
THE MINERAL RESOURCES OF JACKSON COUNTY, O.

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Jackson county is situate in the southern portion of Ohio, and is bounded on the north by Vinton county, on the east by part of Vinton and Gallia, on the south by parts of Gallia, Lawrence and Scioto, and on the west by parts of Scioto, Pike, and Ross. The county is traversed by three railroads; the Marietta and Cincinnati, the Ohio Southern, and the Toledo, Cincinnati, and St. Louis.

Geologically the county lies in the lower coal measures of the State, on the western border of the deep valleys cutting down into the the underlying Waverly sandstone.

The coal measures are about 600 feet thick, and enclose eight or ten different beds of coal, ten or twelve beds of iron ore and three to five beds of limestone. Of the coals, four seams are in course of development, known as the Jackson shaft coal, the Coalton or Wellston coal, the cannel coal, and the limestone coal. Five or six of the ore beds are actively worked, known as the limestone ore, the limestone kidney, the little red block, the sand block, the blue limestone ore, and the Boggs ore. Only one of the limestone beds is in course of development.

Jackson shaft coal is the lower bed of the series and is mined around the village of Jackson for the supply of the blast furnaces, it being an open burning coal of great purity, and hence fitted for furnace use in a raw state. This coal is doubtless the equivalent of the furnace or block coal of the Mahoning Valley, as it is found in both regions at the base of the coal measures. In both districts, also, the seam is met in basins or troughs which seem to have been originally scooped out of a comparatively level plain anterior to the deposition of the coal vegetation. The Massillon and Akron coals also possess the same peculiarities, and these coals are, no doubt, also identical with the Jackson shaft coal.

The Wellston coal lies, according to my measurements, fully 150 feet higher than the shaft coal; but there is a coal on Horse creek, two miles west of Coalton, about seventy feet below the Coalton coal, which possesses all the characteristics of the shaft coal, and is supposed by geologists who have examined this district, among them my honored friend Prof. Orton, to be the Jackson shaft coal. I am, and always have been, disposed to regard this as an intermediate seam.

The cannel coal lies 200 feet above the Wellston coal. It has recently been opened on a large scale at Coal Run, by the Southern Ohio Coal and Iron Co., and ranges from fifteen to twenty-eight inches in thickness. It is a bright burning coal, leaves no coke or clinker in burning, but the ash is rather heavy for a first class cannel. It however commands a ready market and a good price, and on the whole, is equal to any cannel coal in the State now being mined.

The limestone coal is sixty-five feet above the cannel coal. It is

four feet in thickness, and is covered by a massive limestone from two to twelve feet in thickness, the limestone in turn being capped by the famous limestone or grey ore, so extensively mined in the Hanging Rock region of Ohio and Kentucky. The limestone coal is mined only for local consumption. It is a fair coal in quality, but is eclipsed by the superior grade of the Coalton or Wellston coal, which for many purposes has no superior in the whole range of the Alleghany coal field, and until this seam becomes exhausted the limestone coal will never be able to make headway in the market.

The other coals of the county have not been mined to any extent, and several of them are too thin for the practical purposes of the miner, and some of them are mere local beds.

The Jackson shaft coal lies from forty to ninety feet below the surface in the immediate vicinity of the village of Jackson. This coal was discovered in 1863, by drillers who were boring a hole for salt. A shaft was sunk to test the quality and thickness of the vein, and its fine appearance, being remarkably free from sulphur, or other impurities, its bright and splinty character attracted the attention of capitalists, among whom were the late Gov. David Tod, of Briar Hill, from whose farm the famous Briar Hill Coal, of the Mahoning Valley, derives its name. Gov. Tod and his associates in business leased a tract of land near Jackson, bought a furnace and rebuilt it, and opened a mine, for the purpose of making iron out of the native coals, limestones, and ores of the county. The adventure did not prove a financial success, however, for two reasons: the owners lived too far away from their furnace property and mines to give the works personal attention, and the railroad company were too exacting in freights. But an important and remunerative industry has since sprung up around this pioneer enterprise, there being five blast furnaces in Jackson village, all of which use the native coals, ores, and limestones of the county; beside four others at the village of Wellston, seven miles north-east of Jackson, all of which also rely upon native products of the county in making iron.

The Wellston or Coalton Coal is, however, the main-spring of the coal mining industry of the county. This seam of coal had been long opened and mined in the hills surrounding Jackson for local use before its existence was suspected at Wellston. In its progress eastward it plunges below the valley of Horse Creek, a

mile east of Coalton and grows gradually thicker along its line of direction being scarcely two feet thick at Jackson, while at Wellston seven miles northeast it rises to four feet. The coal was discovered at Wellston by Hon H. S. Bundy, member of Congress from the 11th Congressional district of Ohio, in 1872. Mr. Bundy was then, as now, extensively engaged in the manufacture of iron in this county, and conceived the idea of exploring for the Jackson Shaft Coal on his homestead farm where the village of Wellston is now located. He put a set of drillers to work who, at a depth of 60 feet, discovered a 4 foot vein of coal. Mr. Bundy was boring for the Jackson Coal and felt sure he had found it, a feeling shared by all the mining experts of the county upon the discovery of the coal.

The Milton Furnace and Coal Co. was organized in 1872 immediately after the discovery of the coal, which leased several hundred acres of coal on lands adjoining the tract on which Mr. Bundy had drilled. A furnace was built and a shaft sunk before the quality of the coal was practically tested so well assured were the Company that they had the Jackson shaft coal. When at length the coal was reached in the shaft it was found, although differing somewhat in structure, to be equally well fitted for furnace use as the coal at Jackson village. The question of the identity of the two coals was still in dispute in 1877 when the writer, during an official visit to the mines of the county as Inspector of Mines, in company with Mr. John Hall, mining boss of the Milton Furnace and Coal Company's mine, traced the two coals from Wellston to Jackson and established their relation beyond further dispute.

The wonderful purity of this coal, its freedom from ash, and its extraordinary heating power, which resembled the best grades of anthracite soon brought the coal into public favor. The following analysis is a sample of its quality at Coalton:

Specific Gravity	1.3000.
Water	1.35.
Ash	1.30.
Volatile Matter	23.65.
Fixed Carbon	66.70.

The coal makes little smoke in burning and leaves so small an amount of ash after combustion that the late Prof. Andrews, of the State Geological survey, was disposed in consequence to doubt

its vegetable origin. Owing to the freedom from ash and the unusual quantity of fixed carbon contained in the coal, the cinders, in falling through the grate-bars of the fire into the ash pit below, continue burning until they fall into dust. The people of Springfield and Dayton and all the intermediate towns vied with each other as to which city would first reach the new coal field with a railroad, and two roads now known as the Ohio Southern and the Toledo, Cincinnati and St. Louis railroad, the latter a narrow-gauge, were built to Coalton in the fall of 1878, and extended to Wellston in 1880. The narrow-gauge has since been extended to Ironton, passing through the heart of the charcoal iron region of the county.

The mines opened on this coal have been developed with extraordinary energy. In 1878, with the exception of a few thousand tons shipped from the mines of the Milton Furnace and Coal Co., there were no shipments made in the county. In 1880 the output from the mines of this coal seam exceeded one hundred and fifty thousand tons. In 1882 upward of three hundred thousand tons were shipped. Last year the output was limited, not so much from want of trade as in other districts of the State but for want of cars. The two roads along which this coal is shipped to market—the Ohio Southern and the Toledo, Cincinnati and St. Louis, which first entered the coal field in the fall of 1878, not being able to supply themselves with cars as fast as the mines have been opened. During the last four years thirty-three mines have been opened on this seam of coal having an annual capacity of 1,000,000 tons.

The beds of ore, like the seams of coal, are met on well defined geological horizons.

By far the most valuable ore of the county and of the whole Hanging Rock region is the grey or limestone ore which lies two hundred and seventy feet above the Wellston Coal and one hundred and forty-five to one hundred and fifty feet above the Blue Limestone. This ore is usually about ten inches in thickness and is generally mined by stripping or open casting the bed, along the hill sides. The ore mined in this manner along its out crop is a limonite having become oxydized by the action of the atmosphere. Although a very persistent bed it is occasionally wanting where it is due and it sometimes swells up into pockets of three or four feet in thickness. When followed into the hill by drifting, it gradually

changes to a carbonite and otherwise so deteriorates in value as to frequently become unfit for furnace use. The cold blast iron made from this ore is one of the most valuable in the United States, and is especially prized for the manufacture of car wheels, ordnance and for other castings which require an unusually tough and strong iron. This ore, as I have said, rests on a bed of limestone part of which is usually mined with the ore for furnace flux.

The other ores of the county are found in descending order, the first bed below the grey limestone ore being the limestone kidney, which lies twenty to forty feet below the horizon of the grey limestone. This ore, as its name indicates, is a kidney; it ranges from one inch to six or eight in thickness and is next in value, so far as quality is concerned, to the grey ore. About thirty or forty feet below the limestone kidney the little red block is met, a bed which runs from two to ten inches in thickness. This is also an ore of great purity and value, but like the limestone kidney is too thin to be followed in the hills by drift mining, and is only mined by stripping.

The sand block is a rough ore never highly prized, although occasionally used. Its horizon is twenty to forty feet below the little red block, and it is usually eight to ten inches thick. About forty feet lower the blue limestone bed is due. This ore is of a superior quality to the sand block, the little red block and the limestone kidney, but, like the sand block, is not much sought after by furnace owners. The bed is too thin which makes the ore too costly to mine so long as the thicker and superior ores are accessible in the same hill above.

I know of no point in Jackson county where the Boggs ore is mined, but it is opened at a number of points by drifting, in Scioto county, along the Portsmouth branch of the Marietta and Cincinnati railroad, a few miles south of the county line. Its horizon is in the near neighborhood of the blue limestone. The ore is very thick, frequently swelling to eight feet. It is mined by drifting on the pillar and room system, as coal is worked, and is used in the blast furnaces of Jackson county. The ore is rather lean, but owing to its great height is one of untold value. It is probably not a persistent bed; at any rate it has not, I believe, been opened in Jackson county.

The upper of the three beds of limestone is the grey limestone, underlying the grey ore, the horizon of which is 270 feet above the

Wellston coal, and 420 feet above the Jackson shaft coal. Sixty-six feet above this limestone the Nelsonville or No. 6 coal is due, making the horizon of the Nelsonville coal 486 feet above the base of the coal producing rocks of the State. This coal is due and is present in Jackson county in the south and south-east portion of the county, as is also coal No. 7 of the geological nomenclature, but these beds are not yet accessible for shipping purposes.

130 to 150 feet below the grey limestone, the blue limestone belongs. This rock is seldom used in the furnace, being greatly inferior in quality, as a flux, to the grey lime. It is a valuable geological guide all over southern Ohio.

About fifty or sixty feet below the horizon of the blue limestone, a patchy, white lime rock is occasionally seen exposing itself in the county. This is thought to be the equivalent of the Maxville limestone of Athens county, which our geologists have regarded as forming the floor of the productive coal measures of the State. Its horizon in Jackson county is about 70 feet above the Wellston coal, and 200 feet above the Jackson shaft coal, though owing to the peculiar structure of the floor of the coal measures, I have seen the underlying Cuyahoga shale rise up to the horizon of the white limestone.

A great industry exists in Jackson county in the manufacture of charcoal iron, a detailed description of which, would be alike interesting and instructive. This subject, however, properly belongs to a discussion of the charcoal iron interests of the Hanging Rock region of Ohio and Kentucky, and to do it justice would require to be treated in a separate and elaborate paper.

The coals, ores, and limestones of the county, which have not been noticed in this paper have not been worked to any extent to date; but their place in the geological scale is given in the Geological Reports of the State, and they are fully described by my friend Prof. Orton, in his interesting and exhaustive report of the Hanging Rock District, in volume three, Geology pages 885 to 941.