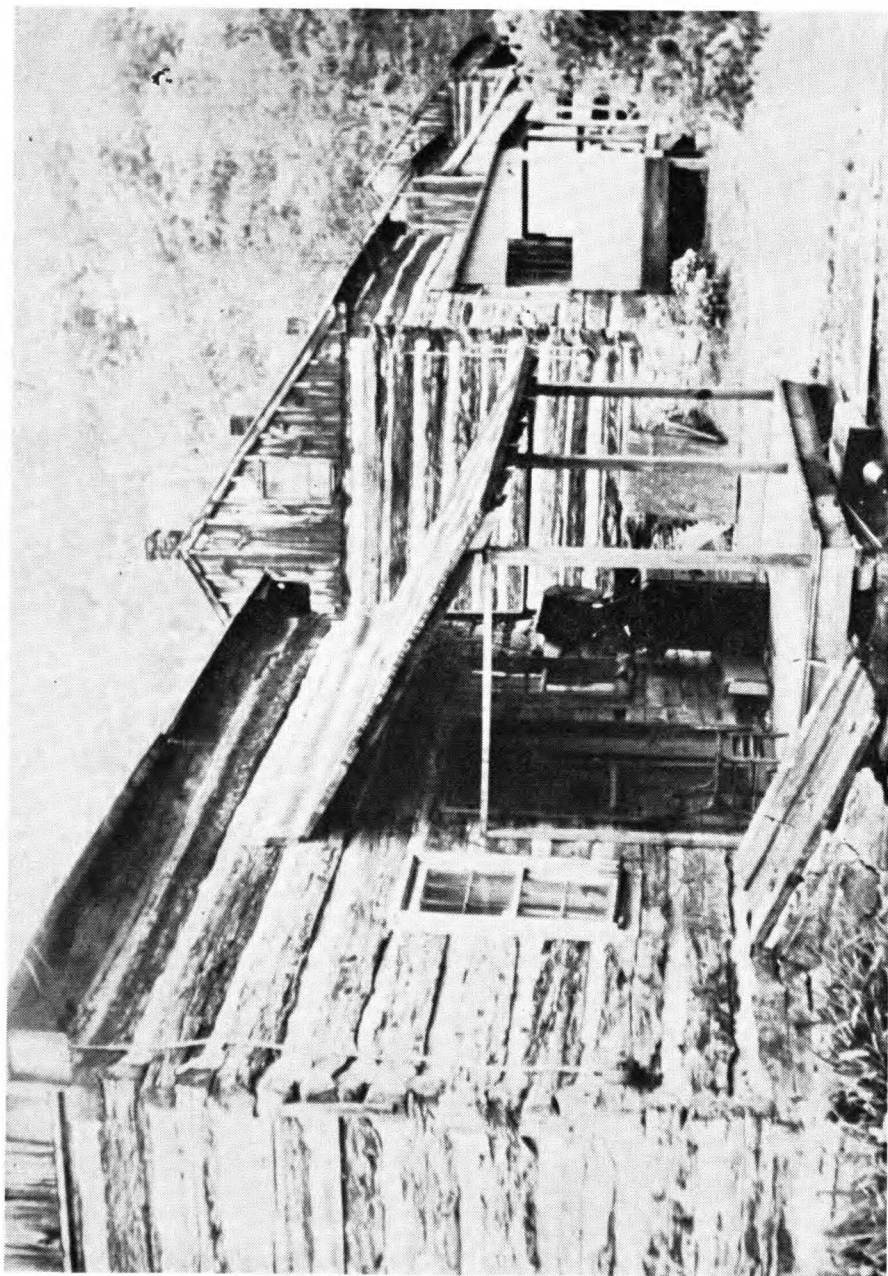
Left: Elizabeth Furnace, Blair County

Right: Soapfat Furnace, Blair County



Above: Ironmaster's house, Mt. Etna Furnace, Blair County (built by Spang and later occupied by Isett)

Below: Store and office at Martha Furnace, Blair County



Log houses at Mt. Etna Furnace, Blair County

We have given names and dates as recorded in various county histories, magazine and newspaper articles, books on the history of the iron industry and recollections of people whose ancestors worked at some of the many furnaces, but we have not attempted to verify any of these statements. We have listed the furnaces visited alphabetically by counties. Our reason for writing is simply to record the locations of the furnaces in Western Pennsylvania, thus producing a guide or directory for the use of those who are interested in the early history of the iron industry and want to see for themselves the surviving furnaces.

In locating the furnaces we have used the road numbering system of the state. There are U.S. highways, as U.S. 22, Pennsylvania highways, as Pa. 711, which go from county to county without change, and L.R. (Legislative Route) roads, which are numbered to show the county in which the road lies, such as L.R. 26015 or L.R. 64065, the first two digits indicating the county. In these cases, 26 signifies Fayette County and 64 Westmoreland County. Also, there are T roads, such as T-241, which are township roads. These may be anything from a paved road to an old abandoned lane. Usually, at the start of an L.R. road there will be a sign with the number and an arrow pointing in the direction in which the road runs. This is also true of T roads, but very often these signs have either never been put up or have been removed.

The state has issued county maps which show almost everything along roads by means of various symbols: gas stations, pumping stations, farms, covered bridges, quarries, mines, schools, churches, cemeteries, etc. Each road is numbered, and by using one of these maps the directions given here easily may be followed.

ALLEGHENY COUNTY

CLINTON FURNACE

Was built in 1859 by Graff, Bennett and Company. It was a coke furnace and the second blast furnace built in Allegheny County. Standing on the south bank of the Monongahela River, it was about halfway between the Point Bridge (covered in those days) and the Pittsburgh and West Virginia Railroad Bridge which also has disappeared. Only the two piers and the sealed entrance to the tunnel through Mount Washington remain.

John Kane, well known Pittsburgh artist, painted a picture of this furnace and the buildings connected with it. It shows the furnace in re-

lation to the bridge and to the churches still standing on Mount Washington. The furnace stood back from the river, about where Carson Street is now.

SHADYSIDE FURNACE

George Anshutz, Anthony Beelen and William Amberson built this furnace in 1793. It was in blast for only about one year, closing because the nearby ore supply failed and ore brought in from Roaring Run near Apollo proved to be too expensive.

The furnace stood at the foot of Amberson Avenue and to the right. When the Pennsylvania Railroad was built through this valley about 1860 the furnace was torn down. In the early 1900's when Alexander Pitcairn's house was being built, the cinder bank supposedly was uncovered; but this either is incorrect or the furnace was farther up the Run than the histories say, because the slag or cinder piles were always downhill from stacks, never above. So much construction has taken place in this area in the past century and a half that it is doubtful if the exact site ever can be located.

ARMSTRONG COUNTY

ALLEGHENY FURNACE

Was built in 1827 on the west bank of the Allegheny River, two miles above Kittanning. It was owned in 1832 by A. McNickle and produced 14-15 tons of pig iron a week.

To reach this site, go west from Kittanning to the west end of the bridge over the river. Turn north on L.R. 03024 for 2½ miles. Just past a junk yard on the left side of the road T-505 turns off to the left, crosses the railroad track, turns south then swings around the end of a hill and continues northwest. The furnace site was in the loop formed by the road T-505. No trace of the furnace remains. We did find considerable charcoal slag on the hillside bench above the probable furnace site, and believe that the road now covers the actual site. The entire area now is an enormous mine slag dump. The millrace and building foundations are covered with many feet of mine refuse or red dog.

AMERICAN FURNACE

Aaron Whittaker, John Jamison and George Ledlie built this furnace in 1846. It is in Madison Township near the village of Rimer.

Originally a hot blast charcoal furnace, it was changed in 1858 to use coke. It went out of blast in 1860.

Starting at Templeton, follow L.R. 03068 north through Mahoning to Widnoon (see Redbank Furnace, Clarion County), a distance of 4.1 miles. Turn left on L.R. 03084 and follow it for about 4 miles. Going downhill toward Rimer, the road crosses a concrete bridge. About $\frac{1}{4}$ mile beyond this bridge and on the right side of the road is a house. A creek flows down the valley, back of the house and parallel to the road. Directly behind the house another creek joins the first one. The furnace was set in the triangle formed by the two creeks and upstream from the junction. At present, the road is on the opposite side of the valley from where it was in the 1850's. After studying an old map of the region, we think that the creek also was moved when the present road was built. A man who lives in the house at the site did not know where the furnace stood but did say that he dug up glassy slag and uncovered an old foundation while plowing the land in the area between the two streams. An old road leaves the main road just above the concrete bridge and goes to the right, following the right bank of the stream but at the top of the hill. At the second creek, it curves to the right and goes upstream along the top of the bank. Then it makes a U turn and comes back down the bank of the creek to the junction where it crossed the second stream and continues downstream along the right bank of the creek.

BEAR CREEK FURNACE

Was built in 1818 on Bear Creek just south of Parker by William Stackpole and Ruggles Whitney. It was the first furnace built in Armstrong County. The builders failed before the furnace was completed; and Baldwin, Robinson, McNickle and Beltzhoover finished it. It was intended for coke but the blast was too weak, and the furnace chilled after two or three tons of iron were produced. When charcoal was substituted, the furnace worked perfectly. Experiments were conducted likewise in the use of raw bituminous coal. The furnace produced as much as 40 tons of pig iron in one week, which was unusual at that time. In 1832 it was the largest furnace in the United States. A tramway with wooden rails took the iron from the furnace to the river for shipment to Pittsburgh. The course of the tramway still can be followed in some places. The furnace went out of blast prior to 1850.

To find remains of this furnace turn south on Jackson Avenue, at the First Presbyterian Church in Parker (Pa. 268 will take you to

Parker). Go 1 mile on this road to a railroad. Park and walk to the left along the track for about 50 feet. Look down over the embankment, and about 50 feet down the hill you will see the ruins of the old furnace, including part of the back wall, a retaining wall and 8 or 10 feet of the inner stack. Below the furnace and toward the creek, the ground is covered with slag.

BIDDLE FURNACE (ROCK FURNACE)

James W. Biddle built this furnace in 1825 on Roaring Run near the town of Apollo. It went into blast on Christmas Day, but the venture was not successful. The furnace changed hands several times until 1855, when it went out of blast permanently.

A little of each side is still standing. One opening is partly visible. There is a large amount of slag over the surrounding area. A huge rock overhangs the road beside the furnace. That is why it was known as Rock Furnace.

To reach this furnace follow L.R. 03120 south from Apollo for 1.4 miles to Jackson Road (L.R. 03120). This road leads to T-454. Go right on T-454 for about $\frac{3}{4}$ mile. Shortly before reaching the creek, a dirt road turns sharply right. Follow this dirt road for about $\frac{3}{4}$ mile. After crossing the bridge over Roaring Run near its junction with Rattling Run, look for the large rock on the left overhanging the road. The furnace ruins are across the road from this rock.

BRADY'S BEND FURNACES (GREAT WESTERN IRON WORKS)

At Brady's Bend was built one of the largest, if not the largest, of the iron industry's plants of the nineteenth century. It consisted of four furnaces, forges and rolling mills. All are gone now except the ruins of two furnaces and enormous piles of slag.

The first of these furnaces, Great Western No. 1, was built in 1840 by Philander Raymond. It was a hot blast coke structure and had a 14 foot bosh and was 50 feet high. This was extremely large for those days.

Great Western No. 2 was built in 1841 at the same place. It also had a 14 foot bosh and was 50 feet high. The capacity of each furnace was 100 tons a week. The poor success of these furnaces established the 12 foot bosh as the favorite size for coke furnaces of that time.

Great Western No. 3 was built in 1843 and had an 11 foot bosh and was 43 feet high. Its capacity was also 100 tons a week.

Great Western No. 4 was built in 1846. It was a hot blast charcoal

furnace with the same dimensions as No. 3 furnace. Its capacity was 60 tons a week.

Two of these furnaces still are standing and in plain view of people passing on Pa. 68. They are in poor condition but still recognizable. To reach them from East Brady, cross the bridge over the Allegheny River on Pa. 68. A little over 1 mile on this road, the furnaces will be seen against the hillside to the left. Between the road and the furnaces is a school yard. The school is just beyond the field, to the south. A bell cast at the Great Western Iron Works stands on a base in front of the school.

BUFFALO FURNACES

The first of these two charcoal furnaces was built in 1839 by P. Graff and Company on Buffalo Creek at the crossing of the Kittanning and Butler Pike. It produced 45 tons a week and was the first furnace in the county to use hot blast.

The second furnace was built in 1846. It was a hot blast charcoal furnace with an 8 foot bosh as compared with a 9 foot bosh in the first furnace. Although smaller than No. 1 Furnace it was, due to improvements, a better producer. Both went out of blast in 1864.

To reach the sites of these furnaces, follow U.S. 422 west from Kittanning through Walkchalk to Worthington. In Worthington, turn right to the old highway which runs parallel to the new one but 100 yards north; turn west on the old highway and go through town. At the foot of the hill, near the west side of town, turn south on a road just before reaching the bridge over Buffalo Creek. An old white store building is on the left. Go down this road past a row of houses on the right (about $\frac{1}{4}$ mile). Park here and proceed on foot down the lane for 200 to 300 feet. On the left just beyond a bend in the road are the depressions where the furnaces stood, on the left next to the hillside. The stones were removed, crushed and used for road repair in the township. There is a large amount of slag around.

COWANSHANNOCK FURNACE (BONNER FURNACE)

James E. Bonner built this furnace in 1845 on Cowanshannock Creek about 3 miles north of Kittanning. It was a cold blast charcoal furnace with an 8 foot bosh. Bad location of the stack led to its early abandonment (1851).

This site may be reached by going north from Kittanning on L.R. 03068 for 3 miles from the courthouse. Turn right on L.R. 03157 at

the north end of the bridge over Cowanshannock Creek. Follow this road for about $\frac{3}{4}$ mile. After crossing a small creek, a road turns back sharply to the right. This is T-507 but it probably is not marked. Follow it up the hill and down again and cross the bridge over Cowanshannock Creek. This road is very rocky and rough, but it can be driven with caution. About $\frac{1}{4}$ mile beyond the bridge, park car and proceed on foot. Look for a steep path going down the hillside to the creek. Go down this path and walk along the near bank of the creek to the foot of an old mine waste pile on the side of the hill. The furnace was located just beyond this dump 20 or 30 feet back from the creek. Only a few stones, some rubble and slag remain.

Instead of going down the steep path to the creek, you can go straight ahead on the old roadway to the old mine and then down the hill to the creek. The furnace site is to the right.

Note: Andrew Bonner built Victory Furnace in Venango County. Joseph Bonner owned Victory Furnace a few years later. James C. Bonner built Cowanshannock Furnace. They probably were related, but no proof has been found.

MAHONING FURNACE (COLWELL FURNACE)

Built in 1845 by John A. Colwell of Kittanning, this furnace was successful for more than thirty years. It started as a cold blast charcoal furnace powered by steam. In 1860 it was remodeled for coke. The stack was enlarged, and an iron jacket lined with firebrick replaced the upper part. At the same time hot blast was applied. In September, 1878, the furnace was taken out of blast because of the depression of that year. It never was reactivated.

To reach this site, proceed north on Pa. 28 to the village of Mahoning Furnace, on the north bank of Red Bank Creek. At the south end of the bridge over the creek turn east into a lane which leads to a farmhouse. Go through the gate at the end of the lane and continue on past the barn. The ruins of the furnace are in back of the barn, about 200 feet. The furnace is in poor condition. One of the openings still can be seen. An abutment for the charging bridge still is intact. Many acres of slag between the furnace and the creek verify the statement about the long life of the furnace. There is charcoal as well as coke slag.

MCCREA FURNACE (OLNEY FURNACE)

Was built in 1857 by McCrea and Galbraith about 1 mile below the Mahoning Dam. Visible from the road is a long retaining wall or load-

ing dock of stone. Above this wall are the ruins of the stack. Most of the stones are there, but much of the structure has fallen. One opening can be seen. It has been practically alive with ground hogs. (Many of these old furnaces are homes to ground hogs, opossums and raccoons.)

To locate this furnace, go north and east from Kittanning on Pa. 28 for about 12 miles to Goheenville. About $\frac{3}{4}$ of a mile past the bridge at the north end of the village, turn right on L.R. 03080. Follow this road for 3 miles, turn left on L.R. 03075 for 1.3 miles, turn right on T-667, follow this road to bottom of the hill. Just before you reach the bridge over Mahoning Creek, turn left on a road which parallels the creek, T-748. About 200 feet along this road you will see a stone wall at the base of the hill on the left. The furnace is on the hillside above the wall. The entire area is covered with slag.

MONTICELLO FURNACE

Was built in 1859 by Robert E. Brown of Kittanning. He operated it for several years with success. It later changed ownership, and the new management became financially involved in an attempt to import high grade lake ore to mix with the native carbonate ore. It was abandoned in 1873.

The furnace stood on the east bank of the Allegheny River about $\frac{1}{2}$ mile above the mouth of Cowanshannock Creek. During its operating years there was a good sized community around the furnace. There were 68 dwellings on the property, and more than 200 employees were on the payroll. The furnace itself stood on the present railroad right of way. However, the retaining wall for the charging terrace still is there, now serving as a retaining wall to protect the railroad from possible slides. The land between the railroad and the river has a small mountain of slag on it.

To reach this furnace site, proceed north from Kittanning on L.R. 03068. Three miles from the courthouse in Kittanning the road crosses Cowanshannock Creek. About 0.5 mile beyond the bridge stop and look down over the railroad toward the river. Several large piles of slag can be seen, but the retaining wall mentioned above cannot be seen, since it will be directly below you.

"OLD" REDBANK FURNACE

This steam powered cold blast charcoal furnace was built in 1841 by Alexander Reynolds and Christian Shunk. It was blown out in 1853.

Shunk had withdrawn in 1842; he became postmaster at Redbank, now called Kellersburg.

The stone from this furnace was hauled to the grounds of the Transylvania Bible School on Pa. 28, a few miles north of Freeport.

To reach the site of "Old" Redbank follow Pa. 28 north from Kittanning to the village of Oakland (Distant Post Office). Turn left on L.R. 03084 and follow it for about 4 miles to Kellersburg; in Kellersburg turn right onto dirt road, T-494, opposite the church; follow this road down the hill and through the strip mine area. The furnace site can be recognized by the vast amount of slag scattered around. Nothing remains of the stack. Its location can be seen against the hill at the back edge of a large level area. Because of the stripping in this area it is difficult to give definite directions.

ORE HILL FURNACE

Was built in 1845 on the left bank of the Allegheny River about 8 miles above Kittanning. It was a hot blast charcoal furnace with a capacity of 35 to 40 tons of pig iron a week. It went out of blast in 1857 for lack of wood to make charcoal.

Parkinson Run in Templeton, near the furnace, became Whiskey Run probably because of the heavy drinking by the furnace employees and is called that to this day.

This site may be reached by following L.R. 03068 north from Kittanning to Mosgrove. After crossing Pine Creek at the north edge of town, turn left (the paved road goes right), cross the railroad tracks and go north along the river. This still is L.R. 03068. Park at the dam and walk along the lane between the tracks and the river for $\frac{1}{4}$ to $\frac{3}{8}$ of a mile. The old stack still is standing, between the tracks and the hill. Several years ago when the railroad tracks were raised because of the dam, the lower part of the furnace was covered by the fill. About five or six rows of stones are visible on one side and two or three rows on the other side. One side has fallen, exposing the inside of the stack. We found some slag along the river bank near the furnace. Most of it was covered by the fill for the railroad roadbed.

PHOENIX FURNACE

Henry Smith, W. B. Travis, Jonathan Grischer and Andrew Workman built Phoenix Furnace in 1846 on Mahoning Creek below Milton. It used a loamy hematite ore found nearby. The furnace never was successful and was blown out in 1853. It is now in the impounding

area behind the Mahoning Dam. Sometimes it is covered with water, always with silt dropped from the water.

To reach the site of this furnace (or as close as you can get to it) follow Pa. 85 east from Kittanning to its junction with Pa. 839; follow Pa. 839 north through Dayton to Milton or Phoenix, as it is known locally. From the north end of the bridge over the Mahoning Creek, south of Milton, proceed $1\frac{3}{4}$ miles north on Pa. 839, through Milton; turn left on T-605 for about $\frac{1}{4}$ mile; when the road bears right an old lane turns left, almost straight ahead. Park and walk down this overgrown lane. Phoenix Furnace was located where the lane crossed the creek. Today, the bridge no longer is there; and the remains, if any, are buried under several feet of mud. They cannot be reached except after a prolonged dry spell and maybe not then.

PINE FURNACE

Was built in 1845 by Brown and Mosgrove of Kittanning to make hot blast charcoal iron, for which purpose it served until 1865, at which time it was remodeled to use coke. The stack of the original furnace was 32 feet high and had a 10 foot bosh. Blast was powered by steam. The new stack (1865) was 40 feet high, had a 9 foot 10 inch bosh and a 4 foot square hearth. Its capacity was 50 to 60 tons a week. It was blown out in the summer of 1879 because of a shortage of local ore. Almost continuously in blast during its entire life except for necessary shutdowns for repairs or renewals, this was the cheapest furnace in the county to operate and earned money right up to the day it was shut down.

Not much remains of this furnace. The stack is a pile of rubble. A large stone abutment for the land end of the charging bridge still stands against the hill back of the furnace. The entire valley between the furnace and the creek is covered with slag, both charcoal and coke.

To reach this site follow Pa. 28 north from Kittanning for 5.8 miles to where T-529 goes to the right; follow this road for a little more than $\frac{3}{4}$ mile and cross the bridge over Pine Creek. The furnace is to the left next to the hill, the stone abutment is in plain sight and the stack was just below it.

STEWARDSON FURNACE

Was built in 1851 by Stewardson and Laughlin. Intended to use coke, it had little success at first, but later it was quite successful. Its measurements were 11 foot bosh and 43 feet high. Capacity was 75 to

80 tons a week until it went out of blast sometime after 1880. Farther up the hill from the furnace are the remains of coke ovens used to produce the coke for the furnace.

To reach this site, drive north from Templeton on L.R. 03068 to Mahoning; turn east on T-691 which goes right just before reaching the bridge over Mahoning Creek; proceed on this road to where it makes a 270° bend while going uphill. The ruins are to the right in the bend.

BEAVER COUNTY

BASSENHEIM FURNACE

Built in 1814 by Dr. Detmar Basse, founder of Zelienople, this furnace was sold to Daniel Beltzhoover in 1818. Its capacity was 5 tons of pigs and castings a week. Out of blast since 1824, a good portion of this furnace still is standing. Some of the outer wall is visible, and a section of one side of the inner wall rises several feet above the ground.

To reach this furnace, go west on Pa. 288 from Zelienople. One-half mile west of the junction of Pa. 288 and Pa. 588, L.R. 04034 comes in from the south. Park here and you will see an old lane which runs along the hillside on the left just above L.R. 04034; follow this lane for about 100 feet to the ruins of the old stack. Although the furnace is near Zelienople, and Dr. Basse lived in Zelienople, the furnace is located in Beaver County.

BEAVER FALLS FURNACE (BRIGHTON FURNACE)

Was built in 1808 by Hoopes, Townsend and Company, near the "Middle Falls" on the Beaver River. In 1812 Frederick Rapp of the Harmony Society at Economy was supposed to have tried to purchase the property for \$32,000 but was unsuccessful. Dr. Lawrence Thurman, Curator at Old Economy, says he never has found anything in the records of the Harmony Society to verify this statement.

In 1826 the furnace was blown out. This furnace was located, according to a map dated 1832 in the files at Old Economy, on the north side of Walnut Run where it enters the Beaver River. On the old map it was called "Brighton Furnace."

HOMEWOOD FURNACE

Built in 1858, on the Beaver Canal a little south of the junction of

Connoquenessing Creek and the Beaver River, by James Wood of Pittsburgh and operated until 1867 or 1868.

To reach this site go to Ellwood City and follow Pa. 351 west and south toward Koppel. About $\frac{1}{4}$ mile before Pa. 351 turns right down the hill you will see a blacktop road (L.R. 04017) to the left. Across Pa. 351 from this road a lane goes straight west. Follow this lane to its end in Ellwood City's town dump. The furnace site, at about the center of the dump, is covered with eight or ten feet of rubbish. Below the dump there are heaps of coke slag. Beside the lane leading to the dump is a sunken road which we believe to be the roadbed of the railroad which was in service when the furnace was in operation. On the hillside below the furnace site (dump) are several building foundations. One of these, an extra strong foundation, probably was the blower or compressor house.

BEDFORD COUNTY

BLOOMFIELD FURNACE

According to the Bedford County histories, Elizabeth Furnace at Woodbury was torn down about 1847 and rebuilt at Bloomfield near the Bedford-Blair County line. Some years later it was again dismantled and moved north to Rodman, Blair County, where it became the Rodman "Middle Maria" Furnace. The weekly production at Bloomfield was about 50 tons. Judging by the large piles of slag at the Bloomfield site, the plant must have operated steadily for many years.

To reach this location follow Pa. 36 south from Hollidaysburg to Roaring Springs and turn onto Pa. 867. Follow this road for 3.2 miles to where L.R. 05103 goes to the right. About 0.2 mile down this road is a red brick house. On the adjacent barn is a sign reading "Bloomfield Furnace Farm." Park here, obtain permission at house and walk through the fields back of the house to the large slag piles. When you reach the slag piles you will see the furnace ruin to your left against the hillside. It now is only a pile of stones. This originally was a charcoal furnace but changed over to coke.

ELIZABETH FURNACE

Was built in 1827 near the town of Woodbury by King, Swope and Company in which Dr. Shoenberger was the "company." After 20 years the stack was taken down and moved to Bloomfield.

To reach the original furnace site, take Pa. 36 south from Holli-

daysburg to Woodbury. At the south edge of town, turn west. Pass the mill on the right, cross the bridge and enter the field on the left. There is a good-sized slag pile near the creek. On a bench above you can see where the furnace was. Higher, on another bench, is the foundation of the charcoal house. There still is charcoal on the ground. Near the charcoal house foundations is iron ore along the bank. The owner of the farm said he had dug up pigs and splashed iron on the furnace level and in the cinder pile below.

HOPEWELL FURNACE

Erected in 1802 by Lane and Davis, on the Juniata River, opposite the mouth of Yellow Creek, this furnace was operated until 1830 or 1831, when the stack was rebuilt, 31 feet high and with an 8 foot bosh. The original furnace produced about 15 tons of iron a week. After remodeling, the production increased to five tons a day. It was blown out finally sometime after 1884 when it was owned by Messrs. Lowry, Eichelberger and Company.

To reach this furnace, go to the village of Hopewell, off Pa. 26 in Bedford County, about 15 miles north and east of Everett; turn south on Pa. 915; turn left on the first street after crossing the bridge over the Raystown Branch of the Juniata River. About one block up the hill you come to a level spot in the street which was, at one time, a railroad right of way. Turn left on this old stretch and proceed about $1\frac{1}{2}$ blocks to the village dump. Go to the far edge of the dump and look down. If there is a barricade at that place, you are standing on top of the furnace. Rubbish has been dumped here until the furnace itself is about half covered. From the foot of the bank, part of the inner lining and some of the outer stonework may be seen. Several large concrete foundations of later years are directly in front of the furnace.

LEMNOS FURNACE

Built in 1841 by Loy and Patterson on Yellow Creek some two miles west of Hopewell, this plant was abandoned prior to 1878 after having had a variety of owners.

To reach the furnace site, proceed north from Everett on Pa. 26 to the village of Yellow Creek. Near the eastern side of the village turn south on L.R. 05059 for $\frac{5}{8}$ of a mile to junction with L.R. 05057; then left on L.R. 05057 for 0.4 mile. East of a house close to the road on the right, a lane turns sharply downhill toward houses in the valley. Follow this lane to the bridge over Yellow Creek. The remains of

Lemnos Furnace are on your right about 50 feet from the lane, a pile of stone and rubble, with one large piece of lining visible at the top of the pile. There is charcoal slag along the creek and in the fields.

BLAIR COUNTY

ALLEGHENY FURNACE

Was built in 1811 by Robert Allison and Andrew Henderson and was operated by them until 1818. Just before the furnace went out of blast, a large stone office building was completed close by. The furnace lay idle until 1836, when it was purchased by Elias Baker and Roland Diller. It then was reactivated, and a dam across the creek (now called Baker Run), a water wheel, a saw mill and a flutter wheel were built. The furnace was converted from charcoal to coke in 1867. It was not blown out until 1884. The stone storehouse building was restored in 1939 and is now the home of the Women's Club of Altoona. When the stack was restored, all of the notches were closed with stone, and mortar was put between all of the stones. Steps were built to the top, and the rim provided with an iron railing.

To reach this furnace go to 3400 Crescent Road, in southeast Altoona.

BALD EAGLE FURNACE

Was built in 1830 and was owned at one time by Lyon Shorb and Company. It is located at the village of Bald Eagle on U.S. 220, a few miles east of Tyrone.

To reach this furnace go northeast from Tyrone on U.S. 220 for approximately 4 miles. Pa. 350 comes in from the north near a bridge over Bald Eagle Creek. Across the bridge and about 50 feet back from the road is a large old barn. Park here and walk south through the field on the east bank of the creek for about 100 yards. The ruins of the old stack are on the hillside to the east. Part of the lining rises several feet, black on the inside and yellow on the outside. A smaller piece of lining is on the ground nearby. The field between the furnace and the creek is covered with slag.

BENNINGTON FURNACE

Blair County histories state that the Bennington Furnace was built in 1846 in Allegheny Township and that another furnace called Harriet was built in the same township at an earlier date. But a book belonging

to W. R. Metz of Williamsburg, oldest member of the Blair County Historical Society, states that the Bennington Furnace originally was called the Henrietta Furnace, and we believe that the "Henrietta" became the "Harriet" through an error in transcription and that they are one and the same furnace.

Searching for the Bennington Furnace, we found the remains of an earlier charcoal furnace (Bennington was a coke furnace) a short distance below the Bennington Furnace. This no doubt was the Henrietta or the Harriet.

To reach this furnace or these furnaces, as the case may be, follow U.S. 22 to the Blair-Cambria County line. A black top road, T-454, runs north on the county line. Follow this road for 1½ miles to the junction of T-454 and L.R. 07018; turn right on L.R. 07018 and go down the hill for about 0.4 mile. There is a very large slag pile in the valley on the left. Park here and cross the valley on foot. Go up the hill at the back end of the slag pile. Just above this spot and below the railroad track which runs along the hillside are the ruins of the Bennington Furnace. Some retaining walls are on the hillside above the furnace. The upper side of the furnace has several rows of stone intact, but the other three sides have collapsed. There are several very large slag piles running from near the base of the furnace out into the valley, showing that this furnace was in blast for many years.

Return to the car and drive down the hill for about 0.3 mile, to an old lane leading to the left and back. Follow this lane on foot for about 200 feet to where it crosses two streams just above their junction. On the far bank of the second stream, and to the left of the road, there is a large salamander. Although no trace of the stack remains, we are sure it stood just about where the salamander lies or at least within a few feet of it. The charcoal slag begins at this point and goes downstream between the two creeks and also between the creek and the highway. No trace of slag was found above the salamander. We assume that this is the site of the original Bennington Furnace (called Henrietta) and that no other furnace was built in Allegheny Township.

BLAIR FURNACE

Was built in Logan Township about 1830 and owned at one time by H. N. Burroughs.

To reach the site, follow U.S. 22 through Duncansville to Spur 884 to the left (Howard Johnson Restaurant on a corner). This road becomes A6849, then U.S. 220. Follow U.S. 220 north for about 4 miles

($\frac{3}{4}$ mile past the junction of U.S. 220 and Pa. 971 to the east). Turn left on this road for about $\frac{3}{4}$ mile, then right on L.R. 07027 for 1 mile; turn left on bridge over the P.R.R. yards. At the end of the bridge turn right about two blocks. There is an old stone tower on railroad to right. The Blair Furnace stood between this tower and the bridge. The site now is covered with fill, no trace of the furnace remains; not even slag.

CHIMNEY ROCK FURNACE

Was built in Hollidaysburg almost directly across the river from the Gaysport Furnace in 1836. (See page 96.)

From the Gaysport Furnace, continue across bridge on L.R. 07044 one block. Turn left and follow dirt road to its end. The furnace site is the flat area to the right between the road and the railroad track, directly opposite the freight station.

ELIZABETH FURNACE

Was built in 1832 on the Little Juniata, in Antes Township, near the present village of Pinecroft. It was owned at one time by Martin Bell and at another time by Edward Bell.

To visit this furnace, start at junction of Pa. 36 and Pa. 764 in Altoona, proceed north on Pa. 764 for 1.9 miles to L.R. 07027. Follow this road for 3.7 miles to bridge over Sandy Run. Do not cross but continue on dirt road for about 100 yards. The furnace is to the right about 75 feet and next to the hill. It is in excellent condition.

FRANKSTOWN FURNACE

The only historical information we were able to obtain about this furnace was that it was built in the village of Frankstown in Frankstown Township in 1836. After visiting the site, we know that, although built for charcoal, the furnace used coke in later years.

To reach the site drive east from Hollidaysburg on U.S. 22 to its junction with L.R. 07011 at the village of Frankstown. There is a pyramid war memorial at the northwest corner of the intersection and a large stone house on a hill opposite the northeast corner. This house, we found, was the ironmaster's house.

Proceed on L.R. 07011 for about 200 yards. The furnace was on the left. The site is now occupied by a school bus garage. You can see the charging bench back of the garage. A piece of iron about 8"x8"x8' is lying on the ground just south of the garage. It probably was a lintel

to support one of the arches. Two large slag piles are across the road, one to the north and the other to the south of the furnace site.

GAYSPORT FURNACE (HOLLIDAYSBURG FURNACE)

Was built in 1836 and was owned by Smith and Caldwell.

Take U.S. 22 to Hollidaysburg and turn south on Pa. 36, over the railroad track. At the first cross street turn left and park in back of brick building on the corner, at south end of bridge over Juniata River. The furnace site was 100-150 feet to the left, about midway between the river and houses along Bedford Avenue. Nothing remains of the structure. When excavating for some of the houses workmen dug through several feet of slag and uncovered old building foundations.

HARRIET FURNACE

See Bennington Furnace.

JUNIATA FURNACE (WILLIAMSBURG FURNACE)

Built in 1857 by Neff, Dean and Company, nothing remains of this furnace. It was located in Williamsburg near the river bank. W. R. Metz pointed out the furnace location. It was on the north side of First Street, opposite the end of Spring Street. A power substation now stands there.

Because there was no hill from which to build a charging ramp to the furnace, an ingenious method for charging was devised, as described on page 80.

MARTHA FURNACE (GAP FURNACE)

In McKee's Gap was built in 1862. E. F. Shoenberger was the owner. We located the site and later talked to Harry E. Shaw of McKee, who verified the location. In 1905 he helped to dismantle the old stack and moved the stones a short distance away to use in the foundation of a large barn, still standing, near the stone house on Pa. 36. This stone house was an office for the furnace.

To reach the furnace site follow Pa. 36 south from Hollidaysburg to McKee. Turn right on L.R. 07006 up the hill to a sharp right turn (about 0.4 mile from Pa. 36). Do not turn but continue straight ahead for about 100 feet. A small white house stands left and below the road and between the bank and the railroad track. The furnace site is about 75 feet beyond this house and against the hillside. Nothing remains of

the stack, but there is a slight depression in the ground where the stack was. Across the railroad and between it and the river are small mountains of slag, testifying to many years of operation.

The office and store building, across the creek and close to Pa. 36, is in excellent condition. Other old houses survive in the immediate vicinity. Several of these are of logs and date back to the days when the furnace was in operation.

MT. ETNA FURNACE (OR ETNA FURNACE)

Was built between 1807 and 1809 and put in operation in the latter year by Canon, Stewart and Moore. It was not blown out until 1870. This was the first furnace in Blair County. Henry Spang bought it in 1837, and Jacob Isett bought it about 1855. Many houses remain from the days when it was active, including a row of log houses about $\frac{1}{4}$ mile from the furnace which are in use today. About 100 yards beyond these log houses is the ironmaster's house, built by Spang and later occupied by Isett. It still was in good condition at the time of our visit. Isett built a large stone house at Arch Spring, about 8 or 10 miles north of Etna Furnace. This house still is in use.

To find Etna Furnace, drive east on U.S. 22 through Yellow Springs to T-463 on the right where there is an historical marker at the intersection. Follow T-463 for 1 mile. The furnace is on the left, about 30 feet from the road. It now belongs to the Blair County Historical Society and the stack has been repaired and the joints mortared, which helps to preserve the furnace but does not make it appear as a stone furnace should look. (Furnaces never were mortared.) The Historical Society also has closed the openings with concrete blocks. There is a large stone retaining wall behind the furnace which is in excellent condition, and there are quantities of charcoal slag around.

Continue on T-463 to L.R. 07020, then on that road for about $\frac{1}{4}$ mile to the log houses on the right and another 100 yards to the stone Spang house.

REBECCA FURNACE

Was the third furnace in Blair County. It was built in 1817 by Dr. Peter Shoenberger, who later became the most prominent ironmaster in Pennsylvania. Other iron enterprises of his in the Juniata Valley were numerous, extensive and followed closely upon the building of Rebecca Furnace. He also owned ironworks in Bedford, Cambria,

Indiana, Westmoreland, Lancaster, Mercer, Allegheny and perhaps other counties and at Wheeling, West Virginia.

To reach the Rebecca site follow Pa. 164 from Roaring Springs east through Martinsburg to the village of Clover Creek. Turn north on the first hard road (not numbered on the county map) for $1\frac{1}{2}$ miles to T-342 which runs downhill to the east. After $\frac{1}{4}$ mile this road makes a sharp right turn. There is an old brick house in the bend. Park here, obtain permission, since this is private property, then go through fence on the left and down to an old barn at the bottom of a small hill. The furnace stood beside the barn and next to the hill. Because it was in a dangerous condition, the ruin was pushed over about 6 years ago as a safety measure. It now is a pile of stone and rubble. Large piles of slag extend from the furnace into the valley. A millrace can be traced upstream for $\frac{1}{4}$ mile to the remains of a dam. Across the creek is a small stone house that probably was the home of a workman. Up the side of the mountain, $\frac{1}{4}$ mile, is the ruin of the foreman's house. An old road leads to it. The red brick building in the bend of the road was a store and hotel. Continue along the hard road, where the millrace will be to the left. You will see the remains of the dam and across the creek is the beautiful house built by Dr. Shoenberger's daughter and her husband, Edward Lytle, Sr., who managed the furnace. The house still is in use, privately owned and in excellent condition.

RODMAN FURNACES

The three Rodman Furnaces, known as Upper Maria, Middle Maria and Lower Maria, were built by Dr. Shoenberger and named for his daughter. Elizabeth Furnace, originally built at Woodbury in Bedford County, was removed to Bloomfield in 1847 and some years later was again moved, this time to Rodman, where it became the Middle Maria.

To visit this site follow Pa. 36 south from Hollidaysburg through McKee's Gap. Just past McKee's Gap, there is on the left a large plant of the New Enterprise Limestone Company. Across the highway from the main entrance are slag piles along the hillside above the road. The three stacks stood where the paved road now is. They were several hundred feet apart. Nothing but slag now remains. An elderly man nearby told us that as a boy he played around the old stacks whose exact locations he pointed out to us.

SARAH FURNACE

Was built about 1832 by Dr. Shoenberger. It never was successful and

was shut down after two or three years of operation. The stack finally was demolished in the winter of 1881-1882.

In quest of this site, follow U.S. 220 south from Hollidaysburg to the village of Sproul, about one mile south of Claysburg. In Sproul turn right on A 5732. After about $\frac{1}{8}$ of a mile along this road a dirt road leads downhill to the right. At the foot of the hill another dirt road to the right is closed by a chain. Walk through this lane to the large dump which now covers the furnace location. The furnace stood on the natural hillside, and the site now is covered with dirt and waste from the brickyard. Only a few pieces of slag remain in the field between the hill and the creek.

A large white house at the junction of U.S. 220 and A 5732 was the ironmaster's house.

SOAPFAT FURNACE (CANOE FURNACE)

The correct name for this furnace was Canoe. It received its nickname of Soapfat when a shipment of pork, brought over from Philadelphia for the workmen to eat, proved suitable only to make soap.

This furnace is one of the most interesting we have seen. It is round, rather than square. About half of the structure has fallen, and the inner lining has been removed, probably for a relining job; but the furnace was abandoned before the work was completed. Two of the openings are in good condition. A large piece of the lining is leaning against the wall at the bottom of the stack. Several walls and foundations are close by.

To reach the location drive east on U.S. 22 to its junction with Pa. 203 on the right. About 0.3 mile down this road a small stream runs from the left through a culvert under the road. Stone gate posts on the left beside the stream form the entrance to a group of houses on the hillside. Go along the east bank of the stream about 150-200 yards. The stack is against the hillside on the right.

SPRINGFIELD FURNACE (ROYER FURNACE)

Built in 1815 by John Royer and his brother Daniel, it was operated until 1855. A forge (Cove) was active in conjunction with the furnace. The Royer family was in the iron business and other enterprises in Blair County until recent times.

To visit this furnace, follow Pa. 866 from Williamsburg southwest to the village of Royer, a distance of 4.6 miles. Drive through Royer to the second road to the right, T-392, and continue to the bottom of

the hill. Park in the field on the left, next to the creek and before the road crosses it. The furnace is to the left in the woods, about 30 feet from T-392. Most of the furnace still is standing, but it is overgrown with brush. There is slag downstream from the stack and a dam on a small stream below the furnace. This could have furnished power to run a grist mill. Many old houses are in the area. The ironmaster's house, an outstanding example of Pennsylvania architecture of the early nineteenth century, is located on the west side of Pa. 866 about $\frac{1}{8}$ mile before reaching T-392.

[To be continued]