JUG ROCK.

Photographed by D. Allbright, Shoals, Ind.
SECOND REPORT

OF THE

GEOLOGICAL SURVEY

OF

INDIANA,

MADE DURING THE YEAR 1870,

BY

E. T. COX,

STATE GEOLOGIST,

ASSISTED BY

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OHIO STATE UNIVERSITY

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OFFICE OF STATE GEOLOGIST,
INDIANAPOLIS, INDIANA,
December 1st, 1871.

To the Honorable President and Members of
the Indiana State Board of Agriculture:

Sirs:—I herewith submit to your honorable body, my
Second Report of progress in the Geological Survey of the
State, for the year 1870.

Very respectfully,
E. T. COX,
State Geologist.
INTRODUCTION.

Since my last Report, I have been principally engaged, with what assistance could be obtained, in determining the extent and importance of the coal seams adapted to household and manufacturing purposes, in the counties which lie to the south of the limits of last year's survey, namely: Sullivan, Knox, Daviess, Martin, Dubois, Pike, Gibson, Warrick, Spencer, Perry, Vanderburg and Posey. Only three of the above counties (Sullivan, Daviess and Martin) could be surveyed in detail, while Perry, Vanderburg and Posey had to be entirely omitted, and the others only alluded to in a brief manner from the notes of a reconnaissance which I made over a portion of the territory of each. This partial examination has, however, been sufficient to furnish a very good general knowledge of their Geology, and proves the continuance of the BLOCK or iron smelting coal from the northern limits of the Indiana coal basin to the Ohio river—a Geological discovery of incalculable advantage to the State, as the day can not be far distant when this coal, which is unequaled for smelting iron, will induce the building of blast furnaces along the entire eastern margin of the coal basin. Its great importance for manufacturing purposes has already been the inducement for locating a number of railroads that traverse the coal field in several directions, some of which are already under construction, with a fair prospect of being completed at an early day.

These roads all reach important coal basins, and one of the principal advantages to be derived from their construction
is the facility which they will afford for securing an abundant supply of good fossil fuel for the large commercial and manufacturing cities that lie beyond the coal basin.

The coal mines at Cannelton, on the Ohio river, in Perry county, are among the most valuable and extensively worked mines in the State, and I regret that I was compelled to defer their examination, as well as Judge Ingle's mines (Bodiam mines) at Evansville, in Vanderburg county, until another season.

My assistants are Prof. John Collett and Dr. G. M. Levette. Dr. Rufus Haymond was also engaged, but becoming sick soon after commencing field work in Dubois county, he was finally compelled to abandon the survey, which was a source of much regret, both on account of the loss felt in being deprived of the Doctor's valuable services and the anxiety expressed by the people of that county for an immediate report on its mineral resources, which, consequently, can now only be briefly alluded to in this report.

To Prof. John Collett, of Vermillion county was assigned the duty of making a detailed survey of Sullivan county, a labor which he has performed in a highly satisfactory manner, as the able and minute report of the Geology of that county, published in this volume, will bear testimony.

He has made known many interesting facts in the stratigraphy of the coals, and collected a large number of organic remains, which serve to increase our knowledge of the vertical range of the fauna and flora of the coal measure.

Dr. G. M. Levette has been engaged in drawing maps and other office work, as well as assisting me in the laboratory with the chemical analyses of coals, iron, iron ores, mineral waters, etc. In this department, a very large amount of work has been accomplished.

Since my First Report there has been decided progress made in mining and manufacturing along the zone of block coal from Attica on the north to the Ohio river on the south, notwithstanding the blighting influence of a "strike" of the miners in Clay county, which continued for several months, and produced a complete stagnation in the coal and iron bus-
The iron masters took advantage of the opportunity presented by this strike, and were otherwise induced by the prevailing low price of pig iron to go out of blast and put their furnaces in complete repair. The Knightsville furnaces have been, to some extent, remodeled and changed from open tops to closed tops.*

The Brazil furnace has, also, been changed from an open to a closed top, and is in complete repair, and ready to blow in at any time.

Several new furnaces were talked of in the early part of the spring, but the prevailing low prices of iron, caused in part by the reduction in the tariff on iron, so discouraged the iron men that but one new furnace has actually been built. This is the Vigo blast furnace at Terre Haute, built mostly by capital furnished by the citizens of that flourishing manufacturing city. A lithographic plate, taken from a photograph that was furnished by the Vigo Iron Company, together with a description of this furnace, will be found in another place.

The Indiana North and South Railway, which runs the entire length of the belt of "iron smelting" coal, from Attica, in Fountain county, to Newburg, on the Ohio river, in Warrick county, has been put under contract, with the expectation that it will be completed inside of two years.†

This road will furnish a direct outlet for coal to the Chicago market.

The Indiana Mineral Railway is also projected to run through the southern portion of the block coal belt. Mr. Alexander, of Philadelphia, Pa., is, I believe, President of this road. Its southern terminus is to be near the mouth of Crooked Creek, in Spencer county, and it will connect with the Indiana North and South Railway, at Bloomfield,

*These furnaces have recently blown in, and the make of iron has been very greatly increased by the changes that were made.

†Dr. E. B. Thomas, President of this road, informs me that the grading was commenced simultaneously at Attica and Brazil, and that both divisions had nearly reached Rockville, in Parke county. Grading has also been commenced at Bloomfield, in Greene county, and will soon be completed to Worthington, on the Indianapolis and Vincennes Railroad.
in Greene county. This road passes through a valuable coal basin, and its completion will prove an immense benefit to the State at large, as well as the counties through which it will pass.

The enterprising gentlemen connected with this road, employed Colonel J. W. Foster, of Chicago, one of the oldest and most experienced geologists in the West, to make a survey and detailed examination of the coals along their respective routes. The results of Colonel Foster's investigations are embodied in two reports, containing maps, on which are located the principal coal out-crops.

In these reports are also given a number of analyses of coals, made by Prof. M. Delafontaine, of Chicago, late Professor of Chemistry in the University of Geneva, Switzerland.

It is highly flattering to me that this able report bears testimony to the accuracy of my previous geological work, and fully confirms all that I have said in regard to the value of the block coal for the manufacture of iron and steel, and sets forth the incalculable advantages possessed by Indiana in controlling the iron market of the new West, and for conducting the most gigantic metallurgical operations in the country.

The existence of two seams of block coal in Clay county below the only seam known at the time of commencing my survey, as shown in the vertical column of the coals given in the first report, 1869, has been fully proved by bores and shafts sunk to the coal.

At Carbon, on the Indianapolis and St. Louis Railroad, "the Carbon Coal Company" are working from the one shaft, coals I and G, and the existence of F has been proved by a bore which started from the bottom of the shaft. The following section made at this shaft, with the assistance of Mr. John Elder, indicates the relative position of these coals:
In this shaft we find a total of eleven feet and six inches of block coal.

The Clay Coal Company, recently opened a mine on this road about two miles and a half west of Carbon. I have not had an opportunity to visit this new mine, but have been informed that the seam worked is referable to the middle coal G of the above section.

Garlick & Collins work the upper and middle block coal seams on Otter creek, one mile and a half north of Brazil. The upper seam, I, is reached by tunnels, and the middle seam, G, by a shaft so situated that the coal from each is loaded into the cars from the same tip. Each seam will average four feet in thickness. The middle coal is, here, one of the purest and best coals for smelting iron that has come under my notice, as may be seen by the analysis, which is given in another part of this report.
Proper investigation will develop the existence of the lower block-coal seams at many places where they are at present unknown, and the lands on which these coals are so proved to exist, will be materially enhanced in value.

The lowest seams of all, A and B, are only to be found in certain localities along the extreme eastern margin of the basin in Clay county, but they have a much broader area in the counties to the south.

The St. L. V. T. H. & I. R. R., has extended its switches into the coal fields, both north and south of the main track. South of Brazil, Ormsby & Co., have completed their shaft and are doing an extensive business. They are mining the coal seam (I.), which averages four feet in thickness, and the coal is of excellent quality.

Morrison, Woodruff & Co. have also sunk a shaft to coal I, about one mile southeast of Ormsby & Co., and are taking out a large quantity of coal. In this county, quite a number of new mines have been opened, and the quantity of coal shipped has been more than doubled since my last report.

The following list shows the number of mines now opened in Clay county, on the Indianapolis and St. Louis Railroad:

Carbon Block Coal Company, at Carbon.
Miller & Sons, at Carbon.
Cabbage & Bro., at Carbon.
John C. Beasley, at Carbon.
David King, at Lena.
Webster & Garrigus, at Lodi.
Clay Coal Company, two miles west of Carbon.
D. Titcomb's, Fountain, in Vigo county.

Mines reached by the St. Louis, Vandalia, Terre Haute and Indianapolis Railroad:

Armstrong's mine, Knightsville.
Brazil Coal Company, Barnett mine, south of Harmony.
Brazil Coal Company, Weaver mine, North Branch.
Bartlett Coal Company, on the Y.
Butsch, Dickson & Co., Ashley Shaft, on the Y.
Clay Coal Company, North Branch.
Ernhart, Jane, on the Y.
Garlick & Collins, North Branch.
Great Western Coal Company, north of Brazil Furnace.
Guest’s, Robert, mine, Knightsville.
Hutchinson & Jones, South Branch.
Indiana Coal and Iron Company, Knightsville.
Indiana Coal and Iron Company, North Branch.
Lafayette Coal and Iron Company, on the Y.
McClelland Coal Company, North Branch.
Morris Coal Company, Strains’ old shaft, on the Y.
Morrison, Woodruff & Co., South Branch.
Niblock, Zimmerman & Co., North Branch.
Ormsby Coal Company, South Branch.
Samuel Strains’ mine, South Branch.
Star Mines, (Planet Furnace,) north of Harmony.
Veach Coal Company, North Branch.
Watson Coal Company.
Wright’s, Mansur, mine, at Fire Brick Factory, north of Brazil.
Great Western Coal Company, Newburg.
Armstrong’s mine, Newburg.
Fortner’s mine, Newburg.
Bailey & Moore, Staunton.
Greencastle Coal Company, Staunton.
Somers & Somers, (two mines,) Staunton.
Williams & Co., Staunton.
E. A. Ferguson, Cloverland.
Bartlett Coal Company, (formerly Bigelow,) Seelyville.