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*THE IRON INDUSTRIES OF COLUMBIANA COUNTY,  
OHIO.*

BY J. G. CHAMBERLAIN.

Preliminary to the historical part of the subject, we will refer briefly to the iron ores found in the valley of the Little Beaver river, as they have never received in our State Geological Reports the notice they deserve.

Beginning near the "Terminal Moraine" on the Middle Fork of this stream and extending down the valley for many miles, are a series of table-lands, the elevation of which are from twenty to fifty feet above the low water level.

These table-lands are found on both sides of the stream, but seldom directly opposite. Their areas vary from one acre to two hundred acres, one of the largest being the one on which the town

of New Lisbon is built. They evidently are of drift formation, the depth of this drift is from ten to twenty-five feet. In this deposit we find the Kidney or Nodular Iron ore which has so largely supplied the blast furnaces of the County. From four thousand (4,000) to six thousand (6,000) tons of ore is frequently found on one acre of land; it is a carbonate with an oxidized shell of one-fourth to one-half of an inch in thickness, and in its raw state contains about 35 per cent. metallic iron, and from 43 to 45 per cent. when calcined. It is mined in benches, the miner digging over the entire deposit, picking out the ore when in large or medium sized nodules, and shoveling it into riddles when small, and after shaking out the dirt separate the stones from the ore by hand. It takes an experienced eye to detect the ore from stone, and with the utmost care many stones will pass into the clamp for calcining. After going through this process the stone are more easily detected, and with proper care, all but a small per cent. can be picked out.

One peculiarity of this deposit, is the large ore is always found at the bottom of the drift; this, at first view, may not seem strange because by the laws of gravitation the heaviest substances sink first to the bottom. Let us ask a few questions, which may be easier asked than answered, and may be the occasion of others wondering at this peculiarity of the deposit.

First, where did this ore come from?

Second, how was it mined from its original deposit?

Third, what force carried it to the places where now found?

Fourth, the length of time it took to mine, remove, and make the deposit?

We will not attempt to answer these questions, but will refer them to geologists for their consideration, however a few suggestions may help to advance the solution.

The Little Beaver river has made its rocky bed in a narrow valley, the high lands on either side being from two hundred to four hundred feet above. The geological formation is the same on both sides of the stream, and in some places as high as five and six seams of coal are exposed. Above and near to, three and possibly four of these seams of coal, regular formations of Kidney or Nodules iron ore are found, which is held firmly in its place (except at the outcrops) by the contiguous shale. From the highest to the lowest deposit a distance of over one hundred and fifty feet

intervenes. Some of the largest nodules of ore are found in connection with the lowest seam of coal exposed, and some in connection with the second, third, and fifth seams above. The ore found in the drift already mentioned, is the same in appearance and in composition as the unoxidized part of the ore found in all the seams in the hills on either side. In rare instances a nodule of ore is found in this gravel deposit very much like the specular ores of Lake Superior and Canada. We now come to the sixth question. How could the large nodules of the lower and upper seam be deposited together at the bottom of the drift, unless the excavation of all the seams were made at one time, which would have been almost an impossibility. I have assumed that the ore in the valley is a portion of the same exposed in the hills, although I do not undertake to state it as a fact, but everything directs to that conclusion.

In speculating or theorizing on this subject we will suggest that the dissolving effects of the heated rays of the spring and summer sun when it met the glazier along its terminal, as it came from the north compelled it to surrender its frigid qualities and become the inundating waters which has cut its channel deep into the strata over which it followed, and carrying with it the ores of the upper seam of coal and depositing it along its banks as it flows on to the sea. The returning seasons bring continued inundations and the next seam of ore is washed out and carried into the valley below, and so on until the lowest seam has been carried away by this mighty excavator and buried in the debris with ore of its kindred seams. Finally the victorious sun, in its conflict with the glazier, has produced an unparalleled flood which has taken up the deposit of ages and in its whirlpools and eddies has redeposited it, dropping the ore at the bottom where we now find it. I have already dwelt too long on this subject, and will now leave it for others to speculate on.

A seam of limestone iron is found along the Little Beaver laying just below Prof. Newbury's number four vein of coal; it contains from twenty-five to thirty-five per cent. metallic iron, varying in different localities. This ore is of considerable value but will not be extensively mined as long as there is plenty of drift ore. These ores attracted the attention of the white settlers who came into this valley as early as 1795 or 6. Undoubtedly exaggerated reports of the minerals in the Little Beaver valley were carried back east of

the mountains by these settlers, which resulted in a blast furnace being built in 1807 on the west bank of the stream, one mile above New Lisbon. This was the third blast furnace built west of Pennsylvania, the first being built in 1804 and the second in 1806, both in Poland township, Mahoning County. The Rebecca furnace—that being the name of the furnace built near New Lisbon—was one of the Pioneer iron enterprises in the west.

The men who originated the idea of building blast furnaces in this—at that time western wilderness—have not received the credit they were entitled to. It was a great undertaking and but few men were courageous enough to make the attempt. But Gideon Hughes, of Baltimore, Maryland, was such a man, and I trust his name will pass into history as the builder of the first blast furnace in Columbiana County, Ohio.

The Blast furnaces of 1807 were not much in advance of the fifteenth century. For nearly three hundred years from the commencement of that century but little progress was made in the manufacture of Pig Iron. From two to three tons per day was a fair average production of the furnaces of that time, while some of the furnaces built in this country the past two years make as high as one ton of iron every five minutes, or about three hundred tons in twenty-four hours.

The Rebecca furnace was built for a charcoal furnace, and for using the kidney and limestone ores found near its location. With these materials an excellent quality of Foundry iron was made.

Mr. Henry Trunick, of New Lisbon, told me only a short time since that he made stoves and kettles from the Rebecca Pig Iron in 1822 (being the first stove plates ever moulded in flasks in Columbiana county) melting the iron in an old Air furnace, using the Whan or Newberry's Number Five Seam of coal. The quality of these castings was good, as many who used the Rebecca stoves made by Mr. Trunick can testify. The furnace and stove was named after the wife of Mr. Hughes.

The size of the Rebecca furnace is unknown, but it must have been not far from thirty-five feet high, with a bosh of about eight feet. It was a square stone stack, using only one tuyere with inside diameter of two and one-half inches. Modern furnaces use from five to eight tuyeres, with inside diameter of five up to ten inches.

An effort was made to use coke in this furnace, which proved a

failure. This is not surprising, when we take into consideration the quality of coal from which it was made. If the coal from Prof. Newberry's Number Four Seam had been coked, and used, the results undoubtedly would have been far different, and New Lisbon might have been the center of a thriving iron manufacturing district.

One great difficulty in successfully running this furnace must have been the inferior quality of limestone used. No furnace man of the present time would use the limestone found in the vicinity of the Rebecca furnace.

Chemistry has been the key that has unlocked the mysteries of reducing iron ores in the Blast Furnace. It has opened the door so that we can see or determine the different substances of which the ore is composed. It has determined the character of the different gases and the amount of each, produced by the combustion of coal, and the effect produced by these gases passing over the heated ore. It has shown us the injurious effects produced by phosphorus sulphur and silicon when found in combination with iron, and points out the way it can be eliminated.

I have digressed somewhat from the historical, but have done it to show some of the reasons so many of the pioneer furnaces of the State were not successful.

Mr. Hughes, as proprietor, and Walter Powers, founder, ran this furnace until 1814 or 1815. After this James McKinley, grandfather of Hon. William McKinley, operated the furnace a few years for Mr. Hughes, and afterwards for himself.

Henry Doyle succeeded Mr. McKinley. He ran the furnace several years and failed. His bondsmen, William Hostetter, George Garretson and Samuel Shriver, under the firm name of Hostetter, Garretson & Co., took the furnace and ran it one year, when Mr. Doyle, by some arrangement with his bondsmen, again assumed the charge of it for about three months, after which it was never operated. This was in the year 1839. I recently learned from William Ward, of Girard, Ohio, the only person living who was ever financially interested in this furnace, that in 1826 his father, himself and others leased the furnace and ran it for one year. There is no record to be found of this lease, but the word of Mr. Ward is sufficient to substantiate the fact.

A small quantity of furnace slag, a portion of the stone stack,

and the old stone boarding-house are the only relics left to show the location of the third blast furnace built in Ohio.

The next blast furnace built in Columbiana county was erected by Arnold Downey, of Pennsylvania, in the year 1840. It was located about three-quarters of a mile from Calcutta, in St. Clair township, on section fifteen in the Valley of Hazel Creek, a tributary to the Little Beaver. It was in operation about eighteen months, during which time it used the kidney and block ores of the neighborhood. The limestone used was procured from section fourteen in the same township. Charcoal and bituminous coal was used as fuel.

It is said this furnace made from twelve to fifteen tons of pig iron every twenty-four hours. If this is correctly reported it shows the furnace was making as much iron as any of the furnaces of that day. The iron was sold in Pittsburg, where it had a good reputation for foundry purposes. After being in operation eighteen months it was abandoned. The failure of the Sandy and Beaver Canal may have had something to do with the discontinuing of operations. However, it only met the fate of most blast furnaces of that time and earlier years, which were built away from lines of water transportation. On account of these failures, the pioneer builders of blast furnaces in this western country have not received that tribute of respect they deserve.

The next attempt made to build a blast furnace in the county was in 1866, in Salem township. The beginning of this enterprise reached back to 1856 and 1857. In 1856 Prof. J. S. Newberry made a geological survey of the minerals along the line of the Ashtabula and New Lisbon railroad, and was so well pleased with the quality of the coke made at Washingtonville, that he and William Wetmore, of Canfield, leased the minerals on the land of Anthony Wisler, adjoining that town. Soon after Mr Wetmore sold their interest to other parties, who enlarged the facilities for mining coal and built quite a number of coke ovens. In 1861 the new owners built a tram-road from the mines to the Pittsburgh, Ft. Wayne & Chicago Railroad, where the town of Leetonia is now located. During the war large quantities of the coke and coal were sold and fully established the reputation given it by Prof. Newberry. The coke had been used in the blast furnaces at Newburg with excellent success. In the meantime the railroad had been built from Leetonia to New Lisbon, with a fair prospect

of being built to Niles and there making a connection with the Mahoning Division of the Atlantic and Great Western Railroad. During this time the owners of the Washingtonville mines leased and purchased over one thousand acres of coal lands adjoining their property. In 1865 a new company was organized, called the Leetonia Iron & Coal Company. It purchased the Washingtonville mines and all the minerals owned by that company. The principal object of this company was to build a blast furnace. It broke ground for that purpose late in the fall of 1865, and commenced active operations in the spring of 1866.

The charter members of this company were Johnathan Warner, Joseph H. Brown, Judge Milton Sutliff, William Lee, (from whom the town of Leetonia was named,) Lemuel Wick, William Mather, and J. G. Chamberlain.

Early in October of the same year the company's Number One furnace was completed and put in blast, and Number Two stack was put in blast in February, 1867.

The quality of Washingtonville coke more than filled the expectations of the company. Its Number One stack made over two hundred tons of iron in a week, being the first furnace west of Pennsylvania that ever made that much iron in one week, and the second west of the Alleghany Mountains making that much in that length of time.

This company run their furnace successfully for about five years, when outside speculators so impaired its credit it was compelled to make an assignment.

In 1879 the Cherry Valley Iron works purchased the property, and are now operating all branches of the works successfully.

During the time the first company's mining operations at Washingtonville were crystalizing into the Leetonia Iron and Coal Company, Henry King, of Salem, Ohio, became aware of the excellent quality of the Washingtonville coke, and secured a large body of coal lands in the west part of the vlliage of Leetonia, and in 1865 organized a company for the purpose of building a blast furnace, under the firm name of King, Marshall & Co., but early in 1866 this company was merged into the Groffton Iron Company. The charter members were William A. Rodgers, A. J. Dull, Jessie Bell, Robert Marshall, all of Pennsylvania, and Henry King, of Ohio. Its Number One furnace was completed in October of the same year and was blown in the same week that the Leetonia Iron

and Coal Company blew in its Number One stack. In 1872 this company built its Number Two stack. All these furnaces, with one exception, were fifty-five feet high and from thirteen to fourteen feet boshes. The Number Two stack of the Groffton Iron Company had a sixteen feet bosh. The Groffton Iron Company's furnaces were twice burned down, but were each time more substantially rebuilt.

This completes the history of the blast furnaces of Columbiana county, Ohio. But the history of the iron industries of the county will not be complete without giving a brief sketch of the rolling mills.

The first rolling mill built in the county was in 1820 or '21, by Gideon Hughes as proprietor, and Joshua Malin had charge of its construction.

This rolling mill was located on the Little Beaver river, about three miles above New Lisbon, near what is now called Robbins' Station.

In 1826 this mill was leased to William Ward, Sen., Thomas Ward, Thomas Russell and William Ward, Jr. It had one puddling furnace and heating furnace, and made about two tons of bar iron in a day; it also had four or five nail machines and a Bloomery Forge. The heating furnace was often changed to a puddling furnace, in that way making a supply of iron ahead, then changing it to a heating furnace until the supply was worked up. The mill was in operation eight or nine years, the machinery being driven by water power.

Mr. Ward says a freshet in 1829 washed the dam away and undermining the mill, it also went down the river. Another authority says it was in 1832.

In 1842 William Ward, Jr., and Thomas Russell dug the train of rolls out of the quick-sand and moved them to Niles, Ohio. A trip-hammer weighing five thousand pounds was washed down the river by this flood and has never been found.

The second rolling mill was built at Lectonia, in 1870, by the Lectonia Iron and Coal Company. It has sixteen puddling furnaces, one scrap furnace, three trains of rolls, eight inch guide train, sixteen inch bar mill, and eighteen-inch muck train.

In 1871 a nail mill was built at Lectonia, consisting of twenty nail machines and train of rolls to make nail plate. About 1866 the nail machines and other machinery were sold and moved to Indiana.

In 1873 a rolling mill was built at Wellsville for the purpose of making tin plate. This mill consists of muck mill and train of rolls for making sheet iron, eight puddling and four heating furnaces. The mill did not prove a financial success to its builders. It was sold to James H. Black, Esq., who sold it to W. D. Woods & Co., in 1879, since which time it has been in successful operation. We have dwelt rather briefly on the recent organizations for manufacturing iron, as the facts connected with their building and operations are well known, but have endeavored to the best of our ability to gather all the facts connected with the pioneer iron industries of the county. It was rather a difficult undertaking, as nearly all those who had any pecuniary or other interest in them are dead.

The historical part of this paper has been gathered, item by item, during the past three or four years for the purpose of keeping the facts connected with these iron industries from passing into oblivion.

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