CHAPTER XXII.

ECONOMIC GEOLOGY—IRON, COAL, AND COKE.

THE MINERAL RESOURCES OF FAYETTE COUNTY.

FAYETTE COUNTY embraces a portion of the great Appalachian coal-field. It is rich in coal, iron, limestone, and fire-clay.

Coal occurs abundantly. The great Pittsburgh bed in the Connellsville basin yields a coal which makes the typical coke; while the same bed in the basin followed by the Monongahela River yields a coal hard enough to bear shipment, and admirably adapted to the manufacture of illuminating gas. Numerous other beds are present, most of which afford good coal for fuel, and are mined to a greater or less extent to supply local needs.

Upper Barren Measures.

Pittsburgh Bed and Upper Coal Measures.

Lower Barren Measures.

Upper Freeport Bed and Lower Coal Measures. Conglomerate XII.

Manch Chunk Red Shale XI.

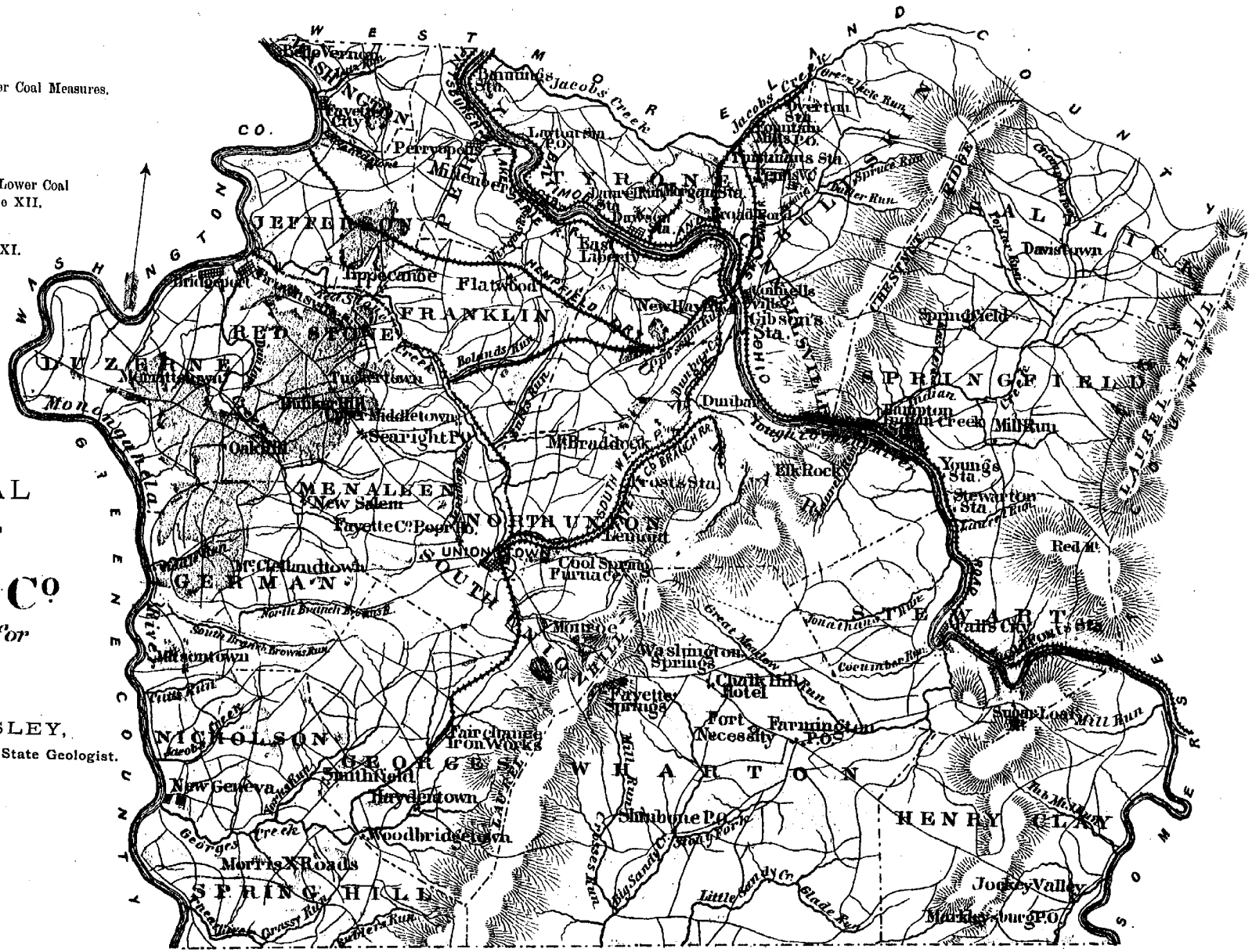
Pocono Sandstone X.

Catskill IX.

GEOLOGICAL OUTLINE MAP of FAYETTE Co

engraved expressly for this Work

J. P. LESLEY,
State Geologist.



In the broad valley occupying the eastern part of the county, and lying between Laurel and Chestnut Ridges, the beds of the lower coal groups are exposed. The upper Freeport coal-bed, the highest of the lower productive coal group, is accessible along Indian Creek from the county line southward to near the Youghiogheny River, while the same bed is found in patches on the hills along that river. South from the Youghiogheny it is accessible at many places along the larger streams. This bed varies in thickness from two to nearly ten feet, and the coal shows equal variations in quality. It is opened at many places within this valley, and the coal is good for fuel; but the volatile matter is too low for the manufacture of gas, and the ash is too high to permit excellence in the coke.

Other and lower beds of coal are exposed in the deep trough excavated by the Youghiogheny River in crossing this valley, as well as on several of the larger streams emptying into the river; but the coal from these, though useful for fuel, contains so much ash and sulphur as to be useless for either gas or coke. These beds are shown on both sides of Chestnut Ridge, and the upper Freeport is mined to a slight extent on the eastern slope to supply fuel. But the proximity of the large Pittsburgh bed in the Connellsville basin has prevented any full development of the bed or a thorough determination of its value. The lower beds are not reached westward from Chestnut Ridge in such quantity as to be economically available.

Beds lying above the Pittsburgh coal-bed in the Connellsville basin are rarely mined. They are irregular both in thickness and quality. The coal from the Pittsburgh as found here is soft and ill fitted to bear handling. The volatile matter is much lower than in the next basin towards the west, and the sulphur rarely exceeds one per cent. Comparatively little of this coal is shipped, and with the exception of the small quantity needed to supply villages, the whole amount mined is converted into coke. This coke, known in the markets as Connellsville coke, is hard, silvery, and retains its lustre for an indefinite period when exposed to the air. It is prepared by burning the coal in beehive ovens for from forty-eight to seventy-two hours.

The greater part of the coking area has been purchased by corporations, and the eastern outcrop of the bed is now lined with coke-works. The western outcrop is not yet open to market, but the coal on that side of the basin is inferior to that obtained from the other side only in this, that it contains a slightly greater proportion of volatile matter. The coke appears to be equally good.

Near the State line the coal from the Pittsburgh bed along the Monongahela is comparatively low in volatile matter and yields a very fair coke; but the presence of some slates detracts from the appearance of the product.

Lack of railroad facilities has prevented a full development of the Pittsburgh coal-bed along the Monongahela River, but slack-water navigation has rendered possible some extensive workings at and below Brownsville. The coal obtained in this basin shows from thirty-four to somewhat more than thirty-six per cent. of volatile matter, is comparatively free from sulphur, and bears handling well. It is shipped down the Monongahela River to the Ohio, and is sold in the markets of Cincinnati and other cities farther south.

The thickness of the Pittsburgh bed is usually somewhat less along the river than it is in the Connellsville basin, frequently being almost ten feet in the latter basin, but rarely exceeding eight feet along the river.

The iron ores of Fayette County attracted attention at a very early day, and the first iron produced west of the Allegheny Mountains was made in Fayette County from Fayette County ore.

The Blue Lump ore, which immediately underlies the Pittsburgh coal-bed in the Connellsville basin, was the first ore-bed discovered, but other beds were found not long after, and furnaces were erected to utilize them. All of the early furnaces were small and used charcoal as the fuel; though Col. Isaac Meason used coke in a small way at his Plumsock Furnace in 1817, and in 1836 Mr. F. H. Oliphant ran Fairchance Furnace with coke for several weeks, making an iron of excellent quality.

The important horizons of iron ore are two, the upper being almost directly under the Pittsburgh coal-bed, and the lower in the shales underlying the great conglomerate which marks the base of the coal-bearing series within this region.

The ore immediately below the Pittsburgh bed, known usually as the coal ore, is confined for the most part to the Connellsville basin, but it crosses to the river basin in Spring Hill township, and is present along the river certainly as far north as Catt's Run; beyond that, northward, it seems to be wanting.

This ore shows serious variation in the Connellsville basin, there being a marked difference between the ores found from the Youghiogheny River to a little way north from the National road, and those found still farther south. In the southern part of this basin the group consists of four beds, known as the Blue Lump, the Big Bottom, the Red Flag, and the Yellow Flag, the order being descending. The whole thickness of ore is not less than two feet, and is included within a vertical distance of not more than twelve feet. The Blue Lump contains from thirty-nine to forty-two per cent. of metallic iron, with .07 to .08 per cent. of phosphorus and .01 to .04 per cent. of sulphur. In the Big Bottom the iron is thirty-five per cent. and the phosphorus only .04 per cent. The ores from the other beds have about the same percentage of iron as that from the Big Bottom, but the percentage of

phosphorus is somewhat greater. The change northward seems to be abrupt, and it certainly occurs within a distance of not more than one mile. At Lemont and Dunbar only a single or sometimes a double layer is mined, which varies from ten to twenty-two inches in thickness. The ore shows material variations in quality, but for the most part it is good. It has from thirty to thirty-three per cent. of iron, and the phosphorus varies from .13 to .20.

This ore is persistent, unlike most of the carbonate ores of the carboniferous groups. The area underlaid by it and actually proved up is estimated to contain not less than two hundred millions of tons, and this does not include any part of the western side of the basin.

The beds of the lower group are known as the mountain ores. They are four in number,—the Little Honeycomb, the Big Honeycomb, the Kidney, and the Big Bottom. The Little Honeycomb is within twenty feet of the great conglomerate, and is seldom more than four inches thick. It is not available except where it can be mined by stripping. The ore is very good. The Big Honeycomb is usually a compact flag ten to twelve inches thick, but occasionally swelling to more than two feet. It is persistent to very near the northern limit of the county. The ore is fine-grained, smooth, and it is regarded as excellent. The metallic iron varies from thirty-five to forty-one per cent., the phosphorus from .03 to .22, and the sulphur from it varies little from .15. The Kidney ore is persistent, and is usually a plate from four to eight inches thick. According to analysis, the percentage of iron varies from thirty-one to forty-one per cent., the phosphrus from .10 to .19, and the sulphur from .08 to .40. The Big Bottom is present at all localities examined along Chestnut Ridge. It consists of one, two, or three flags, with a total thickness of from ten inches to three feet. The percentage of iron varies from thirty-two to thirty-seven, of phosphorus from a mere trace to .25.

Unlike the ores underlying the Pittsburgh coal-bed, these lower ores are not wholly to be depended on; the Kidney and Big Bottom show serious "wants" at several localities, and the Big Honeycomb occasionally fails for considerable distances. These irregularities render extraction of the ore expensive and the supply somewhat uncertain. The amount of ore, however, is enormous, and the beds, notwithstanding the numerous gaps, are practically persistent. Drifts nearly one-half mile long have been run on the Big Bottom at the Dunbar mines, while drifts two-thirds as long have been run in on the Honeycomb and Kidney at Lemont. But in the present condition of knowledge the available amount of ore in these mountain beds can hardly be determined, for erosion has torn away much of the mountain-side.

Four furnaces are now in operation along the west foot of Chestnut Ridge, all of which depend chiefly on the coal ores, but they use more or less of the mountain ores. No furnace is in blast on the east side of Chestnut Ridge. The mountain ores are good on that side, and are present in large quantity, but no way of reaching market exists, and iron cannot be made except at a loss.

The Fayette County iron early attained celebrity, owing to the numerous improvements introduced into the manufacture by Mr. F. H. Oliphant. The Oliphant iron was made at Fairchance Furnace, from a mixture of Blue Lump and mountain ore, the former predominating. This iron was neutral and had extraordinary strength. Cable tried at the Washington navy-yard, it proved to be more than twice as strong as the standard, and the links stretched eighteen inches before breaking. Excellent pig-metal was produced by the furnaces working on the mountain ores exclusively, and it always found a ready market. The iron ore made by Dunbar, Lemont, Oliphant, and Fairchance Furnaces is a good neutral iron, carrying from one-half of one per cent. to one per cent. of phosphorus. Its quality would be improved by the omission of mill-cinder from the charge. The large amount of uncombined carbon in these irons renders them excellent for foundry purposes.

The proximity of coal, ore, and limestone gives the Connellsville basin of Fayette County great advantages over many other iron-producing localities. Iron can be made here profitably when selling at a price which would bring bankruptcy to the great majority of furnaces elsewhere. During 1877 good iron was made by Lemont Furnace at a cost of about eleven dollars per ton.

Limestone is abundant, though there are narrow strips running longitudinally through the country where no limestone is exposed. Thin beds only exist in the valley between Chestnut and Laurel Ridges, but an ample supply for all purposes can be obtained from the great mountain limestone which is exposed in deep hollows in the sides of both ridges. This great limestone is exposed also in the hollows along the western side of Chestnut Ridge, and it has been quarried at many localities, especially in the northern part of the county. Some of its beds yield lime as white as the celebrated Louisville brand.

Good lime is found nearly everywhere within the Connellsville basin, in the hills covering the Pittsburgh coal-bed. This rock is in great part clean enough to be used as a flux in the iron furnaces, but contains more or less oxide of iron, and therefore the lime is not of pure white. The limestones exposed along the river and lying above the Pittsburgh coal-bed are thick, and some of them are very pure. They are quarried at more than one locality for shipment to Pittsburgh, where they are used in manufacture of glass and iron.

Fire-clays are abundant in different parts of the county. An excellent plastic clay occurs at Greensboro' and New Geneva, on the Monongahela River. It

is employed largely in the manufacture of pottery, which has a high reputation, and can be found almost everywhere in the Southeastern States. Good brick clay is abundant everywhere in the subsoil. An excellent non-plastic clay exists along the east slope of Chestnut Ridge, and lies not far above the great conglomerate. It is manufactured into brick at Lemont, Mount Braddock, Dunbar, and on the Youghiogheny River above Connellsville. The bricks are decidedly good, and but little, if at all, inferior to the bricks made at Mount Savage. Another non-plastic clay occurs in Henry Clay and Stewart townships, and is the same with the celebrated Bolivar fire-clay of Westmoreland County. No attempts have been made to utilize this clay here, but in chemical composition it approaches closely to the Mount Savage clay.[1]

IRON AND IRON-WORKS.

There is a tradition that the first discovery of iron ore west of the Allegheny Mountains was made by John Hayden in the winter of 1789–90. This statement has been so often made in the writings of Judge Veech and others without contradiction that it has come to be almost universally regarded as entirely authentic. That such is not the case, however, and that iron ore was known to exist in the valley of the Youghiogheny at least nine years before the alleged first discovery by Hayden, is proved by an entry found in the First Survey Book of Yohogania County, Va.,[2] and made a century ago by Col. William Crawford, then surveyor of the said county. The following is a copy of the entry:

"July 11, 1780.

"No. 32—State Warrant.—Benjamin Johnston produced a State Warrant from the Land Office for five hundred acres of land, dated the 12th day of May, 1780—No. 4926. Sixty acres thereof he locates on a big spring in the Allegany and Laurel Hills, on the waters of the Monongalia—and one hundred and fifty acres of s[d] Warrant he locates on lands of s[d] Hills, where an old deadening and Sugar Camp was made by Mr. Chr. Harrison, situate on the waters of Yohogania, to include a Bank of Iron Ore."

The precise location of the tract referred to as including the ore-bank is not known, nor is it material. The quotation is given above merely to disprove the long-accepted statement that the existence of iron ore west of the Alleghenies was unknown prior to 1789.

FIRST IRON FURNACE IN FAYETTE COUNTY.

The earliest reference to the existence of an iron furnace in Fayette County which has been found in any deed, record, or other document is in the minutes of the June Term, 1789, of the Court of Quarter Sessions of the county, as follows: "A view of a Road, from the furnace on Jacob's Creek, to Thomas Kyle's mill." And the minutes of the March Session of 1791 mention "The petition for a road from Jacob's Creek Iron Works, to intersect the road leading to Mr. Thomas Kyle's mill—granted."

The furnace referred to in these minutes was the "Alliance Iron-Works" of Turnbull, Marmie & Co. The tract on which the furnace was erected was one of three hundred and one acres, named "Rocksbury." It is described as "situate on Jacob's Creek, in the county of Fayette," and was patented to William Turnbull, of Pittsburgh, July 13, 1789.[3] Two other tracts, adjoining this, but situated on both sides of Jacob's Creek, in Fayette and Westmoreland Counties, were patented to Turnbull at the same time. These tracts were named "Frankford" and "Springsbury," and contained respectively three hundred and one and two hundred and nineteen acres. A tract of two hundred and twenty-three acres called "Luton," situated in Tyrone township, which had been patented to Jacob Laurie, Jan. 9, 1789, was sold by the said Laurie to William Turnbull and Peter Marmie, Oct. 9, 1791.

Turnbull had been a purchasing agent and commissary for the Pennsylvania troops during the Revolution. After the war he became associated in partnership with Col. John Holker and Peter Marmie. They claimed to have purchased the site of Fort Pitt, and started a mercantile establishment on the "Point" at Pittsburgh. Marmie managed the business in the West, and Turnbull remained most of the time in Philadelphia. The extract from the court records, as given above, shows that the furnace on Jacob's Creek was built or in process of erection before Turnbull received the patent for the land on which it stood.

The Alliance Furnace was blown in in November, 1789, but nothing is known of the business done at that time. On the 6th of January, 1792, Gen. Knox, Secretary of War, wrote to Maj. Isaac Craig, commandant of the post at Pittsburgh, making this inquiry: "Is it not possible that you could obtain shot for the six-pounders from Turnbull & Marmie's furnace?" In another letter, addressed to the same officer fifteen days later, he says, "Although I have forwarded the shot for the six-pounders (from Carlisle), I am not sorry that you ordered those from Turnbull & Marmie. Let them send their proposals at what rates they will cast shot, shell, cannon, and howitzers, etc." And it is stated on good authority that shot and shell for Gen. Anthony Wayne's expedition against the Indians were furnished by Turnbull, Marmie & Co. from their works on Jacob's Creek.

In December, 1797, certain viewers appointed by

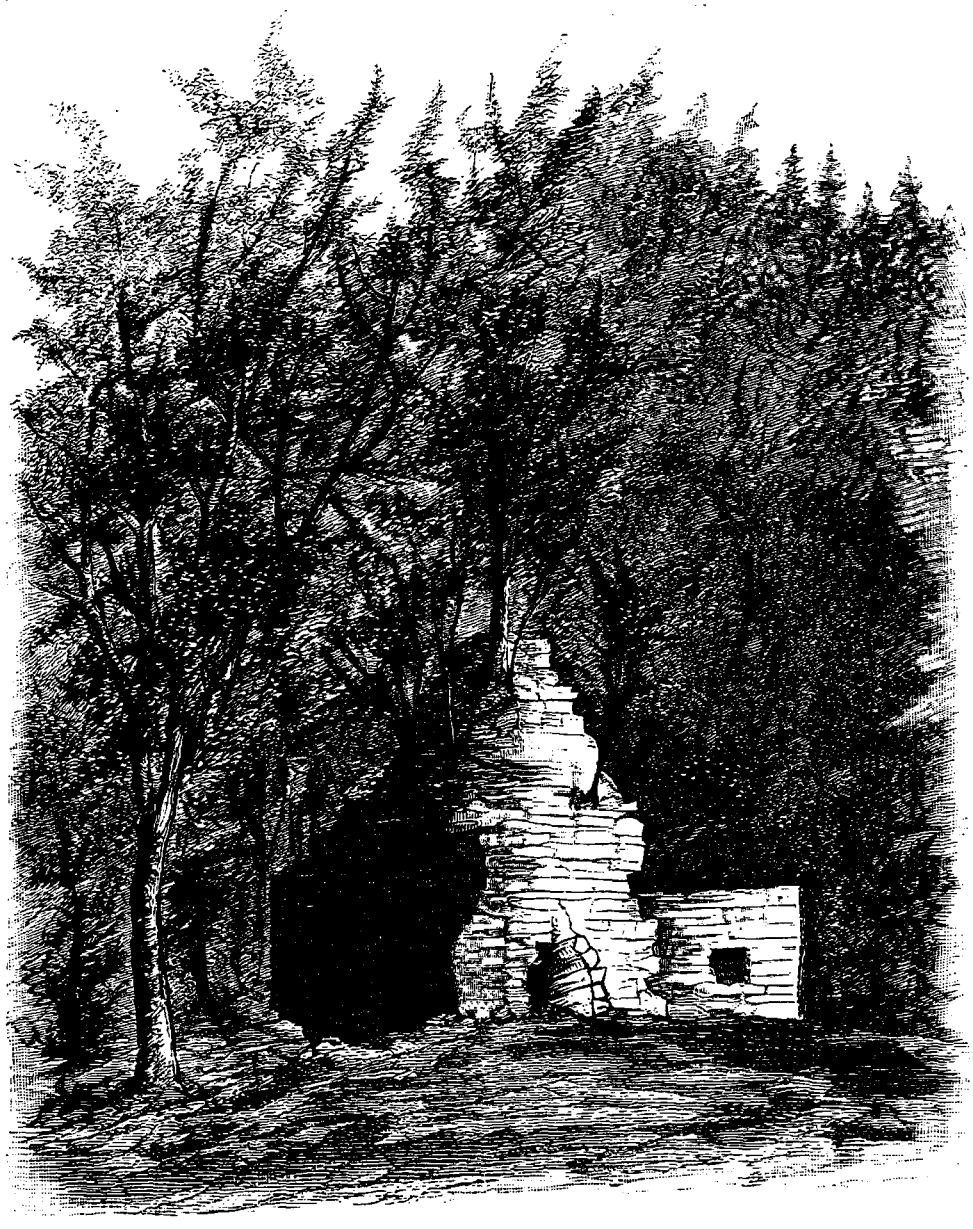
[1] The above article on the mineral resources of Fayette County is furnished by Prof. J. J. Stevenson.

[2] Yohogania County, as established by the Virginia Legislature in 1776, included all the northern and northeastern part of the present county of Fayette, as has been before explained. The Survey Book referred to is still in existence in a good state of preservation, and in possession of Boyd Crumrine, Esq., of Washington, Pa.

[3] Record in the Roll's Office Patent Book No. 15, p. 97.

the court reported on a road "from Turnbull's Iron-Works by the Little Falls." In March, 1799, a report was made to the court by viewers as follows: "Pursuant to an order of the Quarter Sessions for September, 1797, for Fayette County, we, the subscribers therein named, met and viewed the ground between Jacob's Creek furnace and the road leading to Peterstown; and we do agree to return a public road two perches wide, beginning at the county line, on the bridge across Jacob's Creek at Alliance Furnace," etc. In September, 1799, there was presented to the court "a petition for vacating a road from Col. Holker's Iron-Works to near Laurel Hill meeting-house."

It will be noticed that the establishment was variously designated as "Jacob's Creek Furnace," "Alliance Furnace," "Alliance Iron-Works," "Turnbull's Iron-Works," and "Col. Holker's Iron-Works." The last name was used when the works were carried on by Holker (as principal partner) with Marmie, after the retirement of Turnbull.



RUINS OF OLD ALLIANCE FURNACE.

The title to the real estate was in Turnbull, who on the 10th of February, 1797, conveyed to John Holker, in consideration of £2000, "all that messuage, forge, furnace, and tract of land called Roxbury," and also the other tracts designated as "Frankford" and "Springsbury." The works were carried on by Holker & Marmie until 1802, when

their operations ceased, and the fires of the old furnace were finally extinguished.[1]

The Alliance Iron-Works with contiguous lands were offered for sale by Samuel Hughes in an advertisement dated March 27, 1807, but it does not appear that any purchaser was found, and the property was afterwards assigned by Col. Holker in trust to Paca Smith, who conveyed it to Henry Sweitzer, in pursuance of an agreement made Jan. 20, 1817.

The cut correctly represents the appearance of the ruins of the old Jacob's Creek furnace-stack at the present time. Parts of the ancient walls of the furnace are still standing, though greatly dilapidated, and the walls of the charcoal-house in the rear of the furnace remain nearly entire, but gray and moss-covered. The site of the old iron-works is on low ground, on the south side of Jacob's Creek, in the present township of Perry. The land is now owned by the Jacob's Creek Oil Company.

UNION FURNACE.

The old Union Furnace in Dunbar township was built by Isaac Meason at about the same time that Turnbull & Marmie erected their furnace on Jacob's Creek, but it is conceded by all who have any knowledge of the facts that the last named was first blown in. Mr. Edmund C. Pechin, who has carefully gathered all obtainable information in reference to the old Union Furnace, says it was first blown in in March, 1791, which gives a precedence of about sixteen months to the furnace of Turnbull & Marmie. The first mention which has been found of the Union Furnace is in the records of the court of Fayette County for the June term of 1791, when there was presented "a petition for a road from Union Furnace to Dickinson's Mill."

The original furnace was a small establishment, but in 1793 Mr. Meason associated with him John Gibson and Moses Dillon, and this firm (styled Meason, Dillon & Co.) erected a much larger furnace and foundry on the site of the first one. On the formation of the partnership, July 16, 1793, Meason transferred to Dillon and Gibson one-sixth of six hundred acres of land on both sides of Dunbar Creek, "which includes the furnace which is now erecting," with the houses and appurtenances, and also one-half of two thousand seven hundred acres adjoining, and between it and the Youghiogheny River.

The establishment of Meason, Dillon & Co. produced large quantities of castings, stoves, pots, dog-irons, sugar-kettles, salt-kettles, and other articles. The following advertisement of their business appears in the *Pittsburgh Gazette* of 1794:

"MEASON, DILLON & CO.

"Have for Sale at their furnace on Dunbar's Run, Fayette county, three miles from Stewart's Crossings, on Youghiogheny river, a supply of well assorted castings, which they will sell for cash at the reduced price of £35 per ton ($93.33).

"UNION FURNACE, April 10, 1794."

In 1804 an extensive order was filled at the Union Furnace for large sugar-kettles, to be used on the plantations of Louisiana. After that time the works were continued by different parties for more than fifty years, and finally suspended operations. About the year 1868 the property passed into possession of the Youghiogheny Iron and Coal Company, of which Edmund C. Pechin was president. Under his management extensive improvements were made, and the subsequent success of the works has been largely due to his energy. In 1871 the company was reorganized as the Dunbar Iron Company, and later as the Dunbar Furnace Company, which now owns and operates the works.

SPRING HILL FURNACE.

This old furnace, situated in Spring Hill township, was built by Robert and Benjamin Jones, who were Welshmen by birth, and had been interested in the development of mineral lands in their native country. Emigrating to America, they became owners of the lands on which they built this furnace, as stated. The precise date of its erection is not known, but its commencement is placed in 1794 with a good deal of certainty, for the reason that the assessment-roll of Spring Hill township for 1793 shows that Robert Jones was then assessed on four hundred acres of "unseated lands," and that the roll of the same township for 1795 shows, under the head of "Fulling Mills and Furnaces," the name of Robert Jones assessed on "One Furnace, valued at $300." That the works were in operation at least as early as the autumn of the latter year is proved by the following advertisement, found in the *Western Telegraphe* (then published at Washington, Pa.), bearing date Oct. 13, 1795, viz.:

"Springhill Furnace, Ruble's Run, Fayette County, Pennsylvania, within three miles of the river Cheat, near its confluence with the Monongahela.

"For Sale, at said Furnace, a good assortment of beautiful Castings, allowed by real judges to be some of the very best ever cast in America, amongst which are Stoves and Salt kettles of the finest quality.

"By R. & B. Jones, Wells & Co."

James Tucker, of Washington County, had a one-eighth interest in the firm, and assumed the management of the works, being a practical iron-worker. On the 8th of November, 1799, the firm leased the property to Jesse Evans (a son-in-law of Robert Jones) for three years, for the consideration of twenty tons of assorted iron castings.

In 1803 (March 29th), Robert and Benjamin Jones, "of Whitely Creek, Greene Co.," entered into an agreement with Jesse Evans to convey to him, for the consideration of £4000, "the seven-eighths part of Springhill furnace and everything thereunto be-

[1] An interesting account of some of the operations at the old furnace on Jacob's Creek will be found embodied in a letter written by Peter Marmie, which is given in the history of Perry township.

longing, flasks, teams, patterns, and land, containing eight hundred acres; also a piece of land joining, formerly part of Isaac Beal's plantation, containing seven acres, with the remainder of the pigs and stock now on the premises; also three hundred acres formerly belonging to William Wells." On the 9th of August of the following year Evans purchased the one-eighth interest owned by James Tucker, of Washington County, for six tons of assorted castings and two hundred dollars' worth of bar iron, at six cents per pound.

Jesse Evans operated the iron-works until April, 1831, when he removed to Spring Grove farm, where his son, Col. Samuel Evans, now resides. He died in Uniontown, Aug. 15, 1842.

When Mr. Evans retired from the business of the furnace, in 1831, it was sold to J. Kennedy Duncan, and two years later, after several changes, it was purchased by F. H. Oliphant, who kept it in successful operation till 1870, when it was sold to the Fairchance Company, the present owners.

During Mr. Oliphant's occupancy he carried into effect the idea (which had been conceived by him in 1825) of utilizing the furnace gases. He had imparted his discovery to an Alabama company, who used the hint received from him to some advantage in the construction of their furnace. When he reconstructed the Spring Hill Furnace, he made practical his idea by placing the boiler-house upon the top of the stack; this in a crude manner carried out his idea with considerable advantage.

HAYDEN'S FORGE AND FAIRFIELD FURNACE.

On the 6th of March, 1792, Robert Peoples, of Georges township, a miller by trade, conveyed to John Hayden, iron-master, in partnership with John Nicholson, of Philadelphia, a tract of land in the said township of Georges, containing fifty-one acres and twenty-four perches, with all buildings, iron-works, houses, cabins, etc., the consideration being £119. The tract was the same which Peoples had purchased a few days before from Jonathan Reese, who had purchased it Feb. 5, 1790, from Philip Jenkins, who patented it from the State May 31, 1787.

As to the "iron-works" which were mentioned as being then located on the land conveyed by Reese to Hayden, it cannot be stated with any certainty by whom they were built. It is not probable they were built by Reese, for he had owned the property only a few days. The previous owner of the land, Philip Jenkins, might have erected them, but the probability is that they were commenced by John Hayden before the property came into possession of himself and Nicholson, and that Reese had been employed to purchase the land from Jenkins, and then convey it to them, as he did.

In the assessment-rolls of Georges township for that year (1792) John Hayden was assessed on fifty-one acres of land (evidently the same purchased from Reese) and a "bloomery" or forge. No assessment on any such establishment is found in the rolls of that township in any preceding year.

On the 31st of March, 1792, John Nicholson, of Philadelphia (State comptroller), and John Hayden, of Fayette County, entered into articles of agreement, from which the following is an extract: "Whereas the said Hayden represents that there is on the headwaters of Georges Creek, within said county, a valuable iron-mine of sufficient quantity, that there are also streams and seats suitable for a forge and furnace, and whereas it is agreed to have erected for their joint benefit, a forge and furnace on a tract of land which contains four hundred and thirty-six acres, having from seventy to eighty acres cleared, and about four hundred fruit-trees," etc. It appears that this tract had already been bargained for with its owner, Joseph Huston (then sheriff of Fayette County), at three hundred pounds, and by the terms of the agreement between Hayden and Nicholson the latter was to send that amount of money by hand of Albert Gallatin to Huston to pay for the land.

On the same day Hayden and Nicholson entered into a further agreement, by the terms of which Hayden was to finish the forge or bloomery (which, as it thus appears, was not then completed) on the Reese land, and to build a furnace at such place as might be thought best for the purpose on the larger (Huston) tract, and to complete the same on or before Sept. 1, 1794. And Nicholson, on his part, agreed to lease and did lease to Hayden his interest in the forge and furnace at eight hundred pounds per year for the term of seven years, commencing April 1, 1792, the payments to be made semi-annually, and not to begin until Sept. 1, 1794, and if the furnace and forge were completed sooner than that time, then John Hayden was to have the use thereof until Sept. 1, 1794, gratuitously, as well as all the timber and ore he could use up to that date. On the 16th day of March, 1793, they entered into another agreement, in which it is stated that owing to a want of funds the work was lagging, and in order that the work might be prosecuted "with newness of vigor," and that a forge might be built, Nicholson agreed to advance to Hayden twelve hundred pounds, Pennsylvania money, in addition to what had already been advanced and expended, and Nicholson's agent, Jesse Evans, was to take this sum of money to Hayden. But their financial difficulties still continued, the work was not prosecuted, Nicholson became a defaulter, and the partnership between him and Hayden failed. On the 30th of May, 1796, John Hayden, "iron-master," conveyed to Jonathan Hayden, of Georges township, the fifty-one-acre tract purchased from Robert Peoples in the spring of 1793, including the bloomery, cabins, and other buildings.

The agreement between Nicholson and Hayden, made March 31, 1792, was not carried out as to the building of the furnace at the time specified, and in-

deed none was built at any time under this partnership. In 1795, Hayden was still assessed on the bloomery. On the 18th of March, 1797, William Nixon and wife conveyed to John Hayden for the consideration of £118 8*s.* 9*d.* thirty-eight and one-fourth acres of land in Georges township, "for the purpose and convenience of erecting a furnace thereon," this land being a part of a tract named "Fairfield," which was patented to Nixon Sept. 7, 1790.

On the land which he purchased of Nixon, Hayden built the Fairfield Furnace. The date of its erection is placed at 1797, because in that year he was assessed for "Rearly place Forge," "Old Place," "mountain land," and "furnace land," but no furnace; but in the following year "Fairfield Furnace" was included in his assessment at $4000. At the same time the old forge was assessed to him at $250.

Hayden conveyed an undivided one-fourth part of the Furnace tract, "with an equal part of the furnace and all other buildings thereon erected," to Stephen Hayden, Jr., by deed dated Dec. 25, 1797, and on the 16th of January following he conveyed another undivided one-fourth part of the same property to John Oliphant, Andrew Oliphant, and Nathaniel Breading for £2000. These three gentlemen, on the 8th of March, 1805, purchased another one-fourth interest in the property from Neil Gillespie, and at the same time purchased still another one-fourth from John Gillespie, who had bought it at sheriff's sale in 1803, at which time it was sold by Sheriff Allen on a judgment against John Hayden. Finally, John and Andrew Oliphant came into possession of the entire property, and the furnace was operated by them until January, 1817, when their partnership was dissolved by mutual consent, John Oliphant purchasing the interest of Andrew in the Fairfield and Fairchance Furnaces and Sylvan Forge at $4000. The Fairfield Furnace was rented by him to John St. Clair and Isaiah Marshall, who were succeeded by William Paull, Sr., and he in turn by John Martin, whose occupancy continued until the furnace was finally blown out and abandoned.

It is said by old people that during the Oliphants' operation of Fairfield Furnace they furnished from it a quantity of solid shot, which were shipped on small craft down the Monongahela, Ohio, and Mississippi Rivers, and were used by Gen. Jackson's artillery in the battle of New Orleans. Some of the ruins of old Fairfield are still visible.

REDSTONE FURNACE.

The builder and first proprietor of this old iron-works was Jeremiah Pears, who purchased the parcel of land including its site from Moses Hopwood. It was a tract containing twenty acres and thirteen perches, situated on the waters of Redstone Creek, in Union (now South Union) township, and a part of the original survey named "Suttonia." The consideration paid was £276 10*s.*, and the date of the conveyance April 5, 1797. Soon after the purchase Pears erected upon it the furnace known as Old Redstone, which was operated by him for a year or two after its starting, and then rented by Mayberry & Stevens.

On the 26th of December, 1803, Pears sold the land and furnace for $3000 to Joseph Huston, who operated it for some years, but he was finally overtaken by financial difficulties, and then the furnace passed to the possession of his nephew and clerk, John Huston, who continued to operate it for many years. After 1856 it was carried on by John Snyder and John Worthington for a period of about fifteen years, since which time it has been out of blast. The stack remains standing, but much dilapidated.

FAIRCHANCE.

In 1803, Thomas Wynn disposed of his property, near where Fairchance Furnace now stands, to John Hayden for £3000, payable in three years, £1000 annually. This tract consisted of two hundred and eighty acres of mineral lands, and on this tract there was then a flax-seed oil-mill. The payments as they became due were payable in castings at $100 per ton, delivered either at Fairfield Furnace or at Richard Lewis', "Mary Ann Furnace," near Haydentown. On the property sold by Wynn to Hayden was erected the "Fairchance" Furnace.

On the 1st of January, 1805, John Hayden, Sr., sold to James Gillespie one-half of his real and personal estate, consisting in furnaces, forges, bloomery, mills, lands, and tenements, together with all their appurtenances, for the sum of $7000; one-half of all metal then made and at Fairchance Furnace to be taken at $25 per ton. Not long afterwards Fairchance was purchased by John and Andrew Oliphant, who carried on the furnace in connection with the Sylvan Forge, under the firm-name of John & A. Oliphant, until about 1817. From that time it was operated for some time by John Oliphant, and passed to F. H. Oliphant. It was rented for a few years to J. K. Duncan, and after 1826 was operated by F. H. Oliphant for more than forty years. Soon after his commencement at Fairchance, F. H. Oliphant began using the "Flag" and "Big Bottom" ores in place of the "Blue Lump," which had been previously used. In 1836 he used coke as fuel in the Fairchance Furnace, and a sample of the iron so produced is on exhibition at the Franklin Institute, Philadelphia. During the same year he introduced the warm blast, which had previously been used in Europe, but Mr. Oliphant knew nothing of its having been used anywhere previous to his introducing it. It requires from 700° to 900° of heat for the blast, and his furnace was not arranged so as to generate such a great heat, consequently his efforts were not entirely satisfactory. The hot air for his blast was driven through about one hundred and fifty feet of pipe, leading from the rolling-mill to the stack. In 1826, F. H. Oliphant bought Fairchance Furnace from his father, who was compelled to sell it on account

of his indebtedness. About 1834, F. H. Oliphant had erected a rolling-mill at Fairchance. This mill had three puddling-furnaces and complete machinery for making bar and boiler iron. It remained in operation until about 1870, at which time Mr. Oliphant sold out to a New York company, under the style and title of Fairchance Iron Company, who own it at the present time. The capacity of the furnace had been increased to ten tons per day by Oliphant, and that capacity has been doubled by the Fairchance Company.

COOL SPRING FURNACE.

The land embracing the site of this furnace, located on Shute's Run, in North Union township, was patented to Thompson McKean, John Smart, and William Paull, Jan. 13, 1816. The furnace was built soon afterwards by Mr. McKean, and by him kept in operation for many years. About 1842 it passed into possession of Joseph Wiley. Some three years later, Eleazer Robinson became a partner in the business. In 1854, Mr. Wiley removed to the West, and the business of the iron-works was continued by Robinson for a year or two and then closed. The property afterwards passed to the possession of Levi Springer, and is now owned by his heirs. The furnace was a small one, with a blast driven by water-power. The ores used were of the Umbral group, and obtained by benching. Excavations from which the ore was obtained are found, extending along the outcrop for miles from the furnace. The procuring of ore in this manner was necessarily expensive, and the cost of its reduction must have been correspondingly light to justify it.

OLD LAUREL FURNACE.

The location of this old furnace was on Laurel Run, in Dunbar township, nearly opposite the eastern base of the Chestnut Ridge. It was built by Joshua Gibson and Samuel Paxson, about 1797, and two or three years later (before 1800) it passed to the possession of Reuben Mochabee and Samuel Wurtz. In 1800, John Ferrel, the manager of the furnace under these proprietors, advertised for sale "assorted castings, neat, light, and tough," at $100 per ton, also bar iron. The "Hampton Forge" was built by Mochabee & Wurtz, for the purpose of working the product of the furnace.

NEW LAUREL FURNACE.

Col. James Paull and his sons erected the New Laurel Furnace, a short distance below the site of the Old Laurel, on the same run. It was kept in blast by them until 1834, when it passed to Kaine, Vance & Miller, under whom it was operated till 1838, when it was finally blown out.

FINLEY, OR BREAK-NECK FURNACE.

The site of this furnace was on Break-Neck Run, in Bullskin township. It was built in 1818, by Messrs. Miller, James Rogers, and James Paull, and was managed by Miller. David Barnes afterwards became a partner. About 1824 it passed to Boyd & Davidson, who operated it until 1831, after which Miller ran it for a year or two. It was then carried on by David B. Long & Co. until 1838, when its operation was abandoned.

WHARTON FURNACE.

In the records of the Court of Quarter Sessions for June term, 1837, mention is made of a petition for a road in Wharton township, to pass "where A. Stewart is building a furnace." The person referred to was the Hon. Andrew Stewart, who built this furnace in the year named. Its site was a short distance from the National road. The furnace was managed by Alfred Stewart for a number of years from its completion. Afterwards it was successively operated by Edward Hughes and J. Kennedy Duncan. In 1852, D. S. Stewart assumed the management, and ran it about four years. It was blown out in 1856, and remained in disuse until 1858, when it was leased by Worthington & Snyder, who were succeeded by D. W. Woods & Lukens, of McKeesport. After a few years it was blown out, and remained idle till 1870, when it was leased by E. C. Pechin, C. E. Swearingen, Maurice Healey, and others. After being in blast for about one year under this proprietorship it was leased to George W. Paull. Two years later it was blown out and dismantled.

MARY ANN FURNACE.

This furnace, located near Haydentown, was built about the year 1800, by Martin & Lewis. In 1810 the property was owned by Capt. James Robinson. In 1818 it was purchased by Joseph Victor, who rebuilt it and changed its name to Fairview. It was blown out and abandoned about 1840.

MOUNT VERNON FURNACE.

The Mount Vernon Furnace, situated on the headwaters of Mounts' Creek, in Bullskin township, on the road to Lobengier's Mills, was built by Isaac Meason. The date of its erection is not ascertained, but an advertisement in one of the papers of that time shows that it was in operation in July, 1800. An inscription on a stone in the furnace-stack shows that it was rebuilt in 1801. It was sold by Meason to David Barnes and D. B. Long, by whom it was operated for about two years. Its final blowing out was in 1824. The property now belongs to George E. Hogg.

LITTLE FALLS FURNACE.

On Arnold's Run (later called Furnace Run), near its mouth, in Franklin township, was the site of this old iron-works. A forge was built at this place as early as 1800, by Nathaniel Gibson, who not long afterwards built the furnace. It was a small affair, and did not prove financially successful. The property passed to F. H. Oliphant, who repaired and somewhat enlarged it, and named it the Franklin Iron-Works, which were operated by him for a few years and then abandoned.

ST. JOHN FURNACE.

This furnace was located on Salt Lick Creek (now Indian Creek), in the present township of Springfield. It was built in 1807 by Jackson & Gibson, the masonry-work being done by James Taylor. In 1810 it was owned and operated by Trevor & Slater. Afterwards it became the property of Col. James Paull, and still later was in the possession of Steele and Doughty, who were the last to operate it. It was blown out and discontinued in 1828.

ETNA FURNACE.

Thomas and Joseph Gibson erected the Etna Furnace in 1815, on Trump's Run, about one mile above the borough of Connellsville, and one-third of a mile from the Youghiogheny River. It remained in blast for a quarter of a century, and was finally blown out in 1840.

FAYETTE FURNACE.

Near the western base of the Laurel Ridge, in the present township of Springfield, on the north fork of Indian Creek, was the site on which James Rogers, Linton, and Miller built the Fayette Furnace in 1827. Joseph and George Rogers were its later owners, and it was kept in blast till 1840 or 1841, when it was abandoned.

THE OLIPHANT FURNACE.

The last furnace that Fidelio H. Oliphant was ever connected with was the one that is known as the Oliphant Furnace, situated about four miles south of Uniontown, on the Southwest Pennsylvania Railroad. This was built by him after he had disposed of his Fairchance and Spring Hill Furnaces to Eastern purchasers. He operated the new furnace for a number of years, but the enterprise proved disastrous, and his son, Duncan Oliphant, together with his sons, took the furnace and managed it until recently, when it was sold to James Husted, A. B. De Saulles, Robert Hogsett, William Beeson, A. W. Bliss, and George C. Marshall, who are at present carrying on the business.

PINE GROVE FORGE.

The old forge to which this name was given, was built prior to 1798 by Thomas Lewis, on land purchased or contracted from Philip Jenkins, located in a mountain gorge on Pine Grove Run, about four miles from Smithfield and two miles from Woodbridge town, in Georges township. On the 7th of April, 1798, Lewis mortgaged to Meshack Davis that part of his property on which a forge had been erected.

The various business operations of Thomas Lewis led him into serious financial embarrassments, which resulted in his failure in 1799, and on the 29th of November, 1800, the forge property, with six hundred acres of land, was sold by the sheriff to Isaac Sutton. The forge was at that time regarded as of very little value, and its fires were not rekindled.

Mr. Joseph Hickle, of Georges township, was told by old Mr. Jacob Searing many years ago that he (Searing) had been employed in digging ore for Lewis' forge during the time of its operation, and that the ore was carried in sacks on the backs of horses from the places where it was dug to the forge. It was, he said, of the kind known as "Red Short," and especially well adapted to the making of bar iron. A white sandstone was used for lining the furnace. He also related that when Lewis failed, there was on hand at the forge about twenty tons of bar (?) iron, worth at that time fully $100 per ton, and that during the night before the day on which the sheriff came to levy on the property this iron was carried away from the forge and secretly buried in the sand at the head of a little hollow not far distant to save it from seizure. The story, whether true or not, began to be circulated a few years later, and was so much credited by many that search has frequently been made to find the hidden iron, but without success. At the site of the old forge there are still standing the ruins of three stacks, but it is not probable that all of them were ever in use. Mr. Lewis at the time of his failure had commenced the erection of a furnace near the forge, and there is little doubt that one or more of the three stacks belonged to the projected furnace.

LEMONT FURNACE.

This furnace, which commenced operations in 1875, is located in North Union, and is more fully mentioned in the history of that township.

YOUGH FORGE.

John Gibson, of Fayette County, and Thomas Astley, of Philadelphia, were the original proprietors of this forge. The year in which they erected it cannot be given with certainty, but there appears in the Pittsburgh *Gazette* of 1817 an advertisement, dated June 17th in that year, of "the Yough Forge, situate near Connellsville, Fayette Co." It was run for many years by the original owners, and afterwards by Thomas, Joseph, Joshua, and James Gibson (sons of John), who operated it until 1825, when they ceased work, and the forge was dismantled. Its site is occupied by a mill built by Boyd & Davidson in 1831.

EARLY ROLLING-MILLS.

There is little if any doubt that the first rolling-mill in Fayette County was the one erected and put in operation by Jeremiah Pears at Plumsock, in Menallen township. Its location was on a tract of land surveyed to him by Levi Stephens (an assistant of the surveyor, Alexander McClean), May 29, 1786. The name given to the tract by Pears was "Maiden's Fishery," but this was changed at the Land Office to the name "Prophetic," and the patent was issued under that name to Pears on the 28th of November, 1789. On this tract Mr. Pears had erected a forge prior to 1794, as is shown by the fact that the court record of June in that year mentions the presentation of a petition for the laying out of a road "by way of Pears' Forge to Redstone Ford."

Besides the forge, Mr. Pears had erected on his tract a saw-mill and grist-mill, and afterwards built a slitting-mill and the rolling-mill above referred to. The latter was erected in or immediately after the year 1800. By his operations here and at the Redstone Furnace (of which latter he was the builder and first owner, as has been mentioned) Pears became involved in pecuniary difficulties, and in September, 1804, a judgment was obtained against him, to satisfy which James Allen, sheriff of Fayette County, sold, on the 9th of December, 1805, Pears' "Prophetic" tract to George Dorsey, of Monongalia County, Va., for the sum of $3015, the tract being described in the sheriff's deed as being in the townships of Menallen and Franklin, in Fayette County, and containing one hundred and twelve acres, "whereon are erected a forge, slitting- and rolling-mill, grist-mill, saw-mill, and sundry buildings."

On the 9th of April, 1807, George Dorsey (the purchaser of the Pears land and "Rawlling Mill" at sheriff's sale) conveyed the same property to Benjamin Stevens, "Practitioner of Physick," for $3015, the deed describing the land, forge, slitting- and rolling-mills as before. Two years later (Feb. 1, 1809) the same property was conveyed, with other lands adjoining, to Thomas Meason and Daniel Keller, for the consideration of $5800, "embracing the Forge, Slitting- and Rolling-Mill, and Grist- and Saw-Mills erected on 'Prophetic.'"

At the April term of court in 1815, Isaac Meason & Co. obtained a judgment for $3499.63 against Daniel Keller, and Morris Morris, then sheriff of Fayette County, being directed to recover on the judgment, made this return: "I seized and took in execution a certain tract or parcel of land, situate, lying, and being in Menallen and Franklin townships, in the County of Fayette aforesaid, containing one hundred and twelve acres and allowance for roads, etc., for which a patent was granted to Jeremiah Pearse, dated 28th November, 1789, and therein called 'Prophetic,' on which is erected a Forge, Rolling- and Slitting-Mills, Grist-Mills, Saw-Mills, and other valuable buildings. . . ." The property so seized was sold by the sheriff for $7100 to Col. Isaac Meason, Nov. 25, 1815.

It is stated[1] that at this establishment, under the proprietorship of Col. Meason, was done the first puddling and rolling of bar iron west of the Alleghenies; and the circumstances which brought about that result are related by Samuel C. Lewis,[2] of Rochester, Pa., as follows: Thomas C. Lewis (father of the narrator), a Welshman, who had worked in rolling-mills in Wales and was familiar with the processes of puddling and rolling bars, left his native country in July, 1815, and came to America, landing in New York. He visited several iron-manufacturers in the East, and made strong efforts to induce them to erect mills for rolling bar iron. This he urged with many leading iron men in New Jersey and Eastern Pennsylvania, but his propositions were everywhere opposed, and rejected as visionary and impracticable, if not impossible. The narration proceeds:

"He then traveled westward until he got to Connellsville, Fayette Co.; there he met Mr. Isaac Meason, Sr., of Dunbar Furnace, to whom he made known his object and business. Mr. Meason immediately saw the feasibility of the enterprise, and entered into an agreement with him at a certain salary for three years, and if the mill was a success, he was then to be taken into partnership and have one-third of the profits. The place selected for the mill was at Upper Middletown,[3] then better known as Plumsock, on Redstone Creek, about midway between Brownsville and Connellsville, as Mr. Meason already had some forges there. The erecting of that mill was attended with a great deal of difficulty, as pattern-makers and moulders were not very plenty, so that a great deal of this work fell on Mr. Lewis, who made nearly all the patterns. Taking everything into consideration, the mill was completed in a very short time, having been commenced some time in 1816, and started about September, 1817. His brother came over when the work was pretty well on, and as he was also a first-rate mechanic, helped the work on very much. An incident is given here, as showing the opposition he met with in the erection of this mill. Two iron-masters from Lancaster County, by the names of Hughes and Boyer, rode all the way on horseback, nearly two hundred miles, went to Mr. Meason, and tried to convince him that it was impossible to roll iron into bars. Mr. Meason told them to go and talk to Mr. Lewis about it, which they did, and told him it was a shame for him to impose on Mr. Meason, as it might ruin the old gentleman. Mr. Lewis replied to Mr. Hughes, 'You know you can eat?' 'Why, yes,' he knew that. 'Well, how do you know it?' He could not give a reason why, but he knew he could eat. 'Well,' says Mr. Lewis, 'I will tell you how you know it,—you have done it before; and that is why I know I can roll bar iron. I have done it before!' 'Very well,' said Mr. Hughes, 'go ahead, and when you are ready to start let us know, and we will come and see the failure.' According to promise they did come on, but left perfectly satisfied of its success. . . . The persons engaged in starting the works were Thomas C. Lewis, engineer; George Lewis, roller and turner; Sam. Lewis, heater; James Lewis, catcher. Henry Lewis was clerk in the office. They were all brothers. . . . James Pratt worked the refinery, and David Adams worked the puddling-furnace."

It is not ascertained how long this first puddling-

[1] In Swank's "Iron-Making and Coal-Mining in Pennsylvania."

[2] In an article contributed to the Brownsville *Clipper*, and published in that journal June 3, 1880.

[3] Upper Middletown was laid out by Jeremiah Pears, and there was the location of the rolling-mill property owned by him, and which came into possession of Isaac Meason at sheriff's sale, as before mentioned.

and rolling-mill continued in operation, nor when its fires were finally extinguished. No vestiges of it are now remaining.

A rolling-mill (but not including a puddling-furnace, as in the case of Col. Meason's establishment) was built and put in operation by John Gibson about the year 1805, on the right bank of the Youghiogheny below Connellsville. Provance McCormick, Esq., of Connellsville, recollects this old mill as early as 1806. Upon the death of John Gibson it passed to his heirs, and was operated by Thomas Gibson for several years, after which it went into disuse. The tract of land on which this mill stood was sold by Daniel Rogers as administrator, and is now owned by the Pittsburgh and Connellsville Railroad Company, the Building and Loan Association of Connellsville, and the Johnston heirs.

COAL-MINING AND COKE MANUFACTURE.

The earliest recorded mention of the use of coal in the region west of the Allegheny Mountains is found in the journal kept by Col. James Burd, when, in the fall of 1759, he was in command of a detachment of two hundred of the king's troops, engaged in opening a road from Braddock's old road at Gist's plantation (now Mount Braddock) to the Monongahela River at the mouth of Dunlap's Creek, where it was proposed to erect a fort, and where he did erect such a work immediately afterwards. Having proceeded from Gist's towards the Monongahela to a point about four and a half miles from the river, he encamped there on the evening of the 21st of September, and on the following day moved on westward, and made in his journal this entry, viz.:

"SATURDAY, Sept. 22, 1759.

"The camp moved two miles to Coal Run. This run is entirely paved in the bottom with fine stone coal, and the hill on the south of it is a rock of the finest coal I ever saw. I burned about a bushel of it on my fire."

The language of the journal shows clearly that he was not unacquainted with the use of coal, and it is an accepted fact that coal was mined east of the Alleghenies, in Virginia, as early as the year 1750. But there was no mining of coal west of the mountains until 1784, when the Penns, who had been permitted under the Divesting Act of 1779[1] to retain their proprietary interest in certain large tracts of land in the State, sold rights to mine coal in the vicinity of Pittsburgh. This was the first coal-mining done on the waters of the Ohio. Since that time the business has increased steadily and rapidly, and untold millions of tons of coal, mined along the Monongahela and Youghiogheny, have been boated down the great rivers of the Southwest to supply the country from Ohio to Louisiana; but by far the greater part of this vast amount has been mined at points north of the northern limits of Fayette County, operations being of course commenced along the lower and more accessible portions of the rivers, and working slowly up the streams as the navigation is improved or the lower supplies become exhausted, which latter condition is very far from being brought about yet, and will remain so for years to come.

The coal operations on the Monongahela will be found mentioned in the account of the slack-water improvements on that river and elsewhere in this work. On the Youghiogheny a vast amount of coal-mining has been done, and Youghiogheny coal has been well known and highly prized in the towns and cities on the Ohio and Mississippi Rivers for many years; but an exceedingly small proportion of the coal sent from this river to the Southern and Western markets has been mined in Fayette County. The Youghiogheny Valley is barren of coal from a point in Rostraver township, in Westmoreland County, up the river to about the mouth of Hickman Run, in Fayette, where commences the "Connellsville basin," one of the richest coal-fields in the world. But there has never been much inducement to mine coal here for shipment down the river, because, in the first place, the Youghiogheny in all that part which passes through Fayette County, and in the greater portion of its course through Westmoreland, is not and never has been a navigable or boatable stream, except for a very small portion of the year, the season of freshets and high water, and even then its navigation is difficult, not to say dangerous, for the passage of coal-boats. This fact alone gives to the coal operators on the lower Youghiogheny, advantages for shipment which cannot be had in the Connellsville region, and the absence of which has caused the mining of coal for that purpose to be neglected here. Another cause which has helped to produce the same result is that the Connellsville coal is too soft for advantageous transportation, while that of the lower river is harder, and in that respect better adapted for shipment.

But all the disadvantages of the Connellsville region, as above enumerated, are counterbalanced tenfold in another direction; for the coal which cannot be profitably shipped to the lower river markets is found to be greatly superior to any other which has yet been discovered in its adaptability to the manufacture of coke, and to this manufacture it has been and is now being devoted on a scale and to an extent that is amazing to the uninitiated, and with pecuniary results that are surprising. It was said by Judge Veech that "Coal, if not king, was becoming one of the princes of the land, and its seat of empire was the Monongahela Valley." But if coal is mighty

[1] On the 27th of November, 1779, the Legislature of Pennsylvania passed "An Act for vesting the estates of the late proprietaries in this commonwealth." By the terms of this act the State paid the Penns £130,000 in annual payments of from £15,000 to £20,000, without interest, beginning at the close of the Revolutionary war, reserving to the proprietaries their private and manor property, which was in itself a princely fortune.

like Philip of Macedon, its offspring, coke, is like the mightier Alexander, and the seat of its empire is the Connellsville coal basin.

In all the numerous accounts that have been written and published in recent years having general reference to the manufacture of coke in Western Pennsylvania, very little notice has been taken of its origin and early history. What little has been said concerning these particulars, though to a great extent unauthentic and inaccurate, is generally received as correct, and little or no effort is made to investigate and search out the facts. It is but natural that a business so exceedingly remunerative as is the manufacture of coke at the present time should engross all the thoughts and energies of those who are engaged in it; that their chief attention should be given to secure the largest possible yield of coke, making and transporting it at the lowest possible cost, and selling it at the highest obtainable price, without pausing to inquire where and by whom was first produced the article which brings them their wealth. Yet it cannot fail to be a matter of interest to note the humble beginnings of the business which has since grown to such gigantic proportions. In the preparation of the following account, which is based mainly on facts sought out and ascertained by one who is himself interested in coke manufacture,[1] the object in view has been less to enter into details of the immense operations of the present time than to notice the earliest known coke-making, the persons who were pioneers in it, and the subsequent attempts at its successful application and use up to the time of the firm establishment of the business, which is now by far the most important and valuable industrial interest of Fayette County and a large contiguous region. It has been stated (but not clearly proved) that coke was made and used in the manufacture or refining of iron in America before the war of the Revolution. If such was the case, the credit of its first manufacture was certainly due to Virginia, as that colony (having commenced mining in or about 1750, as has been noticed) was the only one which produced any coal at that time. Therefore, if coke was actually made in America before the Revolution, it must have been manufactured in Virginia, or, at least, from Virginia coal.

The earliest authenticated account of the manufacture and use of coke places it at Allegheny Furnace, in Blair County, in the year 1811. The reasons for the failure of that attempt will be referred to hereafter. It is a fact undenied that the first use of coke in Fayette County was made in the refining of iron at the Plumsock (Upper Middletown) Iron-Works by Col. Isaac Meason in 1817. It has been stated by an old resident of the county that he has an indistinct recollection of the making of the coke at the place and time named, and that it was made in ovens similar to the "bee-hive" oven now in general use. But there must be grave doubts as to the accuracy of this statement, though it is, beyond all question, honestly made. He has most probably in mind the old Dutch baking-oven, but has, after the lapse of more than sixty years, come to the belief that it was done in ovens similar to the modern bee-hive. Coke-making in ovens was certainly unknown (or at least unpracticed) at that time and for years afterwards.

In Armstrong County there was a furnace built for coke in 1819, called the "Bear Creek Furnace," believed to be then the largest furnace in the United States. It was blown in on coke, but after a few casts the operators found that the (cold) blast of five pounds to the inch was insufficient for the successful use of coke, and thereupon the original purpose was abandoned and the furnace changed for the use of charcoal.

The Howard Furnace, put in operation in the year 1830, in Blair County, and the Elizabeth Furnace, built in the same county in 1832, were both constructed with a view to the use of coke, and furnaces in Clearfield, Clinton, Lycoming, and Armstrong Counties, Pa., erected between 1835 and 1838, made repeated attempts at the manufacture of coke iron, all of which resulted in failure, from the fact that the cold blast was used and at a very low pressure. The iron-masters of the present time, with all their modern appliances, immense heating surfaces, and powerful blowers, and yet still continually striving for "more heat and more blast," can well appreciate the difficulties encountered in the making of iron in former days and by the old-time methods.

At the "Mary Ann Furnace," in Huntingdon County, Pa., in 1835, William Firmstone made good gray forge iron on coke made from Broad Top coal, but continued it for only about one month. The Georges Creek Iron Company, of Allegheny County, Md., built the "Lonaconing Furnace" in 1837, and made good foundry iron to the amount of about seventy tons per week on coke. The Mount Savage Company also built two blast-furnaces in 1840, and made successful runs on coke, but up to that time most of the attempts to use coke in iron-making had resulted in failure and heavy pecuniary loss.

In 1836, F. H. Oliphant, of Fayette County, used coke at the Fairchance Furnace in the manufacture of iron from Blue Lump ore, and samples of the product were sent to the Franklin Institute of Philadelphia; but the claim which has frequently been made that this was the first coke iron made as a regular product in the United States is inadmissible, as will be seen by reference to the facts and dates given above, coke iron of good quality having been made,

[1] Most of the facts given in this narrative in reference to the earliest production of coke, and the attempts made through many succeeding years to use it successfully and profitably in iron manufacture, were furnished by Mr. George C. Marshall, of Uniontown, who has made the matter the subject of patient and persistent research, in which he has brought to light a great number of facts before unknown, but unquestionably authentic and reliable.

as shown, several years before Mr. Oliphant ever claimed its first production, and even then his claim was merely to have made a few tons.

The Great Western Iron Company built four coke-furnaces between the years 1840 and 1844 at Brady's Bend, Pa., and to that company belongs the credit of making coke iron as a regular product. Their furnaces were built especially for the use of coke, and they never used any other fuel.

The credit of having been the first to make successful use of coke in the manufacture of iron has been given in some accounts to Graff, Bennett & Co., of Pittsburgh, but it will be shown hereafter that they did not enter the field until several years after it had been used with success at Brady's Bend.

The Cambria Iron Company built four coke-furnaces in 1853. These furnaces were blown in on coke, and have continued to use it until the present time.

The coke used in the furnaces of Western Pennsylvania up to and after the commencement of operations by the Great Western Iron Company at Brady's Bend was made by a process called "ground ricking," the coal being placed on the ground in long or conical ricks, and then covered (except the spaces necessary for ventilation) with earth, to smother and prevent it from burning up. This process, though it answered the purpose very well, was slovenly, and much less rapid and economical than the present method, and the coke produced was less uniform in quality.

The earliest date which has been given and perfectly authenticated of the use of ovens for the making of coke, is the year 1841, the facts and account of which will be given hereafter. But in this connection it is proper to give (and it would be unfair and improper to omit) statements which are made by men of unquestioned and unquestionable veracity which indicate an earlier date. Mr. David Trimble, living at Little Falls, on the Youghiogheny, says that at a date which cannot be fixed nearer than that it was not earlier than 1830, and not later than 1836, he helped build one or more coke-ovens at or near the mouth of Furnace Run, and the assumption is that the coke produced was used at the Franklin Iron-Works, which were located there and run by F. H. Oliphant. Mr. Trimble says the idea of building ovens at that place was suggested by an Englishman named John Coates, who had seen them in operation in England. He also says that the coal for these ovens was brought from mines above East Liberty, that the coke made from it was used for the "let-out" fire at the iron-works, and that the supposition then was that these were the first coke-ovens built in Pennsylvania, if not in the United States. Corroborative (to some extent at least) of this statement is that of James Cochran ("Little Jim"), who has an indistinct recollection of seeing, before the year 1840, several coke-ovens standing on the south bank of the Youghiogheny River, just below the mouth of Furnace Run, and that coal was boated down the river to them from Col. Hill's lands. This concurrent testimony establishes beyond a doubt the fact that a few ovens were built and put in use on the south bank of the Youghiogheny, near the mouth of Furnace Run, and that they were among the earliest, if not the first, ever built for that purpose, not only in Fayette County, but in Pennsylvania. It is true that both gentlemen named may be mistaken in their recollection of the date, but as their statements agree (and for other reasons) this is hardly probable. Accepting then the fact that there were ovens at that point at about the time indicated, and that (as both statements agree) the coal was brought to them from the Connellsville region, some miles above, on the river, it is difficult to explain why the ovens were ever built at that place, unless for the purpose of supplying the furnace near which they were located. If the object of their construction had been to produce coke for a down-river market, or for any other purpose than to be used in their immediate vicinity, they would never have been built at the mouth of Furnace Run, but in the coal-producing region, several miles above, on the river. And yet it can hardly be regarded as probable that Mr. Oliphant was the builder of those ovens, or that the coke made in them was used by him while he was proprietor of the Franklin Iron-Works. Those who had conversations with him on the subject of the use of coke in the manufacture and refining of iron all agree that he never made claim to having used it at the Franklin Works, but only to having made coke iron for a brief period at the Fairchance. If he had built those pioneer ovens at Furnace Run, and used their product at the Franklin Iron-Works, he would certainly have asserted the fact and claimed the priority. It is, then, and for these reasons, most probable that the product of those old ovens was used by Nathaniel Gibson in his Furnace Run Works before they passed to the proprietorship of Mr. Oliphant. Whatever may be the fact (which will probably never be known with absolute certainty), the above statements are given here, not only because the sources from which they come are (the treachery of man's memory as to remote events and circumstances only excepted) perfectly and entirely reliable, but because each seems to support and confirm the other. They are therefore submitted without any attempt to explain the slight discrepancies contained in them, with regard to other matters accepted as facts.

In the year 1841, Provance McCormick and James Campbell started the project of manufacturing coke on the Youghiogheny, and succeeded in making some two thousand bushels, which they boated down the river. It is stated that the idea was suggested to them by an Englishman who was then stopping for a time in Connellsville, and who told them that in his native country, coal was made into coke for the use of foundries and furnaces. Such rich deposits of superior

coal as were found in abundance in the vicinity of Connellsville would soon be utilized in that way, he said, if there were Englishmen there to do it. Campbell and McCormick became interested in the story he told, and having gained from him what information he possessed as to the method of making coke, they resolved to try the experiment, and if successful in producing the article, to boat the product to Cincinnati, in the expectation of selling it for the use of the foundries in that city.

Associating with them John Taylor, who was a stone-mason, and the owner of a farm on the Youghiogheny, including a coal-mine, which he operated in a small way, they commenced operations. Taylor constructed two ovens on his farm (near what has been known in later years as Sedgwick Station) and superintended the coking, the coal being taken from his mine. Campbell and McCormick, both carpenters by trade, built the two boats on which the coke was to be floated down the river. Their operations were continued during the fall of 1841 and the succeeding winter, and in the spring of 1842, a sufficient quantity of coke having been produced to load the two boats, they were started down the river on a high stage of water, and under pilotage of William Turner made their way in safety to Cincinnati. On reaching the city they found that the demand was not as brisk as they had hoped to find it. The new fuel was unknown there, and foundrymen regarded it with suspicion, calling it cinders. After a time, however, the owners of the coke succeeded in disposing of about one-half their stock, taking in payment coffee and some other goods,[1] and then, to close out, bartered the remainder for a patent iron grist-mill which was highly recommended. The mill was brought to Connellsville, and soon after placed in the steam-flouring establishment of Strickler & Nickel, in New Haven, where it was put in operation, and found to be, if not wholly, at least so nearly worthless that it was sold for thirty dollars, and so ended the coke operations of McCormick and Campbell, though it need not have been so. The part of their cargoes which had been traded in Cincinnati for the patent mill was afterwards boated up on the canal to Dayton, Ohio, and there sold to Judge Gebhart, who had previously been a resident of Fayette County, but then had a foundry in operation in Dayton. There he used the coke in his establishment, and found it so well adapted for his purpose that he soon after came to Connellsville and proposed to McCormick and Campbell to make more, and furnish him with all he needed, and at a good price; but the result of their previous venture in the coke trade disinclined them to repeat the experiment.[2] In 1843 the ovens built by Taylor on the Youghiogheny were rented to Mordecai, James ("Little Jim") and Sample Cochran, who put them to use in making twenty-four-hour coke. When they had coked about thirteen thousand bushels, it was boated to Cincinnati and sold for seven cents per bushel cash to Miles Greenwood,[3] who in the mean time had become fully informed of the value of coke as a fuel. This is said to have been the first coke ever taken from Fayette County and sold for money, and in this view of the matter the Cochrans and Greenwood must be considered as the pioneers of the coke business in the Connellsville region.

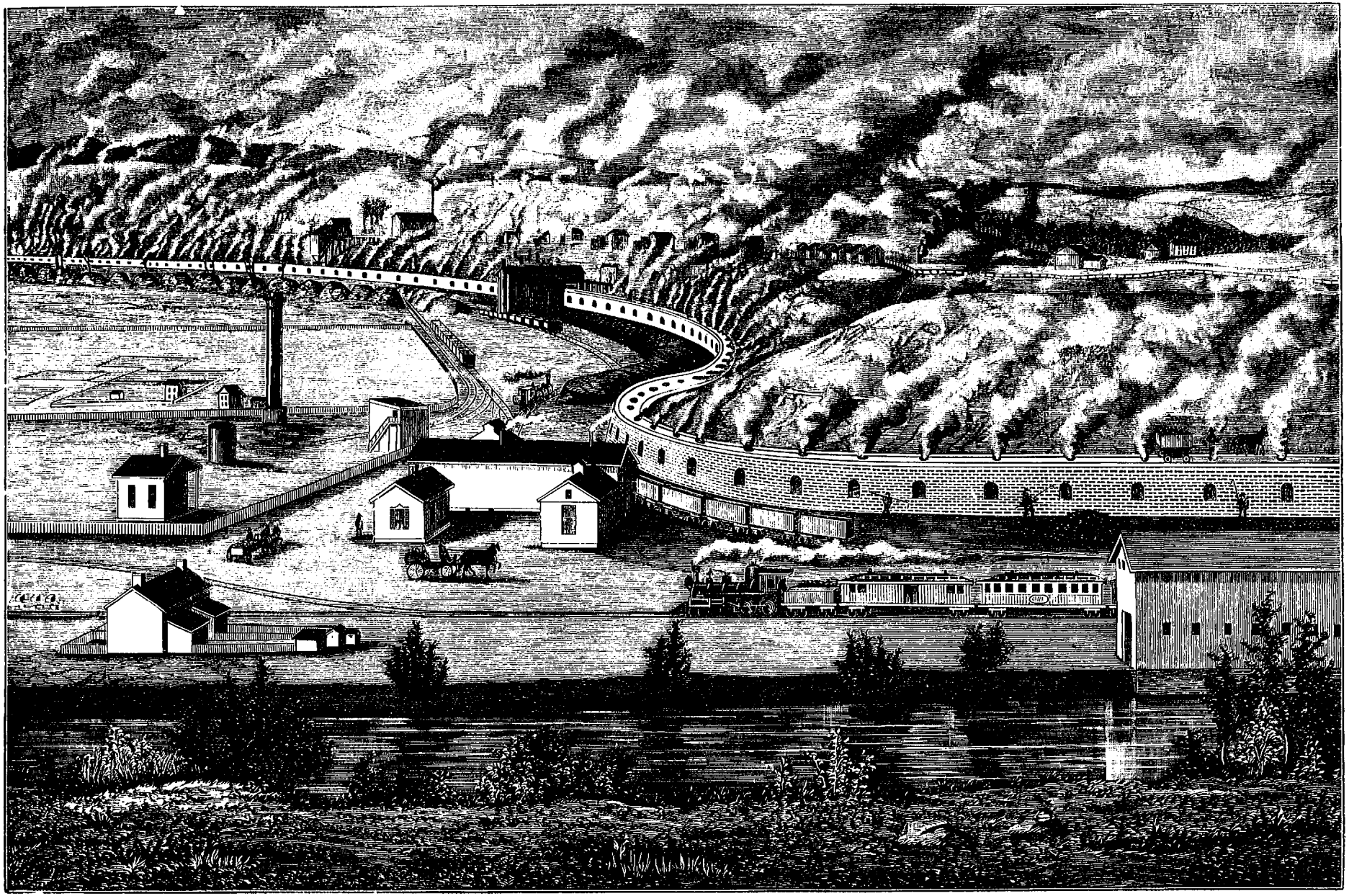
After this time, and before the year 1850, three or four ovens were built and put in operation by Stewart Strickler, the product being sold by him to the Cochrans, by whom it was boated down the river and sold in Cincinnati. About 1860 thirty ovens were built and put in operation at Sedgwick, called the Fayette Works. Shoenberger & Co. purchased a one-third interest in them in 1865. Forty ovens were built on Hickman Run in 1864 by Cochran & Keister, who transported their coke on a tramway to the Pittsburgh and Connellsville Railroad until 1871. Some time after the building of these works by Cochran & Kiester, the Laughlin ovens were built, also the ovens at the Jackson Works, above Sedgwick.

The Pittsburgh and Connellsville Gas-Coal and Coke Company organized about 1860, and built forty ovens near Connellsville. The number was increased by John F. Dravo, who took charge in 1868. The

[1] It is proper to state here that another account of Campbell and McCormick's coke operation in Cincinnati says that about half their stock was peddled out and sold for money at an average price of eight cents per bushel, and the remainder traded for the patent mill.

[2] It is related that not very long after Campbell and McCormick boated their coke to Cincinnati, William Turner (the pilot who took their boats down the river) and Richard Bookens bought coal of Thomas Gregg, on the Youghiogheny, near the site of the present Fort Hill Works, and manufactured coke from it, first by ricking, and afterwards in two or three ovens which they built near that place. They boated their coke down the river to Cincinnati, where they found the same trouble that McCormick and Campbell had experienced: no one knew the value of coke, and no one wanted it. At last a foundryman agreed to try a load of it if they would haul it to his foundry. He tried it, liked it, and purchased the entire lot. The narrative proceeds that Col. Hill soon afterwards built four ovens near the place where Turner and Bookens had made their coke, and later increased the number to twelve. The statement is given for what it is worth.

[3] Miles Greenwood was born March 19, 1807, in New Jersey, to which State his father (Miles Greenwood) had removed from Salem, Mass. He was of English extraction on his father's side, and of Huguenot French and German on his mother's. The family removed to New York in 1808, and to Cincinnati in 1817. Miles in 1825 worked in the New Harmony Community, and two years later went to Pittsburgh and learned iron-working. In 1828 he opened an iron-foundry, and later returned to Cincinnati, working for T. & J. Bevin. After three years he commenced on his own account, employing ten hands. By 1850 he had three hundred hands under him. In 1861 his entire establishment was turned into a United States arsenal for the manufacture of arms and implements of war, seven hundred men being employed. He turned forty thousand Springfield muskets, over two hundred bronze cannon, hundreds of caissons and gun-carriages, and also a sea-going monitor. He constructed the Ohio Mechanics' Institute building, and to him the Cincinnati Fire Department is indebted for its efficient organization. For twenty years he was president of the Cincinnati Fuel Company. In 1859 he was chosen president of the Cincinnati and Covington Bridge Company, and was also a director of the House of Refuge. In 1869 he was appointed a director of the Cincinnati Southern Railway. In 1832 he married a Miss Hills. Two children of this marriage died in infancy, and their mother also died soon after. In 1836 he married Miss Phœbe J. Hopson, by whom he had ten children, seven of whom are living.



THE DAVIDSON COKE WORKS,
CONNELLSVILLE, PA.

Connellsville Gas-Coal Company built their ovens in 1866. Watt, Taylor & Co. built forty ovens just below Watt's Station in 1869. In the coke-works above named were nearly all the ovens in the Connellsville coke region up to 1871, the last two named being all that were on the Fayette Branch until 1872, when Paull, Brown & Co. built one hundred ovens on James Paull's place.

There are some facts connected with the history of coal and coke production in Pennsylvania that are curious as well as startling. Virginia produced coal years before it was mined in Pennsylvania, and the latter State received coal from Virginia for manufacturing gas, and even for domestic use, as late as the year 1850. Yet now, in regard to coal production, Virginia, as compared with Pennsylvania, sinks into utter insignificance, and Virginia, though older in coal-mining by many years than Pennsylvania, produced no coke until within recent years, while the making of coke in Pennsylvania dates back almost three-fourths of a century.

It will be a matter of surprise to many, to learn the fact that Allegheny County never had a furnace within its limits from the time when the old Shady Side Furnace was abandoned, in 1794, until the year 1859, when Graff, Bennett & Co. built the Clinton Furnace, which was blown in on coke on the last Monday in October of that year. The next two were the Etna, built by Laughlin & Co. in 1861, and the Superior (two stacks), erected a year or two later. The Soho, the Isabella (two stacks), and the Lucy Furnaces were built in 1872. All these furnaces were constructed for coke, its superiority as a fuel having already been fully demonstrated when the Clinton Furnace was built in 1859.

The business of coke manufacture has been chiefly built up in the last eight years. In 1876 the number of ovens in operation in the Connellsville region was a little more than three thousand, producing nine hundred thousand tons of coke. In 1879 the number of ovens had increased to more than four thousand. For the present time (April 1, 1882) the accompanying map of the Connellsville coke region shows within that territory the location of about eight thousand four hundred ovens now in operation, and there are several hundred more scattered along the outskirts of the region proper, but not strictly within it and not indicated by the map and references, bringing the whole number in operation considerably above nine thousand, having an aggregate capacity of more than three hundred and fifty thousand tons per month. This capacity will be fully worked up to, and, in fact, exceeded in the present year, by reason of a large number of additional ovens now in contemplation and to be immediately constructed, making the coke product for 1882 more than four million two hundred thousand tons.

The immense proportions of the coke business can hardly be comprehended from a mere examination of these figures, startling as they are, and it is only by another process of thought that it is possible to realize the vast amount of coke produced in the Connellsville region. Let us suppose that the entire product of the region for 1882 could be gathered together and loaded on railroad cars, all joined together in one immense train, so that there should be no break in its continuity; that this train should be put in motion on the morning of a given day, and should move at the rate of fourteen miles per hour (which is above the average speed of freight trains), day and night, without a moment's stop or the least slacking of speed. A person living upon the line of the road would see, hour after hour and day by day, the interminable line of coke-laden cars rattling past his door in endless procession; night after night, through all the hours of darkness, he would hear the ceaseless clank and thunder of the rushing train, and each morning, on awakening from his disturbed slumbers, he would look out as before upon the steel-gray car-loads pursuing each other with undiminished speed along the railway track; and not until after nightfall of the ninth day would he see the signal-light marking the rear of the train, whose head would then be more than two thousand eight hundred miles away! Through all those days, each hour of the twenty-four would have seen the passage by a given point of more than twenty thousand tons of coke, all produced in the Connellsville region, and the greater part of it in Fayette County.

Though the manufacture of coke has already become an industry so gigantic in its proportions, and has grown with such remarkable rapidity from 1872 (and more especially from 1879) until the present time, there seems to be little reason to doubt that the same or perhaps an even greater ratio of increase will be sustained in the future for some years, and this is the view entertained by a majority of operators and others whose opinions on the subject are entitled to much weight. A principal object of manufacturing coke from coal is to furnish a fuel free from sulphur for use in the reduction of ores and the refining of iron. The demand from this source must of course increase with the increase of iron-furnaces and the growth of iron-making. In the eastern part of Pennsylvania, and in other localities east of the mountains, coke is used in blast-furnaces in connection with anthracite, and the proportion of coke to that of anthracite used in this way is being constantly augmented in favor of the former fuel, which has also almost entirely superseded charcoal for use in the manufacture of pig iron. Large quantities of coke are sent to the far West to be used in smelting the ores of the precious metals, regular shipments for this purpose being made to San Francisco and other points in the gold and silver States. Another and still weightier reason for expecting a very large increase in the demand for coke is that within the past two years H. C. Frick & Co. have introduced machinery for crushing, screening, and sizing coke for domestic purposes in compe-

tition with anthracite coal, and that this process, which was at first but an experiment, having already become a successful enterprise, can hardly fail to cause coke in this form to be extensively used as fuel in tens of thousands of households which now know no other than anthracite.

For coking purposes no coal has as yet been discovered which is equal in all respects (and indeed it may be reasonably claimed in any respect) to that of the Connellsville basin. Being a soft and porous coal, which crumbles in handling, it is therefore not so well adapted for economical transportation as the harder gas-coal which is found west of the "barren measures," and for this reason the Connellsville coal was, until the development of coke production, regarded as of little value compared with the other, though its location, which is more remote from navigable waters, had its effect as a partial cause of this disparaging estimate.

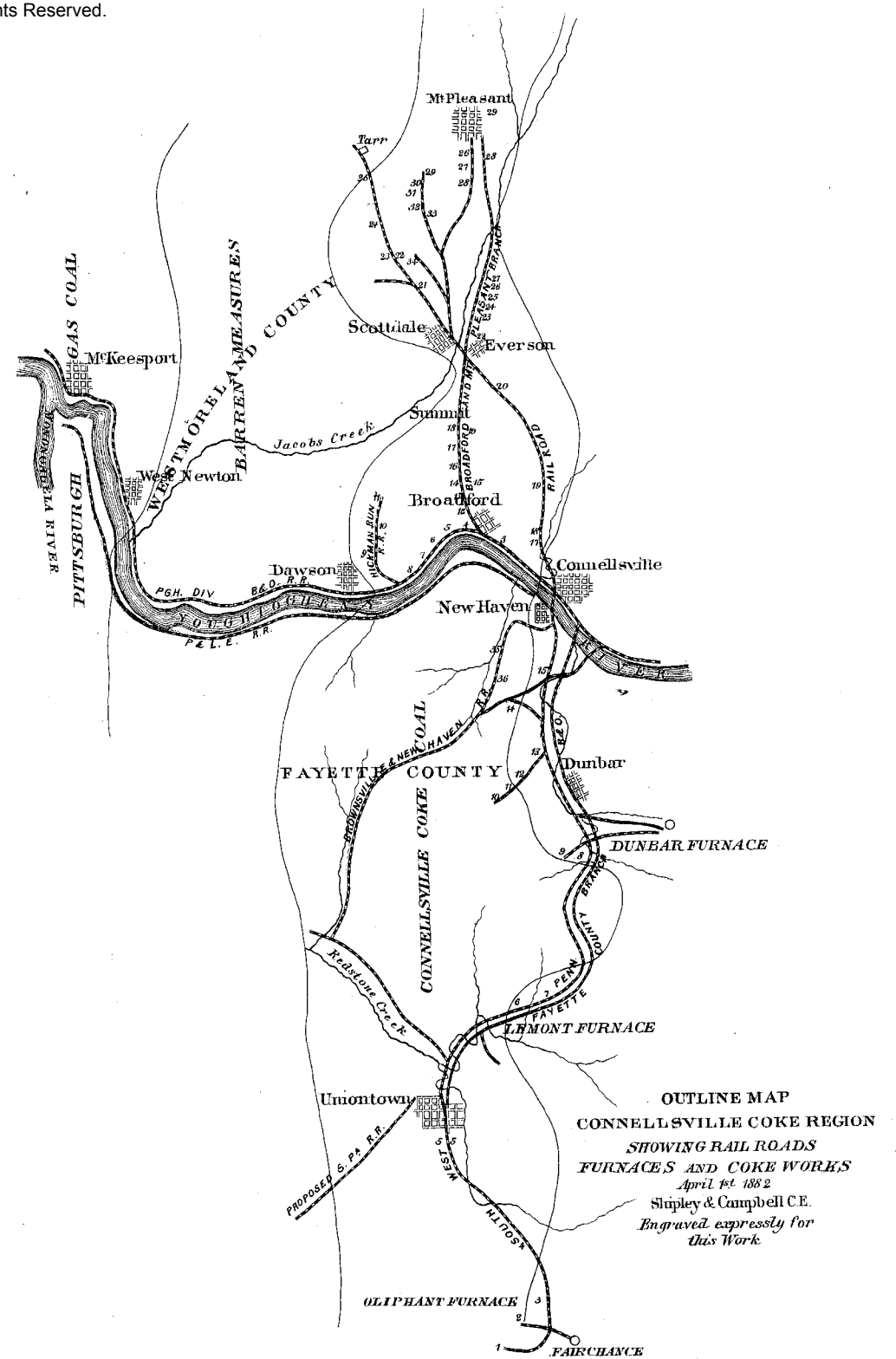
But when it became the object of operators to manufacture their coal into coke, then the conditions were reversed, and the hitherto neglected soft coal became the more highly valued of the two, because of its superior adaptability for coke-making. Its advantages over other coals in this manufacture are many. While the cost of mining the gas-coal of the Pittsburgh bed is seventy-five to ninety cents per ton, the softer Connellsville coal is mined at about one-third that expense per ton. When the Connellsville coking-coal is taken from the mine it is fit for immediate use in the ovens, and is placed in them without any intermediate process of preparation, while with the gas-coal from the Pittsburgh vein an extra expense of about fifty cents per ton is necessary to crush it by mechanical means, and to free it from sulphur as far as practicable by washing before charging the ovens with it. And finally, when the coking is finished, the "desulphurized coke" (as it is termed) produced from the gas-coal is rated in the market as inferior to coke made from the soft coal of the Connellsville basin. Therefore, while the latter offers such great advantages in mining and coking, as well as in the superior quality of its product, it is not probable that attempts will be made to any great extent to utilize gas-coal for coking purposes; and so long as the coal deposits of this basin remain unexhausted (which must be the case for many years to come) and no new discoveries are made of pure coking-coal in other localities, it seems a reasonable prediction that the Connellsville region must continue to hold a practical monopoly of the manufacture of coke. Reports are frequently circulated from time to time of new "finds" of coking-coal, represented to be equal, if not superior, to that of the Connellsville bed; but no instance has yet been reported (and authenticated) of any iron manufacturer or other consumer who did not in his purchases give preference to coke made from the Connellsville vein over that produced in any other district; and it is a fact that the coke made in Fayette County and a comparatively small contiguous region is recognized and acknowledged, wherever used in any part of the United States, as superior to any other for smelting, and for all the processes of iron-making in which coke is used as a fuel.

In view of the great and ever-increasing magnitude of the coke traffic of Fayette County, several of the principal railway lines are making vigorous efforts to secure as large a share of it as possible. The Baltimore and Ohio and Pennsylvania Companies are as yet in possession of a monopoly of this traffic, the Southwest Pennsylvania division of the latter road being, on account of its immense coke freights, more profitable in proportion to its length than any other part of the company's lines. A new road in the interest of William H. Vanderbilt's lines is now being very rapidly constructed along the south bank of the Youghiogheny, and thence (leaving that river below New Haven) through the central and southwestern parts of this county, a principal object being to tap the rich basin of coking-coal over which its route passes. This, as also the extension of the Pittsburgh, Virginia and Charleston road from the mouth of Redstone Creek to the Southwest Pennsylvania road a little north of Uniontown, and the Brownsville and New Haven Railroad, soon to be built between those boroughs, will open a new and extensive territory in the richest part of the coking-coal region. The opening of the first two named roads (which will be earlier completed than the other) will be immediately followed by establishment of additional coke-works along their lines, and the erection of a very large number of ovens, the construction of which has already been provided for and planned.

Following is a list of the several coke-works in the Connellsville region of Fayette and Westmoreland Counties (the greater part, however, being in Fayette), on the lines of the Baltimore and Ohio, Southwest Pennsylvania, and Pittsburgh and Lake Erie Railroads, with the number of ovens now in operation at each of the works. The numbers set against each, indicate their respective locations by reference to corresponding numbers on the accompanying map of the coke region. The lines of railway shown upon the map in red are those of the Baltimore and Ohio, those in black the Southwest Pennsylvania, and in green the Pittsburgh and Lake Erie Railroad:

COKE-WORKS LOCATED ON BALTIMORE AND OHIO ROAD AND BRANCHES.

No.	Name of Works.	Owners.	No. of Ovens.
1	Percy Mining Company		69
2	Mount Braddock		124
3	Henry Clay	H. C. Frick Coke Company	100
4	Washington	Sample Cochran Sons & Co.	32
5	Tyrone	Laughlin & Co.	130
6	Sterling	J. M. Schoonmaker	159
7	Jackson	Jackson Mines Company	64
8	Fayette	James Cochran	100
9	Spurgeon	Cochran & Keister	100
10	Jimtown	J. M. Schoonmaker	303



No.	Name of Works.	Owners.	No. of Ovens.
11...	Cora	John Newmeyer	42
12...	Frick	H. C. Frick Coke Company	106
13...	Morgan	" " " "	164
14...	White	" " " "	148
15...	Foundry	" " " "	74
16...	Eagle	" " " "	80
17...	Summit	" " " "	142
18...	Franklin	B. F. Keister & Co	130
19...	Tip Top	H. C. Frick Coke Company	56
20...	Clinton	James Cochran & Co	44
21...	Valley	H. C. Frick Coke Company	152
22...	Charlotte Furnace Company		60
23...	W. A. Keifer		40
24...	Fountain	J. D. Boyle	50
25...	Dexter	Joseph R. Stauffer & Co	40
26...	Painter's	McClure & Co	228
27...	Diamond	McClure & Co	66
28[1]..	Mullen	Mullen, Strickler & Co	82
29[1]..	Standard	A. A. Hutchinson & Bro	360
30...	Stewart Iron Company		120

ON SOUTHWEST PENNSYLVANIA RAILROAD AND BRANCHES.

No.	Name of Works.	Owners.	No. of Ovens.
1...	Bliss and Marshall		60
2...	Fairchance Iron Company		36
3...	Fayette Coke and Furnace Company		130
4...	Redstone Coke Company	J. W. Moore & Co	170
5...	Chicago and Connellsville Coke Company		284
6...	Lemont Furnace Company	Hogsett, Hanna & Co	150
7...	Youngstown Coke Company		240
8...	Furgeson	Dunbar Furnace Company	70
9...	Hill Farm	" " "	89
10...	Mahoning	Mahoning Coke Company (Limited)	100
11...	Colvin & Co	Colvin & Co	80
12...	Anchor	Morgan, Layng & Co	109
13...	Uniondale	Reid Brothers	76
14...	Morrell	Cambria Iron Company	400
15...	Wheeler	" " "	100
16...	Pittsburgh and Connellsville Gas-Coal and Coke Company		295
17...	Johnson Farm Coke-Works		
18..	Eldorado	W. J. Rainey & Co	225
19...	Pennsville	A. O. Tinstman & Co	70
20...	Horne	Joseph R. Stauffer	20
21[2]..	Enterprise	Dellinger, Rafferty & Co	50
22...	Union	Hurst, Stoner & Co	70
23...	Excelsior	Warden & Co	70
24...	Southwest Coal and Coke Company		138
25...	Dellinger, Tarr & Co		66
26...	Boyle's	Boyle & Rafferty	262
27...	Star	J. M. Cochran's Est	20
28...	Buckeye	" " "	116
29...	Morewood	Morewood Coke Company (Limited)	470
30...	Alice	J. M. Schoonmaker	200
31...	Bessemer	C. P. Markle & Sons	170
32...	Rising Sun	Markle & Son	103
33...	Emma	J. W. Overholt (agent)	36
34...	West Overton	A. C. Overholt & Co	110
35...	Trotter	Connellsville Gas-Coal Company	200
36...	Connellsville Coke and Iron Company		200

ON PITTSBURGH AND LAKE ERIE RAILROAD.

No.	Name of Work.	Owner.	No. of Ovens.
1...	Fort Hill	W. J. Rainey & Co	88

[1] In Westmoreland County; all others on this road as indicated are in Fayette.

[2] Numbers 21 to 34, inclusive, are in Westmoreland County, all others on this line are in Fayette.

[3] Washington, in advocating this route in preference to the more northerly one through Bedford for the passage of Forbes' troops in 1758, said, "The Ohio Company in 1753, *at a considerable expense*, opened the road," etc.