INDIANA.

DEPARTMENT

OF

Geology and Natural Resources.

EIGHTEENTH ANNUAL REPORT.

S. S. GORBY,
STATE GEOLOGIST.

1893.

TO THE GOVERNOR.

INDIANAPOLIS:
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1894.

STATE OF INDIANA,
EXECUTIVE COMMITTEE,
OCTOBER 12, 1893.

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MYRON D. KING,
Private Secretary.

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W. H. MYERS,
Secretary of State.

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CHRISTIAN H. STEIN,
Clerk Printing Bureau.

State of Indiana,

Department of Geology and Natural Resources,

INDIANAPOLIS, IND., October 9, 1893.

TO HON. CLAUDE MATTHEWS,
Governor of Indiana:

SIR: Herewith is submitted the 18th Report of the Department of Geology and Natural Resources. The report embraces papers by Prof. Charles R. Dryer, upon the Geologies of Lagrange and Noble counties; the Botany of Noble County, by Prof. W. B. Van Gorder; reports by State Inspector and Assistant Inspector of Mines; reports by the State Supervisor of Oils and his assistants; report by the State Supervisor of Natural Gas; a paper on the structural features of the State with diagrams by Prof. E. P. Cubberly, and a Paleontological Report by Prof. S. A. Miller, describing and figuring eighty species of fossils hitherto unknown to science.

It is hoped the report will be a valuable aid to those interested in the geology or natural history of the State, whether in an economic or purely scientific sense.

Respectfully submitted,

S. S. GORBY,
State Geologist.

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INTRODUCTORY.

The attention of capitalists has been closely directed to the State of Indiana for several years, and, as a result of careful investigation, investments of capital have been large, varied and continuous. Notwithstanding the business depression of the last year, the affairs of a large proportion of the industries of the State have been fairly prosperous. While a few industries have temporarily suspended operations on account of a depressed state of trade, a large proportion of them continued to operate, some with a reduced force and others with a full complement of employes and with reasonable profit.

THE COAL INDUSTRY.

The coal industry of the State shows a large increase of production during the year just passed, and there has been a corresponding increase in mines and facilities for handling coal, and of employes also. There was more coal mined in Indiana the last year than was ever produced within the same period in the history of the State. With a profitable coal area of more than 7,000 square miles, extending over twenty-two counties of the State, and with fair shipping facilities to a profitable and increasing market, the output of the Indiana fields should be several times greater than the present production. The block and bituminous coals of Indiana compare favorably with those of any other State. Following is an analysis of Hocking Valley, Ohio, coal—the average of the field:

ANALYSIS OF HOCKING VALLEY, OHIO, COAL.

Fixed carbon	54.17
Gas	36.40
Ash	2.81
Moisture	6.61
Total	99.99

ANALYSIS OF INDIANA BLOCK COAL.

Fixed carbon	56.50
Gas	32.50
Ash	2.50
Water	8.50
Total	100.00

The sample of Indiana coal from which the above analysis was made was taken from Clay County. The analysis of a sample of bituminous coal from Vanderburgh County resulted as follows:

Fixed carbon	53.50
Gas	39.00
Ash, red	4.00
Water	3.50
Total	100.00

From a specimen of Fayette County, Pennsylvania, coal, above Pittsburgh, was obtained the following:

Fixed carbon	58.00
Gas	34.00
Ash	5.00
Water	3.00
Total	100.00

A specimen of Mecklenburg County, Kentucky, coal showed as follows:

Fixed carbon	51.00
Gas	42.50
Ash	4.50
Water	2.00
Total	100.00

Coal from Grundy County, Illinois:

Fixed carbon	50.35
Gas	39.85
Ash	4.15
Water	5.65
Total	100.00

The weight of Indiana coal varies from 71 pounds to 85 pounds per cubic foot, with an average of 79 pounds. It contains fixed carbon varying from 40 per cent. to 65 per cent., averaging 55 per cent. Gas, from 33 to 53, averaging 41. Ash, from 1.50 per cent. to 19.50 per. cent., averaging 5.00 per cent. Water, from 2.00 to 6.00, averaging 3.00 per cent. It produces from 42.00 to 65.00 per cent. of coke, averaging 58.00 per cent. It is as generally free from sulphur as that produced in other States. The large, undeveloped coal areas of the State should receive the attention of capitalists, and become a source of large revenue to our people. This department has never had means to make a thorough survey of the coal fields. A special appropriation of at least

$10,000 ought to be made for this work, and the reports thereon published in special volumes, so that the information could be given to those who are directly interested in these industries. The office of the State Geologist is constantly receiving letters from capitalists, making special inquiries concerning portions of our coal area to which no definite answer can be given, for the reason that we have not the facts upon which to base replies. Were a thorough survey of the coal fields made, the facts would always be at hand; and it is certainly true that if the complete facts concerning this great mass of undeveloped wealth were known, the increase of capital in the coal industry, as well as the production of fuel, would soon be doubled.

BUILDING STONE.

It is generally conceded among architects that for general purposes no stone in America surpasses the Indiana Oolitic Limestone as a building material. It is strong, durable, cheap, and of uniform texture and color. No other stone in the market can be so readily and easily dressed, or prepared for the builder's use. In the middle and southern States a larger proportion of this stone is used in the large Government structures, and other large public structures, than all other stones combined. It is so well known now, and its value is so generally recognized that its use in public buildings has become almost universal. As a result of this popularity, the Oolitic limestone quarries of Indiana suffered less on account of the general business depression during the year 1893 than did any other industries of the State. The orders for stone that were booked previous to the beginning of a general feeling of distrust were sufficient to keep all the quarries running to their full capacity during the entire year, while many of them have contracts for all they can produce during the year 1894.

The limestone quarries, other than the Oolitic, have also been very successful, despite unfortunate conditions that have so universally prevailed.

Too little attention has been given to the valuable sandstones that are found in several counties of the State, notably in Fountain, Warren, Vermillion, Parke, Dubois, and a number of others. As a rule, this sandstone is very strong, capable of sustaining a pressure of 6,000 lbs. to 7,000 lbs. per square inch. It is easily worked, and can be obtained in blocks of any dimensions required. It is fine grained, even in texture, and its fire-proof qualities make it very desirable as a building stone. It is found in a variety of colors, but gray and a chocolate color predominate. Several quarries have been opened in the counties named, and it is expected that the beauty and durability of the stone will soon make a demand for it that will put it into close competition with the well known Oolitic limestone.

INDIANA CLAYS.

No other mineral substance is used so extensively by man as clay. Our cities are built of it in the form of bricks; our streets are paved with it, our houses decorated with it in the form of tiles, vases and other objects. In the dining room the ware of the matron is her especial pride. For domestic purposes, hundreds of different articles are made of clay, and on account of the non-corrosive properties of the articles they are far supérior to articles manufactured of any other minerals.

Indiana has a great diversity of clay, some of them being of great value. The clay products of the State already amount to many millions of dollars annually. These products, however, consist principally of building, paving and fire proof bricks, decorative, flooring and roofing tiles, sewerage and drainage tiles, terra cotta, brown stone ware and similar products. The State Geologist is preparing an exhaustive report on the clays of the State, which will appear in the nineteenth report of this department. In preparing for this report he has collected and made analysis of about one hundred and seventy samples of clay from all parts of the State. In this work only such clays have been used as are found in commercial quantities, and at available points. Some of these clays are of extraordinary value on account of their whiteness, and the large proportion of alumina they contain. It is hoped that the publication of the report will result in a widening of the market for these valuable products.

SAND.

In the vicinity of Pendleton and Montpelier valuable white sand has been found for the manufacture of glass. In Washington County, near Salem, occur vast quantities of a good quality of moulder's sand, suitable for foundry use. For building purposes sand of suitable quality occurs in nearly every neighborhood.

NATURAL GAS.

The natural gas fields of the State are still producing enormously. While a number of localities, where the draught has been heavy and continuous, show a marked diminution of pressure and volume, the larger part of the field is found to be reduced but little below the original pressure. If used with economy, natural gas will be a source of revenue to the State for many years yet. It is a humiliating fact, however, that it is viciously and continuously wasted. This waste is not confined to any single class of individuals. In private honses almost twice as much is consumed as is necessary for the comfort of the inhabitants. In most houses it is allowed to burn in each stove, grate or furnace twenty-four hours in the day, regardless of the conditions of temperature. It is still allowed to burn in immense flambeaus in hundreds of places throughout the field, and in some localities it is burned day and night.

In the development of oil wells more or less gas is found. Some of these wells yield two to four millions cublic feet of gas per day. These oil wells, as a rule, are some distance from any gas pipe line, and, of necessity, the gas is wasted. It has been impossible so far to regulate the use of gas in such a way as to prevent this extravagant waste. When it is piped to the premises of an individual he considers all that is admitted through the pipes his, and seems to act upon the assumption that he must consume it all or it will be a loss to him.

The daily loss to the people in the gas area at this time on account of this extravagance is not less than $5,000. The various companies that pipe gas to the various cities and towns have made a few feeble efforts to regulate the use of gas to the actual needs of consumers, but their efforts so far have been almost wholly futile.

PETROLEUM.

Indiana is rapidly attaining importance as a producer of petroleum. During the year 1893 the yield was 2,335,000 barrels of 42 gallons each. The consumption of refined petroleum in the State was about 260,000 barrels, and of crude oil about 150,000 barrels, so the fact is plain that the production of petroleum has become a most important industry. At the beginning of the year there were almost 250 producing wells in the State; at the present time there are more than 1,000. The yield of 1893 will be more than doubled, and it is likely, judging from the increase in developments, that the yield will be three if not four times as much as the last year's product.

The counties producing the largest quantities of petroleum are Jay, Wells, Adams, Blackford and Grant, though many other counties produce it in small quantities. At the present time wells are being brought in, in the counties named above, at the rate of 100 per month. At the present rate of increase the number of producing oil wells in the Indiana field will be near 2,000 by the close of the year 1894.

The following tables by Mr. George A. Whitney, Jr., of Toledo, Ohio, show the new wells drilled during each month of 1893 and the rate of production.

TABLE No. I.

The Indiana Oil Field in 1893.

Showing the number of wells completed for oil during the year by months:

MONTH.	Wells Completed.	New Production. Barrels.	Dry.	Drilling.	Rigs Up.	Abandoned Wells.
January	20	1,206	7	23	13	4
February	30	911	10	19	15	..
March	28	2,805	7	24	15	9
April	40	5,600	9	17	14	4
May	52	2,925	17	34	22	4
June	53	5,060	7	44	28	..
July	52	3,550	11	29	38	6
August	62	3,790	12	50	42	..
September	77	3,620	17	54	35	3
October	81	3,000	14	67	44	4
November	83	2,393	19	62	47	11
December	83	2,318	12	67	51	6
	661		142			51
In Grant County	4		4			...
Total for year	665		146			51

TABLE II.

Jay County, Indiana, in 1893.

Showing the number of wells completed for oil during the year by months.

MONTH.	Completed Wells.	New Production, Barrels.	Dry.	Drilling Wells.	Rigs Up.
January	5	525	2	14	12
February	14	620	2	7	9
March	14	1,770	3	15	9
April	23	4,600	5	10	9
May	31	1,750	10	11	10
June	24	2,960	5	44	28
July	22	2,150	3	26	30
August	30	2,250	5	31	23
September	45	2,390	11	30	10
October	28	850	8	12	10
November	13	320	4	10	5
December	8	95	5	11	11
Total for year	257		63		

TABLE No. III.

Wells County, Indiana, in 1893.

Showing the number of wells completed for oil during the year, by months:

MONTH.	Completed Wells.	New Production, Barrels.	Dry.	Drilling Wells.	Rigs Up.
January	8	605	. .	5	2
February	7	176	2	8	1
March	10	1,000	2	6	4
April	9	680	. .	4	4
May	13	865	3	18	10
June	19	1,490	. . .	16	8
July	17	1,010	2	6	8
August	18	830	3	8	12
September	15	320	2	12	10
October	32	1,235	4	28	24
November	52	1,500	10	34	34
December	54	1,583	5	41	29
Total for year	254		33		

TABLE No. IV.

Adams County, Indiana, in 1893.

Showing the number of wells completed for oil during the year by months.

MONTH.	Completed Wells.	New Production, Barrels.	Dry.	Drilling Wells.	Rigs Up.
January	7	70	5	5	5
February	7	115	4	4	5
March	3	30	2	3	2
April	5	320	1	3	1
May	8	310	4	5	2
June	10	610	2	6	5
July	12	390	5	3	2
August	7	390	1	5	4
September	9	300	2	5	6
October	9	465	1	9	4
November	7	240	2	6	3
December	11	395	1	8	7
Total for year	65		30		

TABLE No. V.

Blackford County, Indiana, in 1893.

Showing the number of wells completed for oil during the year by months:

MONTH.	Completed Wells.	New Production, Barrels.	Dry.	Drilling Wells.	Rigs Up.
January	...	....	...	2	...
February	2	....	2	...	...
March	1	5	...	...	...
April	3	....	3	...	...
May	...	....	...	...	...
June	...	....	...	2	4
July	1	....	1	4	8
August	7	320	1	6	3
September	8	320	2	7	9
October	12	450	1	8	6
November	11	335	2	12	5
December	10	245	1	7	4
Total for year	55		13		

At the present time more extensive developments are being made in Grant County, and are likely to follow around the rim of the gas area into Howard and Tipton counties. Valuable deposits of petroleum occur in the vicinity of Royal Center, Cass County, and near Francisville, Pulaski County.

THE GEOLOGY OF NOBLE COUNTY.

BY CHARLES R. DRYER.

Noble County was organized in 1836, and named after Col. Noah Noble.

It then comprised 432 square miles, or twelve congressional townships, numbered 33, 34 and 35 in ranges 8, 9, 10 and 11 east of the second principal meridian. It is bounded on the north by Lagrange, on the east by Dekalb, on the south by Whitley and on the west by Kosciusko. In 1860 the two southern tiers of sections 25 to 36, of township 33, range 8, were set off to form Etna Township, Whitley County, leaving in Noble County 420 square miles. Four sections in the geographical center of the county have been taken to form the township of Albion, which includes the county seat. For convenience the townships will be referred to by their civil names as follows:

	Range 8.	*Range 9.*	*Range 10.*	*Range 11.*
Tp. 35.	Perry.	Elkhart.	Orange.	Wayne.
Tp. 34.	Sparta.	York.	Jefferson.	Allen.
Tp. 33.	Washington.	Noble.	Green.	Swan.

Noble County is crossed by three railroads and touched by two more. The Grand Rapids & Indiana, built in 1873, passes north and south through the eastern part; the Baltimore & Ohio, built in 1873, east and west through the center, and the Lake Shore & Michigan Southern, built in 1857, east and west through the northern tier of townships. The Eel River division of the Wabash, built in 1878, crosses the south-east corner, and the new Detroit & Chicago Division, built in 1892, touches the northern border for about three miles in Orange Township.

The county seat, after much tossing about was finally located at "the center," now Albion, in 1846, where a beautiful and commodious court-house was built in 1889, at a cost of $114,000. The first land was bought and permanent settlement made in 1831, on Perry's Prairie, sections 27, 28, 31, 32, 33 and 34, Perry. One of the most important events in the early history of the country was the attempted construction of the Michigan and Erie Canal. At the session of 1836–7 the Legislature of Indiana authorized the construction of a ship canal from

Michigan City to Fort Wayne, passing through the townships of Swan, Green, York and Perry into the Elkhart River east of Rochester. A navigable feeder was provided for from Northport, a village then existing in section 9, Orange, to the point of intersection of the main canal with the Elkhart River. In 1837–9 surveys were made, a dam was built across a tributary of the Elkhart at Northport, forming the lake now known as Sylvan Lake at Rome City, and portions of the canal were built which can still be traced in Orange and Greene Townships. Two hundred and forty thousand dollars are said to have been expended upon the work in Noble County. The principal towns and villages have grown up along the railroads. The largest is Kendallville, with a population of 3,000. Ligonier has 2,000, Albion 1,300, and Avilla 600, while LaOtto, Swan, Rome City, Brimfield, Wawaka and Cromwell are of smaller size. Green Center, Noblesville and Wolf Lake are important centers in the southern townships, which are still devoid of railroad communication. Embryo towns of great importance in pre-railroad days, like Port Mitchell, Rochester and Northport, have nearly or quite disappeared, except in name. The population of Noble County according to the census of 1890 was 23,369.

Physically Noble County is almost occupied covered by what was originally described by Chamberlain* as the *Saginaw-Erie interlobate moraine*, an immense mass of drift about twenty-five miles wide and from 200 to 500 feet deep. The crest of this moraine, forming the divide between the basin of Lake Michigan on one side and of Lake Erie and the Wabash River on the other, transverses the southeastern part of the county, through the townships of Greene, Allen and Wayne. Thus three-fourths of the county lies upon the Saginaw side, of which about one-half of Washington and Noble townships are drained by the headwaters of Tippecanoe River, and the remainder by the Elkhart. This interlobate moraine is the joint product of a lobe of glacial ice which passed from Saginaw Bay southwestward across Michigan and northern Indiana, and another lobe which entered Indiana from Lake Erie and covered nearly the whole State south of the Wabash River. The moraine mass was differentiated in Whitley and Steuben counties by the present writer, in 1889, into three divisions,† a work which the herein described survey of Noble County (1893) has confirmed and completed. According to this scheme the territory of Noble County falls into three natural divisions:

1. The Salamonie or Third Erie Moraine.
2. The Mississinewa or Fourth Erie Moraine.
3. The Region of Saginaw Drift.

*U. S. Geological Survey, Third Annual Report, p. 330.

†See Reports upon the Geology of Steuben and Whitley counties, Seventeenth Report of State Geologist, especially p. 168.

These divisions could not have been distinguished by a survey of Noble County alone, but a knowledge of the general glacial geology of northeastern Indiana enables any one to see that they are actual and natural. They are more sharply distinguished both to the north and to the south of this region, and using such previously discovered and undisputed evidence as a guide it becomes possible to explain the structure of Noble County, which would be otherwise unexplainable.

THE SALAMONIE OR THIRD ERIE MORAINE.

So called because its southern wing extends along the right bank of the Salamonie River, crosses the southeastern corner of Noble County, occupying the township of Swan and small portions of Green and Allen. It is a plain, gently sloping to the southeast and drained by Willow, Black and Little Cedar creeks, all emptying into Cedar Creek in Dekalb and Allen counties, which in turn emptied into the St. Joseph River, whose waters flow through the Maumee to Lake Erie. Its surface presents the succession of swell and hollow, characteristic of mild morainic topography, which sufficiently distinguishes it from its neighbor on the northwest. There is not in the whole course of this moraine in Indiana north of the Wabash River an elevation of sufficient magnitude to be called a hill, except in the eastern part of Steuben County. As a whole it is decidedly less massive and more feeble than either the second or the fourth moraine. Except in Steuben County it is closely contiguous to the fourth, to which it bears a relation similar to that of foot-hills to a mountain range. Small lakes are not wanting but most of the kettle holes have passed beyond the lacustrine stage and have become peat bogs or meadows. Originally small and shallow, natural and artificial agencies have conspired to extinguish them, so that the area of land now uncultivable is very small. The irregularity of surface is sufficient to give a pleasing variety to the landscape, a profitable diversity of soil and easy drainage. In Whitley County the third moraine is separated from the fourth by the valley of Blue River, but in Noble County there is no interval, the boundary being a line along which hills or considerable rises in elevation appear. This line is most distinct in sections 36, 25, 24 and 13, Green, and 7, 8 and 4, Swan. In Allen Township and in Fairfield Township, Dekalb County, the two moraines are not only contiguous but coalescent, while in Steuben County they are separated by the valley of the Upper Pigeon River, five or six miles wide. The ascertained elevations of this moraine in Noble County are, Swan, 905 feet, and Potter's Station, 881 feet, A. T.

THE MISSISSINEWA OR FOURTH ERIE MORAINE.

So called because its southern wing extends along the right bank of the Mississinewa River, is the most massive and pronounced of all the moraines of northeastern Indiana. It occupies the townships of Greene, Jefferson, Allen, Orange and Wayne. It has a width of six miles in Greene and ten miles in Orange and Allen, and an average elevation of one hundred feet above the country on either side. Its crest forms the principal watershed of the county and the backbone of the whole morainic mass, against which the third Erie moraine is banked up on one side and the Saginaw moraine on the other. In fact, it is impossible to determine just how much of its constituent material was furnished by the Saginaw glacier, but it is classed as the outer Erie moraine because south of Noble County it is separated by a wide interval from morainic masses which are certainly of Saginaw origin. This interval begins in Noble County where the depression, about three miles wide, occupied by the Tippecanoe and Muncie groups of lakes and by extensive marshes in Noble Township, separates the chief moraine from the outlying masses to the west. Between the Muncie Lakes and Albion it is joined by a spur of very rugged country which connects it with the Saginaw moraine. From Albion to Brimfield the border is indefinite, the western slope fading out imperceptibly into almost level country which has no recognizable morainic features. From Brimfield to the south end of Waldron Lake, section 17, Orange, the border is a low but distinct bench. North of the last mentioned point it is joined at right-angles by another Saginaw spur. This moraine rises from either side by successive elevations to an undulating tableland which presents considerable diversity of feature. In Greene Township it is characterized by a group of sand knobs among which are scattered small lakes forming a chain along the distal tributary of the south branch of Elkhart River. From Summit Lake, section 12, Greene, the chain extends westward including Long, Sister, Dock, Indian, Sand, Webber and Rivir lakes, the largest not exceeding one hundred acres in area. They lie fifty to seventy-five feet below the general level. Almost from the margin of the valley occupied by these lakes and their connecting stream, tributaries of Blue River flow southward, cutting channels into the plateau seventy or eighty feet deep. In Jefferson and Allen townships the plateau is undulating, but without knobs or lakes, except Skinner Lake, section 16, and Sackrider Lake, section 1, Jefferson. The former covers about 150 acres and has a depth of only twenty-five or thirty feet. The shores are low and tame. The streams in this region flow in channels so narrow and abrupt as to appear almost artificial. Compared with the broad drainage valleys to the west they are very young and strictly post glacial. In Orange and Wayne townships the character of the moraine again changes and becomes more pronounced in all features peculiar to a moraine. High, rounded domes, hills and ridges alternate with deep valleys of corresponding outline. Lakes are numerous, though small, but are greatly exceeded in number by marshes which occupy the former sites of lakes, many of which still contain a small pool of open water. More are of sufficient importance to require particular description except two. Rome City Reservoir, now known as Sylvan Lake, is an artificial lake created by a dam built in 1837 for a feeder to the proposed Michigan and Erie Canal. It covers 1,200 acres to a depth of twenty-five to thirty feet and is extremely irregular in outline with numberous points, narrows and islands. Its extreme length is about three miles. It has no geological interest or significance, but in the hands of the G. R. & I. R. R. Co. it has become a very pleasant and popular summer resort. The Island Park Assembly, an institution of the Chautauqua character, under the management of the Methodist Church, holds here its regular summer sessions. Picnic and excursion parties are of almost daily occurrence, while numerous cottages furnish accommodations for permanent summer sojourn. Tamarack Lake, section 1, Orange, and 6, Wayne, formerly occupied a valley two miles long, extending northwest and southeast, with a considerable arm to the northeast; the removal of a dam and clearing out of the channel has now drained it to an elliptical body of water of sixty acres. Its southern shore rises steeply to a table-land about forty feet higher than the general level of the country north of the valley, and marks here the boundary of the fourth moraine. One feature of this moraine was noticed in both Dekalb and Noble counties.

The Erie slope is characterized by a heavy deposit of bowlder clay upon all the higher points, sand and gravel being found only in the valleys, the result of the wash of streams. On the Saginaw slope absolutely no clay occurs near the surface, everything from the highest hilltops to the lowest depressions being composed of coarser or finer sand and gravel, except where covered by deposits of peat. This is probably the result of the conditions of drainage which prevailed during the glacial period. All the evidence points to the fact that the Saginaw glacier was a much smaller and feebler mass of ice than the Erie glacier. The former was a narrow tongue, originally shaped by the basin of Saginaw Bay, and hemmed in by its more powerful neighbors from Lakes Michigan and Erie. It may have advanced somewhat earlier in time than the others, and thus offered an obstruction which deflected the Michigan glacier westward into Northern Illinois, and the Erie glacier southward toward the Ohio River, compelling it to heap up its burden of drift into the very massive and closely contiguous moraines of Whitley, Allen, Noble, Dekalb and Steuben counties. During the period of glacial retreat the weaker and less massive Saginaw glacier melted first and the whole drainage from the Erie ice in this region found an outlet into the territory just evacuated by the Saginaw ice. Thus the water upon the Erie side of the moraine found sluggish and inadequate outlets, and settling back under the ice, deposited a thick mantle of clay over the whole sub-glacial surface. On the other hand, the water which escaped over the crest of the moraine found free and rapid escape into the present St. Joseph and Kankakee valleys. The streams, at first voluminous and torrential, washed vast quantities of coarse materials over the crest and down the Saginaw slope, carrying the finer materials farther westward.

Railroad and canal surveys furnish the following elevations upon the fourth moraine in Noble County:

Summit three miles east of Kendallville	1,018 feet A. T.
Summit near Lisbon	1,017 feet A. T.
Summit one and one-half miles west of Avilla . .	1,015 feet A. T.
Avilla.	981 feet A. T.
Kendallville	977 feet A. T.
General level of watershed	973 feet A. T.

The Region of Saginaw Drift presents features differing widely from those of the compact and well defined masses of drift just described. It is characterized by extreme diversity of character and irregular distribution. Smooth, almost level country, wild, undulating, morainic topography, sharp and irregular ridges, isolated groups of gravel knobs, and broad valleys, now or once occupied by extensive lakes and marshes, are distributed over the western half of Noble County in such a manner as to render intelligible description difficult, if not impossible, without a detailed map to aid the reader. Much of this diversity and irregularity is due to the fact already alluded to, that during the period of glacial retreat and rapid melting of ice, vast volumes of water escaped over the crest of the outer moraine, and flowing across the face of this country, cut and gashed it into irregular gorges, leaving corresponding ridges between. The greater part of the material left by the Saginaw glacier has been washed away or redistributed to such an extent as to leave few of the original features recognizable. Scattered patches of hills and the more prominent ridges are probably all that escaped the action of the flood of water. The valleys themselves, originally cut to a depth of perhaps one hundred feet below their present bottom levels, have since been filled up with silt and vegetable growth, forming large areas of marsh and muck meadow, with frequent pools of open water. The area of marsh land has been estimated to comprise ten or fifteen per cent. of the whole county, and in some townships it must be nearly fifty per cent.

Noble Township is occupied in great part by an intermoranic interval continuous on the south with that of western Whitley County,* but

*Seventeenth Report of State Geologist, p. 163.

differing from the latter in being relatively a depression instead of a tableland. It is bounded on all sides, except the south, by elevations rising fifty to one hundred feet above its bottom. On the east, the slope of the fourth moraine gradually rises from it along the east line of the township. On the northwest a prominent ridge skirts it from Port Mitchell to Wolf Lake, and from Wolf Lake to Loon Lake, a tract of tumultuous morainic hills separates it from the smoother country to the west. About one-half its area was originally occupied by lakes and marshes; but these have been considerably diminished by drainage. On the south line of the county the part of Crooked Lake projects into section 33, which contains also Little or Crane Lake. In sections 32 and 33 lies Tippecanoe Lake, which is probably the largest body of water lying wholly in Noble County. It is a compact oval with a long diameter of more than one mile and a short diameter of more than half a mile, and covers five or six hundred acres. The shores are low, except upon the south, where it is skirted by a considerable bluff. The body of the lake is clear, open water, but little obstructed by shallows. Although visited several times, no boat was ever found available for sounding. Its depth probably corresponds with that of its neighbors, Crooked and Loon,* which are both over one hundred feet. These lakes form the extreme head waters of Tippecanoe River, which, after a very circuitous and troubled course empties into the Wabash at Lafayette. The south fork of the Elkhart River enters this valley in section 12, Noble, and drains an irregular depression in sections 11, 10, 1 and 2, Noble, and 35 and 36, York, known as the Muncie Lakes. The main body is now a marsh containing half a dozen small ponds. At the northern extremity at Port Mitchell the river cuts through the retaining ridge and escapes by a deep and tortuous channel to the lowlands in northern York.

York Township forms a structural as well as civil unit. It is chiefly occupied by a morainic knot or connecting spur between the fourth Erie moraine on the east and the more irregular masses of Saginaw moraine on the west, and is the most rugged and diversified tract in the county. The narrowest portion of the spur, from the north line of the village of Albion to the foot of the Muncie lakes is two and a half miles wide. It joins the Erie moraine in the southwestern part of Jefferson, where the branches of the Elkhart drain its western slope. The surface of this region is cut up into a succession of deep valleys and high, sharp ridges, having a general northwest and southeast trend. There is a temptation to use the word *canons*, so far as it may be applicable to drift gorges. The same formation extends and widens westward to cover the greater part of York Township, although the ridges in that direction grow lower and broader, and the valleys wider and less profound. The latter appear to have been half filled up since their original erosion, and are now

*Seventeenth Report of State Geologist, pp. 164, 165.

occupied by extensive marshes through which the river winds, passing frequently from one basin to another, through a dividing ridge. Upper and Lower Long lakes, sections 28 and 33, occupy a narrow north and south valley, resembling the valley of Grass Lake in Steuben County.* As in that case, also, the country west of it, although of the same general elevation, is decidedly smoother in contrast with the tumultuous hills on the east. A more important contrast, however, exists a little farther west, where a line of bluffs extends along the eastern line of the western tier of sections. Here the general level drops quite abruptly about fifty feet, and from the top of the bluff a smooth, gently sloping plain may be overlooked, extending through Sparta and Washington townships to the western line of the county. In a line directly north of this bluff, in the northeast quarter of section 18, is a patch of knobby sand hills, rising 150 feet above the river valley on the north and east. Directly east of these hills, in the southwest quarter of section 10, a single lenticular, drumlin-like hill rises to about the same height. The northern two tiers of sections in York, and the northwest corner of Jefferson, are low and level, with a small area in sections 3, 4, 9, 10 and 11, which may be recognized as distinctly morainic. Sections 5 and 6, York, and 1, Sparta, form the basin of Eagle and Diamond lakes, an embayment three miles long and a mile and a half wide, nearly surrounded by more or less strongly marked moraine. The Elkhart flows northward across its eastern end. Diamond Lake, sections 6, York, and 31, Elkhart, is one-half mile by one-quarter, its shores flat and marshy except on the north side, where it washes the foot of the highest and most precipitous hills in the county. They are as rough and irregular a pile of gravel knobs as can be found in Indiana, rising 150 to 200 feet above the lake, with a southern descent almost too steep for a horse and wagon. They are prolonged westward at a lower elevation through section 36, Perry. The range is two and a half miles long east and west, and from one-half to three-fourths of a mile wide. It is completely isolated by the valley of the Elkhart on the east and north, and the valley of the lakes and their outlet on the south and west, and forms one of the most remarkable as well as conspicuous features of the region. The Diamond Lake hills stand like an Egyptian pyramid amid the ruins of an ancient city, a monument to show us what the Saginaw glacier could do upon occasion.

Diamond Lake, though small, is not unworthy of its gigantic neighbor, showing an average depth of 50 feet, with a maximum of 82 feet, the deepest lake of its size which the writer has yet examined. Eagle Lake, in section 1, Sparta, covers a larger area, but is said to be shallower than Diamond. The Elkhart flows through the embayment only half a mile east of Diamond Lake, with no elevation between, yet the lake adds to

*Seventeenth Report of State Geologist, p. 117.

its other surprising characters by emptying westward into [illegible] thence by a small stream which cuts through the highland around the west end of the hill range and joins the Elkhart near Rochester.

Elkhart Township presents, as a whole, a condition and topographical type which is shared by portions of York, Jefferson and Orange. With a few exceptions, it shows no morainic features, whatever. It is a level and comparatively low plain, through which the numerous tributaries of the north fork of the Elkhart River wind sluggishly, bordered by wide marshes. On the eastern border the marshy expanses are broken by a group of lakes. Sanford, in sections 12, Elkhart, and 7, Orange, is said to be 30 feet deep. Lower Lake, in sections 12 and 13, is an irregular horseshoe, of which only the eastern segment was visited. It proved to average 30 feet in depth, with a maximum of 47 feet near the south end. Waldron Lake, section 18, Orange, is a tributary of about equal depth, with a maximum near the head of 39 feet. These lakes lie close against the morainic border, which is marked by a line of conspicuous hills extending along their northeastern sides. The range is highest in section 6, Orange, and forms a spur of the Saginaw terminal moraine which trends northwestward into Lagrange County.

Two miles north of the Diamond Lake hills, in section 24, Perry, is another group of knobs, similar but lower and less massive. From these a belt of moderately strong moraine extends through sections 17, 18 and 19, Elkhart, to the centre of section 8 and southwest corner of 9. This patch is about one mile wide by four miles long, and is separated from the morainic masses to the South by the Elkhart Valley, one mile and a half across this isolated area, and the Diamond Lake hills, may be regarded as morainic outliers whose connection with the main range, if it ever existed, has been cut off by the escaping floods of the period of glacial retreat.

Perry Township is divided diagonally from southeast to northwest by the valley of the Elkhart River, which, having gathered the waters from its numerous and wide-spreading branches, and escaped from all entanglements of lakes, marshes and hills, flows in a direct course about thirty miles to join the St. Joseph at Elkhart. The northern half of Perry is popularly included in what is known as the Hawpatch, although the Hawpatch proper originally consisted of about 4,000 acres in Noble and Lagrange counties. This and an indefinite area surrounding it comprises some of the richest and most valuable farming lands in Indiana. The southern part of it now contains many tracts of magnificent beech and maple timber. Southwest of Ligonier lies Perry's prairie, comprising two or three sections of beautiful level land, which slopes gently westward to lower and more marshy country in Kosciusko County. Sections 34 and 35 form part of a hilly ridge lying between the valley of Eagle Lake on the east, and the valley of Solomon's Creek on the west. It is a continuation of the spur which branches from the Erie moraine south of Albion, and occupies sections 1, 2, 3, 11, 12, 13, 14 and 24, Sparta. This ridge is only about two miles wide, but is cut lengthwise near its western border by a straight, narrow gorge, about eighty feet deep, which extends from Sparta Lake, section 23, to the Elkhart just east of Ligonier. It is five miles long and scarcely anywhere more than a quarter of a mile wide, with very steep bluffs, unbroken by any tributaries. A small stream flows in a narrow channel at the bottom, which has been deepened to drain Engle Lake, a slight expansion in sections 2 and 3.

Sparta Township is divided by the valley of Solomon's Creek, parallel with the Elkhart valley in Perry, from section 25 to the northwest corner of the township. It is a depression about one mile wide and eight miles long, chiefly occupied by marsh and numerous small pools of water. It is now being drained by a ditch, the main line of which is ten miles long, sixteen feet wide and six feet deep, with branches aggregating an equal length. The cost will be about $20,000 and the estimated benefits $30,000.

The southwestern half of Sparta, with the northeastern corner of Washington, is generally level, with slight undulations and irregularities which render its affinities doubtful. If it is to be classed as a part of the moraine, its morainic characters are among the mildest recognizable. The writer is inclined to exclude it and to draw the border of the moraine at the line of bluffs already described from section 32, York, along the east side of Solomon's Creek valley to Perry's prairie. The whole mass of unmistakable moraine then forms a very irregular spur or promontory from Albion and Port Mitchell to Rochester and Ligonier, with a large bog in northwestern York and a hooked extremity extending into western Elkhart. It is probably the remains of the eastern extremity of a terminal moraine of the Saginaw glacier, which extends in a fragmentary condition along the course of the Elkhart River to the St. Joseph.

The southwestern corner of Noble County contains the beginning of another Saginaw terminal moraine which extends along the south side of Turkey Creek into Kosciusko County. It is connected with the knot in York Township by the ridges and hills of northwestern Noble Township, which occupy the greater part of sections 3, 4, 5, 6, 7, 8, 9, 17, 18 and 19. This area also includes two important and interesting lakes. Bear Lake, sections 8, 7, 17 and 18, Noble, covers 420 acres, and has an elevation of 903 feet A. T., and a depth of about fifty feet. It is a clean, compact body of water with rather low shores and but a small area of marsh except in the interval between it and High Lake. The latter is in sections 18, Noble, and 13, Washington, 300 acres in area, and scarcely anywhere more than thirty feet deep. It is interesting from the fact that its basin seems to belong to a type hitherto undescribed in Indiana. The western half of section 7, Noble, is occupied by a series of sand ridges, perhaps twenty feet high, extending north and south. At the north end of High Lake they divide into two branches which follow the east and west shores respectively. Thus the lake basin lies between the arms of the Y in a space which is nearly closed up by a cross ridge along the south shore. These ridges are generally of moderate slope and from twenty to forty feet above the lake, composed chiefly of sand; but, at the point on the east side where the outlet leaves the lake, the ridge is not more than three feet high and composed almost entirely of small angular boulders. At this point it was first observed and was mistaken for a beach ridge. A few excavations in the higher part of the ridge show yellow sand intermingled with angular stones from the size of a man's fist to the size of his head. We evidently have here a specimen of the kames or eskers which are so numerous in other portions of the great morainic belt of North America. Another example occurs a few miles to the west of this. In sections 9, 4 and 5, Washington, and 31 and 32, Sparta, a chain of small lakes occur in the course of Turkey Creek. Like Bear and High lakes they belong to the Elkhart system. The valley is about half a mile wide, and its left bank is bordered by a continuous esker for about two and a half miles, nearly to Indian Village. Its average height is not far from forty feet above the valley, and it is as distinctly separated from the land of about equal elevation on one side as from the valley on the other. The crest is generally smooth and even, but is broken occasionally by gaps through which small marshes on the land side are drained. The valley contains a half dozen lakes—Big, Moss, Hindman's, Gordy, etc., of varying size and shape, determined apparently by the arrangement of branches and subordinate eskers. In section 5, the main esker strikes northward, crosses the valley, and sweeps around to the west, forming an almost complete loop, within which lies Gordy Lake, of probably fifty acres extent. In the southeast quarter of section 31, Sparta, lie three curious marshes or huckleberry swamps. They are long, narrow and parallel, extending east and west, separated from each other by narrow ridges which branch from the main esker and join the high land, and dammed back from the valley at a much higher level by the esker itself. They have no outlet, although a cut of a few feet in length and depth would drain them into the creek. This valley, with its eskers and lakes, is, so far as the writer is informed, unique.

In section 9, Washington, a low ridge separates the lakes at the head of Turkey Creek from a chain which empties southward into the Tippecanoe, thus forming a part of the divide between the basins of the St. Lawrence and the Mississippi. The southwestern half of Washington Township exhibits the swell and sag topography of moderately developed moraine in beautiful perfection. It is crossed from east to west by the valley of the Tippecanoe River, about one mile in width, with gently sloping sides, and containing a chain of small lakes, of which Smalley Lake, sections 13 and 22, is the largest. The view from the bluffs along the north side, comprising a wide expanse of upland and valley, with half a dozrn lakes glittering in the distance, forms one of the most pleasing landscapes in Indiana.

In the survey of Noble County one of the problems which arose for solution was the determination of the boundary between the Erie and the Saginaw drift. It had already been located to the north and to the south of the area under consideration, and the work herein described has filled up the gap with as much certainty and definiteness as the nature of the problem could lead any one to hope for. The conclusion briefly stated is this: *A line extending north and south through the middle of Noble County* will nowhere, except at the north end, lie more than one mile from the boundary between the Erie and the Saginaw drift. East of that line by far the greater part of the material which covers the native rock to a depth of several hundred feet was brought by a mass of land ice from the highlands of Canada and the bed of Lake Erie. West of that line the greater part of the material was brought by a similar but smaller mass of ice from Lake Huron and Saginaw Bay, all the Erie drift present being the result of water transportation from the east. The exception above noted refers to the northwestern half of Orange Township, where the boundary probably should be deflected from Brimfield to Tamarack Lake. This division is unexpectedly corroborated by the observation of Prof. W. B. Van Gorder in his remarks upon the flora of Noble County, appended to this report, that "the flora of the western half of the county contains many forms different from the eastern half of the county." This fact is doubtless due to differences of soil and situation, but it emphasizes a contrast for the causes of which we must go back to the earlier portion of the glacial period.

The approximate boundary of the Erie drift has now been traced by the writer from the northeast corner of Wabash County through South Whitley, Larvill, foot of Crooked Lake, Noble County; Albion, Brimfield, Tamarack Lake, Turkey Lake, Steuben County; Hogback, Grass and Gage Lakes to a point on the State line about six miles east of the northwest corner of Steuben County.

The topographical structure and surface features of Noble County may be briefly summarized as follows:

The eastern half of the county is occupied by a massive ridge composed of two contiguous Erie moraines, the crest of which has an average elevation of 400 feet above Lake Erie, or 973 feet above tide, rising at some points fifty feet higher, and forming the divide between the basins of Lake Erie and Lake Michigan. These moraines are terminal, rather than interlobate, in relation to the Erie glacier, because the north segment of its rounded end impinged against the side of the Saginaw glacier. The prevailing surface deposit upon the Erie slope up to the crest is bowlder clay.

The western half of the county contains the eastern portions of three terminal moraines of the Saginaw glacier, which join the Erie moraine at right angles: (1) the Turkey Creek moraine in southern Washington, with its connecting spur in western Noble; (2) the Elkhart moraine in southeastern York, extending thence through that township and northeastern Sparta into southeastern Perry and western Elkhart; (3) the Rome City spur of the Pigeon River moraine in northwestern Orange, extending thence into LaGrange County. *

The intermorainic intervals occupy nearly the whole of Elkhart, the northern third of York, small portions of Jefferson and Orange, three-fourths of Perry and Sparta, northeastern Washington and the central part of Noble.

The whole mass of Saginaw drift has been profoundly modified by running water. The drainage from the Erie ice having cut and gashed the material into numerous deep valleys which have since been half filled up with silt, and having spread over the country large quantities of sand and gravel, the overwash from the crest of the Erie moraine. There is almost no clay in sight, the streams having been too rapid to allow of its deposit. The whole region abounds in unusual and surprising features; the half-filled valleys, the large and numerous areas of marsh, the isolated patches of knobs, the irregular and abnormal drainage lines, the chains of lakes strung along the threads of the streams, and the eskers with their accompanying lakes, point to an origin from peculiar conditions and conspire to give to the region an unique interest.

Bowlders are everywhere numerous, chiefly granitic and gneirsoid in character. Masses of the peculiar jasper conglomerate, which has been traced to its original home in the region north of Lake Huron, are of frequent occurrence, while bowlders too large to be handled before breaking up are plentiful, none of extraordinary size were seen. They are rounded and subangular, and devoid of distinctly planed or striated faces.

The vertical range of relief lies within 150 feet, the lowest point being the Elkhart River at the west line of the county, 868 feet, and the highest either the summit in Wayne Township, 10.18 feet A. T., or the peaks of the Diamond Lake hills. Other elevations not already given are:

*For knowledge of these moraines west of Noble County, I am indebted to Mr. Fran Leverett, of the United States Geological Survey.

Railroad track at Albion	927	feet A. T.
Summit of hills at Albion	975	" "
Railroad track at Cromwell	938	" "
Railroad track at Brimfield	951	" "
Railroad track at Wawaka	903	" "
Railroad track at Ligonier	893	" "
Railroad track at Rome City	920	" "

The mantle of drift in Noble County is probably nowhere less than 200 feet thick, while upon the crest of the moraine it is nearly 500 feet. Its internal structure, so far as known, presents the usual alternations of sand, gravel and clay, Fountain or flowing wells are numerous, of which the following section of the well of John Pasch, one and a half miles west of Wawaka, is typical.

Gravel	6 feet.
Quicksand	40 "
Blue clay	34 "
Gravel	2 "
Blue clay	77 "
Cemented gravel (very hard)	1 "
	160

During the boring for gas at Albion a very accurate and complete record was kept by Prof. W. B. Van Gorder, who furnishes the following section of the drift:

Yellow clay	10 feet.
Blue clay	10 "
Sand and gravel	115 "
Blue clay	20 "
Sand and gravel with streaks of blue clay	50 "
Blue clay	2 "
Sand and gravel	81 "
Blue clay	2 "
Quicksand	5 "
Blue clay	24 "
Quicksand	4 "
Blue clay	7 "
Sand and blue clay	10 "
Gravel	5 "
Red bowlder clay	15 "
Sand	5 "
Slate	1 "
Sand	9 "
Total depth	375 feet.

Some features of this section are worthy of note. Of the whole 375 feet only 100 feet contains any clay. Of the upper 295 feet only about 50 feet is clay. The occurrence of 15 feet of *red* bowlder clay at a depth of 345 feet, its surface 30 feet above bed rock, indicates a period of oxidation due to exposure to air and rain-water. The section of drift in the boring for gas at Butler, Dekalb County,* exhibits the same peculiarity, which was overlooked at the time. Under 275 feet of gravel and coarse sand was found 40 feet of "red quicksand," its surface 88 feet above bed rock. In the light of recent discussion and opinion among glacialists, it seems probable that these oxidized strata near the bottom may form the upper member of "the older drift," a sheet deposited during a previous glacial period, exposed to air and rain during a long interglacial period, and finally buried under the more voluminous deposits of the second ice sheets.

Details of the boring at Kendallville are not at hand, but the section is said by Prof. Van Gorder to have been very similar to that at Albion except that the drift was about 100 feet deeper.

Of the geological formations underlying the drift in Noble County, our only information comes from the careful observation of Prof. Van Gorder at Albion. He furnishes the following section:

Drift	375 feet.
Devonian black slate	65 "
Hamilton and corniferous limestone	65 "
Oriskany sandstone	5 "
Lower helderberg	168 "
Water lime (containing crystals of gypsum)	152 "
Niagara limestone	400 "
Niagara shale	20 "
Clinton (red from presence of hematite)	30 "
Clinton shale	16 "
Medina (?)	59 "
Hudson River limestone and shale	85 "
Hudson River shale	200 "
Utica shale	156 "
Utica slate	94 "
Trenton limestone	24 "
	1,914 feet.

The identification of Clinton beds is probably correct; of Medina, doubtful. Analysis of the supposed Medina rock from samples furnished by Professor Van Gorder, shows the following composition:

Calcium carbonate	25.8
Magnesium carbonate	38.0
Ferric oxide	5.0
Silica	14.0
Undetermined	17.2
	100.0

*16th Report of the State Geologist, p. 103.

In the absence of fossils the true relation of this stratum remains uncertain. A geologist who spends but a few days or weeks in a given region can report very little of value in regard to its natural history. Such work requires the patient and careful attention of years. Fortunately Noble County possesses a citizen who has had the happy combination of taste, ability and opportunity, which has enabled him to do thorough and trustworthy work in botany and zoölogy. Prof. W. B. Van Gorder, of Albion, is a native of Noble County, and was for several years County Superintendent of Schools. In 1884 he published at his own expense a catalogue of the Flora of Noble County, which has been ever since a standard authority upon the flora of this portion of the State. The catalogue is here reprinted with corrections and additions to date (1893), thus making available to all an important contribution to the natural history of Indiana. A hasty comparison of this catalogue with that of Mr. Bradner, of the Flora of Steuben County, published in the 17th Report of the State Geologist, suggests some interesting facts. Of the phœnogams and ferns of Steuben County, 723 species are reported; of Noble County, 724. The two counties are contiguous at their corners and in general present much similarity of soil and situation; yet of the 723 species of Steuben, 199 have not been found in Noble, and of the 724 species of Noble, 182 have not been found in Steuben. Of the 900 or more species in both, only about 540, or 60 per cent., are common to both. (A more careful comparison would make these figures more accurate.) The largest percentages of disagreement occur in the orders Legunimosœ Compositæ, Cyperaceæ and Granimeæ. A collaboration of all the material by both botanists would eliminate some of the differences, but it is reasonable to suppose that the apparent discrepancy in the two floras is much greater than the actual, and that prolonged study of the territory would increase the list in each county to at least 900 species.

FLORA OF NOBLE COUNTY.

BY W. B. VAN GORDER.

REMARKS.

In 1884, after three seasons' careful work, a list of the plants of this county was published, enumerating nearly 700 species. The work has been continued since then, as time and opportunity permitted, and the few additions that have been made lead me to think that the present list comprises quite fully the flora of the county.

In some respects, the flora of Allen, Swan and Jefferson townships is much the same; that of Wayne, Orange and Green townships bears much resemblance; while the flora of the western half of the county contains many forms different from the eastern half of the county. Along the Elkhart River and its branches grow many plants common mostly to river territory. It is also noticeable that some plants common farther northward make their appearance here in our county, at the same time apparently being the northern limit of some of those common farther southward.

The following catalogue includes 724 species belonging to 99 orders, and grouped under 363 genera. Many of them here named are usually regarded as "weeds" and "wild grasses," many others as "wild flowers," while numerous others are our shrubs and valuable forest trees; but all of them have their value and place in the economy of nature.

In giving the names of the plants, the order as presented in Gray's Manual of the Flora of the Northern United States, 5th edition, has been strictly adhered to, although aware that several changes in nomenclature are now recognized. The common names of the plants have been added, as they will be of more interest to those who are not botanists. The locality and ranges of the plants, so far as observed, have also been given, along with such other information as is thought would be of general interest.

It is not likely that any of our native plants has yet been exterminated, as is the case in some places, but the cultivation of the soil, the pasturing of the woodlands, the draining of the marshes, is rapidly reducing their abundance. Some are already quite scarce from these causes, while along our railroads, roadsides, and in grainfields, new ones occasionally make their appearance.

CATALOGUE.

RANUNCULACEÆ—Crowfoot Family.

Clematis Virginiana, L. Common Virgin's Bower. Scarce. Aug.

Anemone cylindrica, Gray. Long-fruited Anemone. A few specimens seen in Sparta Township.

Virginiana, L. Virginiana Anemone. Not common. July.

Pennsylvanica, L. Pennsylvanian Anemone. Not common. June.

nemorosa, L. Wind-flower. Wood Anemone. Plentiful at one place in Orange Township, section 10. A few specimens seen in York and Jefferson Townships. May.

Hepatica acutiloba, DC. Liver-leaf. Common.

Thalictrum anemonoides, Michx. Rue-Anemone. Common in sandy soil.

dioicum, L. Early Meadow-Rue. Common in woods,—early spring.

purpurascens, L. Purplish Meadow-Rue. Common.

cornuti, L. Tall Meadow-Rue. Common.

Ranunculus divaricatus, Schrank. Water-Crowfoot. At one place in the lake at Rome City. Scarce.

aquatilis, L., var. trichophyllus, Chaix. White Water-Crowfoot. Plentiful at several places in the Elkhart River.

multifidus, Pursh. Yellow Water-Crowfoot. Common.

alismæfolius, Geyer. Water Plantain Spearwort. At one place in Green Township, on roadside between sections 19 and 30. Rare.

abortivus, L. Small flowered Crowfoot. A common weed.

sceleratus, L. Cursed Crowfoot. Growing in a ditch on roadside north of Kendallville, 1886.

recurvatus, Poir. Hooked Crowfoot. Common.

pennsylvanicus, L. Bristly Crowfoot. Scarce.

fascicularis, Muhl. Early Crowfoot. Common. April, May.

repens, L. Creeping Crowfoot. Moist woods. Common. May, July.

bulbosus, L. Bulbous Crowfoot. Roadsides. Very scarce. May, July.

Isopyrum biternatum, Torr & Gray, False Rue-Anemone. Common at places in rich beech woods. May.

Caltha palustris, L. Marsh Marigold. Common. May.

Coptis trifolia, Salisb. Three-leaved Goldthread. Common in a few tamarack marshes. May.

Aquilegia Canadensis, L. Wild Columbine. Not common.

vulgaris, L. Garden Columbine. Escaped from cultivation. Scarce.

Delphinium consolida, L. Field Larkspur. Escaped. Scarce.

Hydrastis Canadensis, L. Orange-root. Yellow puccoon. Rich woods. Very scarce. May.

Actæa alba, Bigel. White Baneberry. Rich woods. Common. Early spring.

The most of these plants of the Crowfoot family are handsome wild flowers.

MAGNOLIACEÆ.—Magnolia Family.

One representative, viz.:

Liriodendron Tulipifera, L. White-wood. Poplar. A common and valuable forest tree.

ANONACEÆ.—Custard-Apple Family.

One representative only:

Asimina triloba, Dunal. Papaw. Common in all rich beech woods.

MENISPERMACEÆ.—Moonseed Family.

One representative, viz.:

Menispermum Canadense, L. Canadian Moonseed. Common.

BERBERIDACEÆ.—Barberry Family.

Caulophyllum Thalictroides, Michx. Blue Cohosh. Pappoose Root. Rich woods. Common.

Podophyllum peltatum, L. May Apple. Mandrake. Common.

NYMPHÆACEÆ.—Water-Lily Family.

Brasenia peltata, Pursh. Water Shield. Common in a few of the lakes of the county.

Nymphæa tuberosa, Paine. Water-Lily. Common in most all the lakes in the county.

Nuphar advena, Ait. Yellow Pond-Lily. Spatter Dock. Very common. Swamps and lakes.

SARRACENIACEÆ.—Pitcher-Plants.

Sarracenia purpurea, L. Side Saddle Flower. Pitcher-Plant. Huntsman's Cup. Peat bogs. Common.

PAPAVERACEÆ.—Poppy Family.

Papaver somniferum, L. Common Poppy. Escaped from cultivation. Scarce.

Stylophorum diphyllum, Nutt. Celandine Poppy. Plentiful in a rich woods in Wayne Township. Sec. 32.

Sanguinaria Canadensis, L, Blood-Root. Open rich woods; not common. April, May.

FUMARIACEÆ.—Fumitory Family.

Dicentra cucullaria, DC. Dutchman's Breeches Rich woods. Very common. April, May.

Canadensis, DC. Squirrel Corn. With the last. Very common.

CRUCIFERÆ.—Mustard Family.

Nasturtium officinale, R. Bs. True Water-Cress. Escaped from cultivation. Plentiful in several brooks and ditches in Orange Lownship.

palustre, DC. Marsh Cress. Common. June.

Armoracia, Fries. Horshradish. Escaped from cultivation.

Dentaria laciniata, Muhl. Pepper-Root. Rich woods. Common. April, May.

Cardamine rhomboidea, DC. Spring Cress. Wet meadows. Common. April, June.

var purpurea, Torr. Spring Cress. Rich woods. Common. April, May.

hirsuta, L. Small Bitter Cress. Wet soils. Rather common. June.

Arabis Canadensis, L. Sickle Pod. South shore High Lake; high banks of streams in woods. Scarce.

hirsuta, Scop. Scarce.

laevigata, DC. Rock Cress. On creek bank south of Albion. Scarce.

Sisymbrium officinale, Scop. Hedge Mustard. A very common, homely weed.

BRASSICA NIGRA, Koch. Black Mustard. Escaped from cultivation. Common.

CAPSELLA BURSA-PASTORIS, Mœnch. Shepherd's Purse. The commonest of weeds.

LEPIDIUM VIRGINICUM, L. Wild Peppergrass. A common weed.

VIOLACEÆ.—VIOLET FAMILY.

VIOLA BLANDA, Willd. Sweet White Violet. Common.

CUCULLATA, Ait. Blue Violet. Common.

PEDATA, L. Bird-foot Violet. Common on hills north of Diamond Lake, 1887. Our finest species.

ROSTRATA, Pursh. Long-spurred Violet. At places in dry beech woods. Not common.

STRIATA, Ait. Pale Violet. Common.

CANADENSIS, L. Canada Violet. Rich wood. Common.

PUBESCENES, Ait. Downy Yellow Violet. Common in the woods.

CISTACEÆ.—RORK-ROSE FAMILY.

HELIANTHEMUM CANADENSE, Michx. Frost Weed. Sandy soil. Sparta and Orange Township. Not common.

DROSERACEÆ.—SUNDEW FAMILY.

DROSERA ROTUNDIFOLIA, L. Round-leaved Sundew. Only a few specimens on the banks of a lake in Orange Township, sections 2 and 11.

HYPERICACEÆ.—ST. JOHN'S-WORT FAMILY.

HYPERICUM PROLIFICUM, L. Shrubby St. John's-wort. A small patch on a roadside in Allen Township, between sections 26 and 27.

PYRAMIDATUM, Ait. Great St. John's-wort. Scarce.

PERFORATUM, L. Common St. John's-wort. On roadside in Orange Township, section 20. Scarce.

CORYMBOSUM, Muhl. St. John's-wort. Not common.

CANADENSE, L. St. Sohn's-wort. Seen at a few places in Orange Township, on wet, sandy soil. Scarce.

ELODES VIRGINICA, Nutt. Marsh St. John's-wort. Rather common.

CARYOPHYLLACEÆ.—Pink Family.

Saponaria officinalis, L. Common Soapwort. Bouncing Bet. Escaped from cultivation to roadsides; many places.

Silene stellata, Ait. Starry Campion. A few specimens seen in Noble and Washington Townships; July.

Virginica, L. Fire Pink. Catchfly. Rich Woods. Not common; June.

noctiflora, Muhl. Night Flowering Catchfly. Wayside and waste places. Scarce.

Lycanis Githago, Lam. Corn Cockle. "Cockle." A weed in wheat fields. Common.

Stellaria media, Smith. Common Chickweed. Everywhere in damp grounds.

longifolia, Muhl. Long-leaved Stitchwort. Wet grassy place. Rather common.

Cerastium viscosum, L. Mouse-eared Chickweed. Fields. Common; June.

Mollugo verticillata, L. Carpetweed. Sandy ground, York Township. Not plentiful.

PORTULACACEÆ.—Purslane Family.

Portulaca oleracea, L. Common Purslane. A weed in every garden.

Claytonia Virginica, L. Spring Beauty. A handsome wild flower, common in moist woods; April, May.

MALVACEÆ.—Mallow Family.

Malva rotundifolia, L. Common Mallow. Roadsides. Plentiful many places; also common around dwellings.

moschata, L. Musk Mallow. Raodsides. Scarce.

Abutilon Avicennæ, Gærtn. Velvet-Leaf. A tall roadside weed, most abundant in the eastern part of the county.

Hibiscus Trionum, L. Bladder Ketmia. Escaped from cultivation. Scarce.

TILIACEÆ.—Linden Family.

Tilia Americana, L. Basswood. A common forest tree.

LINACEÆ.—FLAX FAMILY.

LINUM VIRGINIANUM, L. Flax. Dry Oak woods. Common.
USITATISSIMUM, L. Common Flax. Growing as a weed along railroads.

GERANIACEÆ.—GERANIUM FAMILY.

GERANIUM MACULATUM, L. Wild Crane's Bill. Common; April, July.
IMPATIENS PALLIDA, Nutt. Pale Touch-me-not. Common; July.
FULVA, Nutt. Spotted Touch-me-not. With the last, common.
OXALIS STRICTA, L. Yellow Wood-sorrel. Cultivated fields. Common; May, September.

RUTACEÆ.—RUE FAMILY.

One representative, viz.:
ZANTHOXYLUM AMERICANUM, Mill. Prickly Ash. A common shrub of rich woods.

ANACARDIACEÆ.—CASHEN FAMILY.

RHUS TYPHINA, L. Staghorn Sumach. Hillsides. Common.
GLABRA, L. Smooth Sumach. Common. Sandy soil.
VENENATA, DC. Poison Sumach. Swamps. Common.
TOXICODENDRON, L. Poison Ivy. A common climbing shrub.

VITACEÆ.—VINE FAMILY.

VITUS LABRUSCA, L. Northern Fox-Grape. Occasional in thickets along the Elkhart River.
ÆSTÍVALIS, Michx. Summer Grape. Thickets. Not common.
CORDIFOLIA, Michx. Winter or Frost Grape. Thickets. Common.
AMPELOPSIS QUINQUE FOLIA, Michx, Virginian Creeper. A common woody climbing plant of rich grounds.

RHAMNACEÆ.—BUCKTHORN FAMILY.

CEANOTHUS AMERICANUS, L. New Jersey Tea. Red Root. A small shrub, common in sandy dry woodlands, especially in Wayne, Orange, Sparta and York townships. July.

CELASTRACEÆ.—STAFF-TREE FAMILY.

CELASTRUS SCANDENS, L. Wax-work. Climbing Bitter Sweet. A climbing shrub. Not common.

EUONYMUS ATROPURPUREUS, Jacq. Burning-Bush. Waahoo. In thickets along streams. Scaree.

AMERICANUS, L. Strawberry Bush. One specimen only.

VAR. OBOVATUS, Torr & Gray. Strawberry Bush. A very small shrub; common in all beech woods.

SAPINDACEÆ.—SOAPBERRY FAMILY.

STAPHYLEA TRIFOLIA, L. American Bladdernut. A shrub in thickets along streams. Scarce.

AESCULUS GLABRA, Wild. Buckeye. A common forest tree.

ACER SACCHARINUM, Wang. Sugar or Rock Maple. A common forest tree.

VAR. NIGRUM. Black Sugar Maple.

DASYCARPUM, Ehrhart. Silver Maple. Planted for shade trees. Also escaped.

RUBRUM, L. Red or Swamp Maple. Common.

NEGUNDO ACEROIDES, Mœnch. Ash-leaved Maple. Box-Elder. Rich soil. Along streams. Scarce.

POLYGALACEÆ—MILKWORT FAMILY.

POLYGALA VERTICILLATA, L. Milkwort. A few specimens seen in Orange and Washington townships.

SENEGA, L. Seneca Snakeroot. Sandy soil of woods. Scarce.

SANGUINEA, L. A few specimens seen in York Township, Sec. 15, 1892.

LEGUMINOSÆ.—PULSE FAMILY.

LUPINUS PERENNIS, L. Wild Lupine. Common on sandy soil.

TRIFOLIUM ARVENSE, L. Rabbit-foot Clover. Stone Clover. Dry fields and road sides throughout the western part of the county. Scarce.

PRATENSE, L. Red Clover. Cultivated.

REPENS, L. White Clover. Common.

HYBRIDUM, L. Alsike Clover. Common.

MELILOTUS ALBA, Lam. White Melilot. Sweet Clover. Escaped to waste grounds.

ROBINIA PSEUDACACIA, L. Common Locust. Escaped from cultivation many places.

TEPHROSIA VIRGINIANA, Pers. Goat's Rue. North shore Bear Lake and Diamond Lake.

ASTRAGALUS CANADENSIS, L. Milk-Vetch. North shore Bear Lake and Diamond Lake.

DESMODIUM NUDIFLORUM, DC. Tick-Trefoil. Rich woods. Common. August.

ACUMINATUM, DC. Tick-Trefoil. With the last. Common.

ROTUNDIFOLIUM, DC. Tick-Trefoil. Sandy dry woods. Not common.

DILLENII, Darlingt. Tick-Trefoil. Open woodlands. Rather common.

PANICULATUM, DC. Tick-Trefoil. Open woods. Not common.

CANADENSE, DC. Tick-Trefoil. Scarce.

RIGIDUM, DC.? Tick-Trefoil. Woods. August.

CILIARE, DC. Tick-Trefoil. A few specimens seen in York Township.

LESPEDEZA VIOLACEA, Pers. Bush Clover. Rather common on sandy soil.

VICIA CAROLINIANA, Walt. Vetch. Very common in Orange, Green and York townships. Sandy open woodlands.

AMERICANA, Muhl. Vetch. Occasional with the last. Plentiful north shore Bear Lake.

LATHYRUS OCHROLEUCUS, Hook. Vetchling. Everlasting Pea. Small patches of this plant are occasional throughout the county.

VENOSUR, Muhl. A small patch in fence corner on road side, Section 16, Washington Township. A rare plant. 1888.

PALUSTRIS, L. Marsh Vetchling. In marshes about lakes. Not common.

VAR. MYSTIFOLIUS. Marsh Vetchling. Occasional with the last.

APIOS TUBEROSA, Mœnch. Ground-nut. Wild Bean. In thickets of rich low grounds. Rather common.

PHASEOLUS PERENNIS, Walt. Wild Bean. Thickets. Scarce.

BAPTISIA LEUCANTHA, Torr & Gray. False Indigo. Two or three specimens have been seen in each of the following townships, viz.: Orange, Elkhart, Noble, Sparta, Perry and Swan.

CERCIS CANADENSIS, L. Red Bud. A small ornamental tree, rather common in thickets at places along the Elkhart River. Otherwise scarce.

CASSIA MARILANDICA, L. Wild Senna. In rich soil along streams. Plentiful many places.

GYMNOCLADUS CANADENSIS, Lam. Kentucky Coffee-tree. Scarce.

GLEDITSCHIA TRIACANTHOS, L. Honey-Locust. Rich soil along streams. Not common.

ROSACEÆ—ROSE FAMILY.

PRUNUS AMERICANA, Marshall. Wild Plum. Common.

VIRGINIANA, L. Choke-Cherry. Fence rows. Common.

SEROTINA, Ehrhart. Wild Black Cherry. Common.

SPIRAEA SALICIFOLIA, L. Common Meadow-Sweet. Low grounds everywhere. July.

TOMENTOSA, L. Steeple Bush. A few specimens seen in Birch Marsh, Section 15, York Township.

AGRIMONIA EUPATORIA, L. Common Agrimony. Fence rows and borders of wood. Common.

PARVIFLORA, Ait. Small-Flowered Agrimony. Along a road-side in Sparta Township, near Eagle Lake. Surprised to find this plant within the limits of Noble County.

GEUM ALBUM, Gmelin. Avens. A common homely herb.

VIRGINIANUM, L. Avens. A common homely herb.

RIVALE, L. Water Avens. Birch Marsh, Section 7, Jefferson Township. Rare.

POTENTILLA NORVEGICA, L. Norway Cinque-foil. A common homely weed.

CANADENSIS, L. Common Cinque-foil, or Five-Finger. Common.

ARGENTEA, L. Silvery Cinque-foil. On road side east of Skinner Lake, Jefferson Township. and road side Section 11, York Township. Rare.

FRUTICOSA, L. Shrubby Cinque-foil. A shrub two to four feet high, with numerous yellow flowers. Common in low grounds along the Elkhart River, and in marshes around lakes at various places. August.

PALUSTRIS, Scop. Marsh Five-Finger. In cranberry marshes. Rather common. June.

FRAGARIA VIRGINIANA, Ehrhart. Wild strawberry. Common.

RUBUS STRIGOSUS, Michx. Wild Red Raspberry. Thickets. Common at least in the eastern part of the county.

OCCIDENTALIS, L. Black Raspberry. Common.

VILLOSUS, Ait. Blackberry. Common.

CANADENSIS, L. Low Blackberry. Dewberry. Sandy soil. Common.

HISPIDUS, L. Swamp-Blackberry. Low rich woods. Rather common.

ROSA CAROLINA, L. Swamp Rose. Common.

PARVIFLORA, Ehrhart. (R. LUCIDA, PH.) Dwarf Wild Rose. Common.

RUBIGINOSA, L. Sweet Brier. Occasional.

CRATÆGUS COCCINEA, L. Scarlet-fruited Thorn. Common.

TOMENTOSA, L. Black or Pear Thorn. Common.

CRUS-GALLI, L. Cock-spur Thorn. Common.

PYRUS CORONARIA, L. American Crab-Apple. Sandy woods. Common.

ARBUTIFOLIA L. Choke-berry. Low grounds. Rather common.

AMELANCHIER CANADENSIS, T. & G.
June-berry. Shad-bush. Service-berry. Common.

SAXIFRAGACEÆ.—SAXIFRAGE FAMILY.

RIBES CYNOSBATI, L. Wild Gooseberry. Woods. Common.

HIRTELLUM, Michx. Wild Gooseberry. Scarce.

FLORIDUM, L. Wild Black Currant. Woods and fence rows. Common.

PARNASSIA CAROLINIANA, Michx. Grass of Parnassus. A pretty wild flower. Very common in the low rich meadows of York and Sparta townships; also common on low grounds along the Elkhart River, in Orange Township. August and September.

SAXIFRAGA PENNSYLVANICA, L. Swamp Saxifrage. A homely herb. Common in marshes. June.

HEUCHERA AMERICANA, L. Alum-root. Hillsides and fence rows. Not common.

MITELLA DIPHYLLA, L. Mitre wort. A delicate little plant. Common in rich woods. May.

CRASSULACEÆ.—ORPINE FAMILY.

PENTHORUM SEDOIDES, L, Ditch Stone-crop. A very common herb.

SEDUM ACRE, L. Mossy Stone-crop. Occasional on road sides.

TELEPHINUM, L. Garden Orpine or Live-for-ever. Occasional on road sides.

HAMAMELACEÆ.—WITCH HAZEL FAMILY.

One representative within our limits, viz.:

HAMAMELIS VIRGINICA, L. Witch Hazel. A common sh

HALORAGEÆ.—Water-Milfoil Family.

Myriophyllum Spicatum, L. Water-Milfoil. Plant found in deep water. A few specimens seen in the lake at Rome City. August.

Proserpinaca palustris, L. Mermaid-weed. In wet swamps, growing with smart weed. Very common many places. August.

ONAGRACEÆ.—Evening-Primrose Family.

Circaæ Lutetiana, L. Enchanter's Nightshade. A little inconspicuous plant of woods. Common.

alpina, L. Enchanter's Nightshade. With the last, but not so abundant.

Epilobium angustifolium, L. Great Willow-herb. A small patch in each of the following townships on the B. & O. R. R. track: Allen, Jefferson and York. A handsome plant, —five feet high, with numerous very showy flowers. June and July.

palustre, L., var. lineare. Willow-herb. Peat bogs. Rather common.

coloratum, Muhl. Willow-herb. Woods and fields. Common. August.

Œnothera biennis, L. Common Evening Primrose. Fields, fence rows and waist places. Very common. July—September.

pumila, L.? Sundrops. Open woodlands. York and Orange townships. June.

Ludwigia palustris, Ell. Water Purslane. Common in Creeks, ditches, etc. August.

LYTHRACEÆ.—Loosestrife Family.

But one species so far known to be within the limits of Noble County, viz.:

Nesaea verticillata, H. B. K. Swamp Loosestrife. Growing around the shore of lakes. Stems 2–8 feet long bending to the water and bearing many fine rose purple flowers. Common several places. August.

CUCURBITACEÆ.—Gourd Family.

This order includes several of the most common cultivated plants, but only the following as wild plants in the State:

Echinocystis lobata, T. & G. Wild Balsam-apple. Waste places; also cultivated.

Sicyos angulatus, L. One-seeded Star-Cucumber. Scarce.

UMBELLIFERÆ.—Parsley Family.

Hydrocotyle umbellata, L. Water Pennywort. A small patch on the moist shore of a lake in Green Township, section 30; and another on the moist shore of Long Lake, in Wayne Township. Rare.

Sanicula Canadensis, L. Black Snakeroot. Woods. Common.

marilandica, L. Black Snakeroot. Common.

Daucus Carota, L. Common Carrot. Escaped.

Heracleum lanatum, Michx. Cow-Parsnip. Scarce.

Pastinaca sativa, L. Common Parsnip. Escaped from cultivation.

Archangelica atropurpurea, Hoffm. Great Angelica. Occasional on low grounds along the branches of the Elkhart River. A tall coarse plant.

Conioselinum Canadense, T. & G. Hemlock-Parsley. In low marshes around lakes. Scarce.

Thaspium trifoliatum. Gray, Meadow Parsnip. Dry woods. Rather common.

Cicuta maculata, L. Spotted Cowbane. Common.

bulbifera, L. Spotted Cowbane. Growing in swamps with smartweed. Not common.

Sium lineare, Michx. Water-Parsnip. Common.

Cryptotaenia Canadensis, DC. Honewort. Thickets. June.

Osmorrhiza longistylis, DC. Sweet Cicely. June.

brevistylis, DC. Sweet Cicely. Moist woods. Common.

Erigenia bulbosa, Nutt. Harbinger-of-Spring. A delicate and very common little plant of all beech woods. April.

ARALIACEÆ.—Ginseng Family.

Aralia racemosa, L. Spikenard. Rich woods. Scarce.

nudicaulis, L. Wild Sarsaparilla. Rich woods. Rather common.

quinquefolia, D. & P. Ginseng. Rich woods. Very scarce.

trifolia, Dwarf Ginseng. Ground nut. A very delicate little plant, very common in beech woods. April, May.

CORNACEÆ.—Dogwood Family.

Cornus florida, L. Flowering Dogwood. A small forest tree.
sericea, L. Silky Cornel. Willow swamps. Common.
stolonifera, Michx. Red-osier. Dogwood. With the last. Common.
paniculata, L.'Her. Panicled Cornel. Thickets. Scarce.
Nyssa multiflora, Wang. Tupelo. Pepperidge. Black or sour gum. A few small trees seen in Orange and Wayne Townships, and several large ones on the bank of Tippecanoe Lake, Noble Township.

CAPRIFOLIACEÆ.—Honeysuckle Family.

Symphoricarpus vulgaris, Michx. Indian Currant. Coral-berry. Escaped. Occasional.
Lonicera parviflora, Lam. Small Honeysuckle. Not common.
Triosteum perfoliatum, L. Fever-wort. Horse Gentian. Not common.
Sambucus Canadensis, L. Common Elder.
pubens, Michx. Red-berried Elder. Common, at least in the eastern part of the county.
Viburnum Lentago, L. Sweet Viburnum. Sheep-berry. Common.
prunifolium, L. Black Haw. Common.
acerifolium, L. Maple-leaved Arrow-wood. Very common in beach woods.
opulus, L. Cranberry-tree. A few specimens seen in Jefferson Township, section 1. Rare.

RUBIACEÆ.—Madder Family.

Galium Aparine, L. Cleavers Goose-Grass. Common in rich woods.
asprellum, Michx. Rough Bedstraw. Common in low thickets along streams.
trifidum, L. Small Bedstraw. Very common.
var. tinctorium, Gray. Common.
var. latifolium, Gray. Common in swamps.
triflorum, Michx. Sweet-seented Bedstraw. Common.
pilosum. Bedstraw. Scarce.
cicaezans, Michx. Wild Licorice. Common.
lanceolatum, Torr. Wild Licorice. Dry woods. Not common.
boreale, L. Northern Bedstraw. Rather common.

CEPHALANTHUS OCCIDENTALIS, L. Button-bush. A very common shrub of swamps.

MITCHELLA REPENS, L. Partridge-berry. A trailing little evergreen herb of dry woods. Common.

DIPSACEÆ.—TEASEL FAMILY.

DIPSACUS SYLVESTRIS, Mill. Wild Teasel. A roadside weed. Too common.

COMPOSITÆ.—COMPOSITE FAMILY.

VERNONIA NOVEBORACENSIS, Willd. Iron-weed. A tall coarse weed with purple flowers, growing in low grounds, pastures, etc. Common; August.

FASCICULATA, Michx. Iron-weed. Too near the last. Growing along the Elkhart River. Not common.

LIATRIS SCARIOSA, Willd. Blazing Star. Dry soil. Rather common.

SPICATA, Willd. Blazing Star. Moist grounds along the Elkhart River. Very common some places. August. Both are handsome plants.

EUPATORIUM PURPUREUM, L. Joe-Pye Weed. Trumpet Weed. A tall stout plant with purple flowers and leaves three to six in a whorl. Low grounds. Common. August.

PERFOLIATUM, L. Thoroughwort. Boneset. One of the commonest of plants of all low grounds. August.

AGERATOIDES, L. White Snakeroot. Rich woods. Common. August

ASTER CORYMBOSUS, Ait. Aster. Woodlands. Common, at least in the eastern part of the county. August.

MACROPHYLLUS, L. Aster. With the last. Common. August.

PATENS, Ait?. Aster. Scarce. Leaves usually contracted below the middle. August.

CORDIFOLIUS, L. Aster. Scarce.

DUMOSUS, L. Aster. Thickets, fence rows. Rather common.

TRADESCANTI, L. Aster. Moist, shady grounds. Common. August.

PANICULATUS, Lam. Aster. Found in cold peat bogs. Scarce. Gray's Flora of North America, p. 187.

LONGIFOLIUS, Lam. Aster. Noble County. Editors Botanical Gazette.

PUNICEUS, L. Aster. Moist thickets and swamps. Common.

NOVAE-ANGLIAE, L. Aster. Moist grounds of the northern and western part of the county. Common. August. Aster is far the most difficult of our genera. Gray.

ERIGERON CANADENSE, L. Horse-weed. Butter-weed. A very common weed of fields, gardens and waste places. July, October.

BELLIDIFOLIUM, L. Robin's Plantain. Dry banks and open woodlands of sandy soil. Common. May and June.

PHILADELPHICUM, L. Common Fleabane. Moist grounds along streams. May and June.

ANNUUM, Pers. Daisy Fleabane. Sweet Scabions. Plant four feet high. Flowers white. A nuisance in every meadow. July.

STRIGOSUM, Muhl. Daisy Fleabane. With the last. A nuisance in meadows. July.

SOLIDAGO LATIFOLIA, L. Golden-rod. Moist Woods. Common. August.

CAESIA, L. Golden-rod. Woods and fields. Common. August.

STRICTA, Ait. Golden-rod. Cold peat bogs and "flats," along the Elkhart River. Scarce. July and August.

S. RIGIDA, L. Golden-rod. A few specimens in Noble and Perry Townships.

RIDDELLII, Frank. Golden-rod. Low grounds along the Elkhart River in Orange and York Townships. Not common.

PATULA, Muhl. Golden-rod. Low, moist grounds. Rather common.

ALTISSIMA, L. Golden-rod. The plant is not tall, as the name indicates. Woods. Common. August.

ULMIFOLIA, Muhl. Golden-rod. With the last. Common.

CANADENSIS, L. Golden-rod. Fence rows. Common. August.

GIGANTEA, Ait. Golden-rod. With the last. Common. August. Solidago is a difficult genus.

INULA HELENIUM, L. Elecampane. A tall, stout plant. Roadsides. Common. August.

POLYMNIA CANADENSIS, L. Leaf-cup. Common in rich woods.

SILPHIUM TEREBINTHINACEUM, L. Prairie Dock. Dry, open places of woods; northern and western part of the county. Not abundant.

TRIFOLIATUM, L. Prairie Dock. With the last. Common. Both are tall plants. August.

AMBROSIA TRIFIDA, L. Great Ragweed. At places along the Elkhart River. August.

ARTEMISIAEFOLIA, L. Roman-wormwood. Hogweed. Ragweed. A very common, homely weed of fields and waste places. July, August.

XANTHIUM STRUMARIUM, L. Cocklebur. Roadsides. Common. A nuisance. August.

RUDBECKIA LACINIATA, L. Cone-flower. Low thickets. Sandy soil. Common. August.

TRILOBA, L. Cone-flower. Dry soil. Common. August.

HIRTA, L. Cone-flower. Naturalized in meadows. Plant a foot or so high, with large, yellow flowers.

HELIANTHUS ANNUUS, L. Common Sunflower. Escaped from cultivation.

GIGANTEUS, L. Wild Sunflower. Moist thickets. Not common. August.

DIVARICATUS, L. Wild Sunflower. Thickets. Common. July.

DECAPETALUS, L. Wild Sunflower. Moist soil. Common. August.

TUBEROSUS, L. Artichoke. As a weed in waste places. Rare.

ACTINOMERIS SQUARROSA, Nutt. Actinomeris. A tall, stout plant growing everywhere in rich soil along streams. Flowers yellow. August.

COREOPSIS TRIPTERIS, L. Tall Coreopsis. Swamps. Common. August.

ARISTOSA, Michx. Coreopsis. Found in Noble County. Catalogue Indiana Flora.

BIDENS FRCNDOSA, L. Beggar-ticks. Spanish Needles. Fields and waste places. A very common and troublesome weed.

CONNATA, Muhl. Swamp Beggar-ticks. Not so common as the last.

CHRYSANTHEMODES, Michx. Bur-Marigold. Swamps. Common. August.

BIPINNATA, L. Spanish Needles. Moist soil. August. A troublesome weed. Rather common.

HELENIUM AUTUMNALS, L. Sneeze-weed. Not common.

MARUTA COTULA, DC. May-weed. Dog-Fennel. Common everywhere.

ACHILLEA MILLEFOLIUM, L. Yarrow. Roadsides. Common. July.

LEUCANTHEMUM VULGARE, Lam. Ox-eyed Daisy. A very troublesome weed that has been introduced at few places.

TANACETUM VULGARE, L. Common Tansy. Roadsides, some places.

ARTEMSIA BIENNIS, Willd. Wormwood. A very common weed of all waste places. September.

GNAPHALIUM ULIGINOSUM, L. Low Cudweed. Fields and roadsides. Not common.

ANTENNARIA MARGARITACEA, R. Brown. Pearly Everlasting. Roadsides. Common. August.

PLANTAGINIFOLIA, Hook. Plantain-leaved Everlasting. Dry, open woodlands of sandy soil. Common. May.

ERECHTHITES HIERACIFOLIA, Raf. Fireweed. A tall weed, very common in new fields. August.

SENECIO AUREUS, L. Golden Ragwort. Moist places. Not common. May.

VAR. OBAVATUS. Golden Ragwort. Not common. May.

CIRSIUM LANCEOLATUM, Scop. Common Thistle. Very Common. July.

DISCOLOR. Thistle. Very tall and branched. Scarce. July.

MUTICUM, Michx. Swamp Thistle. Common.

ARVENSE, Scop. Canada Thistle. Patches of Canada Thistle are numerous, but in most cases the plants are cropped to prevent the ripening of the seed; yet this is much neglected. At one place in an open wood-land, at least a quarter of an acre of this pernicious pest had matured and the seed scattering broadcast with the wind.

LAPPA OFFICINALIS, Allioni. Burdock. Fields and waste places. Common.

CICHORUM INTYAUS, L. Cichory. Occasional on road sides.

HIERACIUM SCABRUM, Michx. Rough Hawkweed. Fields. Common.

NABALUS ALBUS, Hook. White Lettuce. Woods. Common.

ALTISSIMUS, Hook. Tall White Lettuce. Sandy soil. Common.

RACEMOSUS, Hook. Sections 7 and 22 Jefferson Township. A few specimens. Rare.

TARAXACUM DENS-LEONIS, Desf. Common Dandelion. Common everywhere.

LACTUCA CANADENSIS, L. Wild Lettuce. A tall plant of woods and fence rows. Common. July.

VAR. INTEGRIFOLIA, T. and G. Wild Lettuce. Common.

SCAROLA, L. Prickly Lettuce. This plant was first noticed in 1890. It is a bad weed and is becoming plentiful everywhere.

SONCHUS ASPER, Vill. Spiny-leaved Thistle. A very common weed of fields and gardens.

LOBELIACEÆ.—LOBELIA FAMILY.

LOBELIA CARDINALIS, L. Cardinal flower. Low grounds. Common. July.

SYPHILITICA, L. Great Lobelia. Low grounds. Common.

INFLATA, L. Indian Tobacco. Copses. Common.

SPICATA, Lam. Lobelia. Dry sandy soil. Not Common.

KALMII, L. Lobelia. Very common in the low rich meadows of Sparta and York townships. August.

CAMPANULACEÆ.—Campanula Family.

Campanula aparinoides. Pursh. Marsh Bellflower. Cranberry marshes and wet grassy places of lakes. Common.

americana. Tall Bellflower. A very common plant of fence rows and roadsides. July–August.

Specularia perfoliata, A. DC. Venus, Looking-glass. A few specimens seen in Orange Township.

ERICACEÆ.—Heath Family.

Gaylussacia resinosa, T. & G. Black Huckleberry. Dry sandy woodlands. Common.

Vaccinium macrocarpon, Ait. Cranberry. Many marshes of this plant still exist throughout the county.

corymbosum, L. Swamp Blueberry. Huckleberry. Common.

Gaultheria procumbens, L. Creeping Wintergreen. At one place in Orange Township.

Cassandra calyculata, D. Leather-Leaf. A small evergreen shrub —plentiful at one place in Orange Township. (Section 2.)

Andromedia polifolia, L. Wild Rosemary. A small evergreen shrub, very common about Pleasant Lake, Noble Township. Sparingly at few other places.

Pyrolia rotundifolia, L. Shin leaf. In woods along the high banks of streams. Not common.

Chimaphila umbellata, Nutt. Prince's Pine. Section 36, Allen Township, there is a small patch (about ten feet square) of this beautiful plant growing in a woods on my father's farm. Not noticed at any other place in the county.

Monotropa unifloa, L. Indian Pipe. Corpse-Plant. A small waxy white plant. Common in beech woods. July.

hypopitys, L. Pine sap. False Beech drops. But one specimen.

AQUIFOLIACEÆ.—Holly Family.

Ilex verticillata. Gray. Black Alder. Winterberry. A common shrub of swamps.

PLANTAGINACEÆ.—Plantain Family.

Plantago major, L. Common Plantain. Moist grounds of fields and door yards. Very common.

lanceolata, L. English Plantain. A few specimens seen in Allen and Wayne townships.

PRIMULACEÆ.—Primrose Family.

Dodecatheon meadia, L. American Cowslip. A few specimens seen in the rich meadows of Sparta Township. A very handsome wild flower. June.

Trientalis Americana, Pursh. Star-flower. A small plant growing in tamarack marshes in moss near the roots of the trees. Very common in some places. May.

Lysimachia thyrsiflora, L. Tufted Loosestrife. Swamps. Common.

cilata, L. Loosestrife. Moist thickets. Common.

lanceolata, Walt. Loosestrife. Occasional in low grassy lands about lakes.

Samolus Valerandi, L., var. Americanus. Gray. Water Pimpernel. Brook-weed. Plant a foot high, much branched, with cherry wild leaves, and small white flowers. Wet places along streams in woodlands. Scarce. June–August.

LENTIBULACEÆ.—Bladderwort Family.

Utricularia minor, L.? Small Bladderwort. Shallow pools. Not common.

OROBANCHACEÆ.—Broom-rape Family.

Epiphegus Virginiana. Bart. Beech-drops. Common everywhere in beech woods. August–October.

Conopholis americana. Walroth. Squaw-root. Cancer root. In oak woods in clusters among fallen leaves. Not common.

SCROPHULARIACEÆ.—Figwort Family.

Verbascum thapsus, L. Common Mullein.

Verbascum blattaria, L. Moth Mullein. Roadsides. Western part of county. Scarce.

Linaria vulgaris, Mill. Toad-Flax. Butter-and-eggs Fields and roadsides. Escaped. Too common.

Scrophularia nodosa, L. Figwort. Fence rows General but not abundant.

Collinsia verna, Nutt. Collinsia. Rich woods. Common many places. A very showy wild flower. May, June.

Chelone glabra, L. Turtle-head. Snake head. Wet places. Rather common.

PENTSTEMON PUBESCENS, Solander. Beard-tongue. Plentiful on north shore Bear Lake.

MIMULUS RINGENS, L. Monkey-flower. Wet places. Common.

GRATIOLA VIRGINIANA, L. Hedge-Hyssop. A delicate little plant of moist places in woods. Common.

ILYSANTHES GRATIOLOIDES, Benth. False Pimpernel. A small plant growing on the moist shores of ponds in fields.

VERONICA VIRGINICA, L. Culver's root. Growing on sandy soil throughout the county. Common.

ANAGALLIS, L. Water Speedwell. Brooks and ditches. Not common.

SCUTELLATA, L. Marsh Speedwell. Growing in marshes with smart-weed. Rather common. June and July.

SERPYLLIFOLIA, L. Thyme-Leaved. Speedwell. A common weed everywhere.

GERARDIA PURPUREA, L. Purple Gerardia. A handsome wild flower, very common in the low, rich meadows of Sparta Township. Also at places in York Township. August.

TENUIFOLIA, Vahl. Slender Gerardia. Dry woods of western part of the county. Does not appear to be common.

FLAVA, L. Downy False Foxglove. Open woods of sandy soil. Not common.

PENDICULARIA, Benth. Foxglove. Scarce. Western part of county.

CASTILLEIA COCCINEA, Spreng. Scarlet painted cup Sandy, low grounds along the Elkhart River of Orange Township. Also at a few places in York Township. Not common. A beautiful plant.

PEDICULARIS CANADENSIS, L. Lousewort. Wood Betony. Common in oak woods. May.

LANCEOLATA, Michx. Wood Betony. Sparingly in swamps along the Elkhart River, York Township. Common at lakes on sections 7 and 15, Jefferson Township. September.

VERBENACEÆ —VERVAIN FAMILY.

VERBENA HASTATA, L. Blue Vervain. A plant four to six feet high. Common everywhere along roadsides, waste places, etc. August.

URTICIFOLIA, L. White Vervain. August. With the last. Common.

BRACTEOSA, Michx. Creeping Vervain. Seen at only one place in the county. A small patch on a roadside in Allen Township. Rare. August.

PHRYMA LEPTOSTACHYA, L. Lopseed. A common plant of the woods, flowering in July.

LABIATÆ.—MINT FAMILY.

TEUCRIUM CANADENSE, L. American Germander. Wood Sage. Western part of county. Not common.

MENTHA VIRIDIS, L. Spearmint. Common.

PIPERITA, L. Peppermint. Roadsides and waste places. Rather common.

CANADENSIS, L. Wild Mint. Not common.

LYCOPUS VIRGINICUS, L.? Bungle weed. Wet places. Common.

PYCNANTHEMUM LANCEOLATUM, Pursh. Mountain Mint. Basil. Not common.

HEDEOMA PULEGIOIDES, Pers. American Pennyroyal. Woods and fields. Very common.

COLLINSONIA CANADENSIS, L. Rich-weed. Stone-root. Rich woods. Common.

MONARDA FISTULOSA, L. Wild Bergamont. Woods and fence rows. Common.

PUNCTATA, L. Horse Mint. Common.

LOPHANTHUS NEPETOIDES, Benth. Giant Hyssop. Borders of woods and fence rows. Common.

BLEPHILIA CILIATA, Raf. Blephilia. Scarce.

HIRSUTA, Benth. Blephilia. Scarce.

NEPETA CATARIA, L. Catnip. Common.

GLECHOMA, Benth. Ground Ivy. Gill. A nuisance in yards.

BRUNELLA VULGARIS, L. Heal-all. Woods and fields. Very common. June, July.

SCUTELLARIA VERSICOLOR, Nutt. Skullcap. Sparingly along the Elkhart River.

GALERICULATA, L. Skullcap. Usually found growing in tamarack marshes. Scarce.

LATERIFLORA, L. Skullcap. Wet shady places. Rather common.

LEONURUS CARDIACA, L. Common Motherwort. Moist places, roadsides, etc. Rather common.

LAMIUM AMPLEXICAULE, L. Dead-Nettle. Waste places. Scarce.

STACHYS PALUSTRIS, L.? Hedge-Nettle. Along the banks of streams. Scarce.

BORRAGINACEÆ.—Borage Family.

Lithospermum arvense, L. Corn Gromwell. Sandy soil. Rather common some places.

latifolium, Michx. Borders of woods. Rare.

hirtum, Lehm. Hoary Puccoon. Woods of sandy soil. Scarce.

canascens, Lehm. Hoary Puccoon. Open woods of sandy soil. Not common.

Echinospermum Lappula, Lehm. Stickseed. A common weed.

Cynoglossum officinale, L. Common Hound's-Tongue. A common weed of waste grounds and pastures.

morisoni, DC. Beggar's Lice. A common weed of woods, copses, etc.

virginicum, L. Wild Comfrey. Oak woods of sandy soil. Scarce.

HYDROPHYLLACEÆ.—Waterleaf Family.

Hydrophyllum Virginicum, L. Waterleaf. Damp rich woods. Common.

macrophyllum, Michx. Waterleaf. Rich woods. Scarce.

appendiculatum, Michx. Water-Leaf. Common in rich woods. June, July.

Phacelia Purshii, Buckley. Hawpatch. Perry Township.

POLEMONIACEÆ.—Polemonium Family.

Polemonium reptans, L. Greek Valerian. In rich woods south of Tippecanoe Lake, Noble Township.

Phlox pilosa, L. Phlox. A pretty plant, common on sandy soil throughout the county. Growing in open woods, borders of thickets, etc. May, June.

divaricata, L. Phlox. Wild Sweet-William. Rich woods. Very common. June.

CONVOLVULACEÆ.—Convolvulus Family.

Ipomœa purpurea, Lam. Common Morning-Glory. Escaped from cultivation to waste places.

pandurata, Meyer. Wild Potato-Vine. Sandy banks and fields. Scarce.

Calystegia sepium, R. Br. Hedge Bindweed. Seen at few places. Scarce.

CALYSTEGIA SPITHAMEA, Pursh. Bindweed. Railroad tracks. Plentiful in many places.

CUSCUTA GRONOVII, Willd. Dodder. A herb, common everywhere in low rich grounds. The yellowish and thread like stems climbing and twining over various other herbs and small shrubs. July, August.

GLOMERATA, Choisy. Dodder. In York Township, in low grounds along the Elkhart River. Scarce.

SOLANACEÆ.—NIGHTSHADE FAMILY.

SOLANUM DULCAMARA, L. Bittersweet. General, but not abundant. June, September.

NIGRUM, L. Common Nightshade. Shady places. Common. July, September.

CAROLINENSE, L. Horse Nettle. Scarce. July.

PHYSALIS PHILADELPHICA, Lam. Ground Cherry. In waste grounds, some places, where it has escaped from cultivation.

PUBESCENS, L. Ground Cherry. Fields. Not common.

DATURA STRAMONIUM, L. Common Stramonium. Waste grounds. Scarce.

TATULA, L. Purple Stramonium. Waste grounds. Very common.

GENTIANACEÆ.—GENTIAN FAMILY.

FRASERA CAROLINENSIS, Walt. American Columbo. Dry woods. Orange, Wayne, Green. Common. July.

GENTIANA QUINQUEFLORA, Lam. Five-flowered Gentian. At places along the banks of the lake at Rome City. September.

CRINITA, Froel. Fringed Gentian. A very pretty wild flower, growing in moist grounds along the Elkhart in Orange; also at several places in York. August, September.

DETONSA, Fries. Smaller Fringed Gentian. A small patch in York Township. Rare.

ALBA, Muhl. White Gentian. A small patch in moist meadow, York Township. Rare.

ANDREWSII, Griesb. Closed Gentian. Borders of swamps, general, but not abundant. September.

BARTONIA TENELLA, Muhl. Bartonia. A small herb, a few specimens at one place on the moist shore of a lake in Orange. Rare. August.

MENYANTHES TRIFOLIATA, L. Buckbean. Moist shores of lakes—very common at Pleasant Lake, Noble Township. May, June.

APOCYNACEÆ —Dogbane Family.

Apocynum androsæmifolium, L. Spreading Dogbane. Rather common.
cannabinum, L. Indian Hemp Common.

ASCLEPIADACEÆ.—Milkweed Family.

Asclepias Cornuti, Decaisne. Common Milkweed. Fields and roadsides. Common.
phytolacco ides, Pursh. Poke Milkweed. Rather common.
purpurascens, L. Purple Milkweed. Not common.
variegata, L. Variegated Milkweed. Scarce.
incarnata, L. Swamp Milkweed. Low grounds. Common.
tuberosa, L. Butterfly-weed. Pleurisy-root. Scarce in the eastern part of the county, but common in the western part.

OLEACEÆ.—Olive Family.

Fraxinus America, L. White Ash. A common and valuable forest tree.
sambucifolia, Lam. Black or Water Ash. A common tree of low grounds.
quadrangulata, Michx. Blue Ash. A forest tree, not very plentiful.

ARISTOLOCHIACEÆ.—Birthwort Family.

Asarum Canadense, L. Wild Ginger. Rich wood. Not common.
Ariltolochia Serpentaria, L. Virginia Snakeroot. Rich beech woods. Very scarce. A well known medical plant.

PHYTOLACCACEÆ.—Pokeweed Family.

Phytolacca decandra, L. Common Poke or Scoke. A tall and stout plant. Common.

CHENOPOCIACEÆ.—Goosefoot Family.

Chenopodium Album. Pigweed. A very common homely weed.
hybricum, L. Maple-leaved Goosefoot. Waste places. Scarce.
Botrys, L. Jerusalem Oak. Feather Geranium. Waste places. Not rare.

AMARANTACEÆ.—Amaranth Family.

Amarantus retroflexus, L. Pigweed. Green Amaranthus. A very common weed of cultivated grounds.

paniculatus, L. Prince's Feather-of-the-Garden. Rarely escaped to waste grounds.

albus, L. Tumble weed. Waste places. Not plentiful.

POLYGONACEÆ.—Buckwheat Family.

Polygonum orientale, L. Prince's Feather. Escaped. Scarce.

Careyi, Olney. Prince's Feather. Reported from this county by the editors of the Botanical Gazette.

Pennsylvanicum, L. Moist places. Common.

incarnatum, Ell. Moist places. Common.

Persicaria, L. Lady's Thumb. Common everywhere in damp places. June–August.

hydropiper, L. Common Smartweed. Common.

hydropiperoides, Michx. Wild Water Pepper. Not very plentiful.

amphibium, L. Water Persicaria. Shallow water. Rather common.

Virginianum. Common in woods.

aviculare, L. Door-weed. The commonest weed in yards.

var. erectum, Roth. Door-weed. Common everywhere with the last.

arifolium, L. Halbert-leaved Tear-thumb. Low grounds. Common in the eastern part of county.

sagittatum, L. Arrow-leaved Tear-thumb. Low grounds. Common.

dumetorum, L. Climbing False Buckwheat. A common plant.

var. scandens, Gray. Climbing False Buckwheat. Rich grounds of thickets, climbing high over bushes.

Fagopyrum esculentum, Moench. Buckwheat. Remaining as a weed in fields after cultivation.

Rumex orbiculatus, Gray. Great Water Dock. Plant four to six feet high. Swamps. Scarce.

verticillatus, L. Swamp Dock. Common.

crispus, L. Curled Dock. A very common weed of cultivated grounds and waste places.

obtusifolius, L. Bitter Dock. With the last. Both are very unwelcome weeds of grain fields.

Acetosella, L. Field or Sheep Sorrel. Dry fields and roadsides. Very common.

LAURACEÆ.—Laural Family.

Sassafras officinale, Nees. Sassafras. A shrub or small tree. Sandy soil. Common.

Lindera Benzoin, Meisner. Spice bush. Rich woods. Common.

THYMELEACEÆ.—Mezereum Family.

Dirca palustris, L. Leatherwood. Moose-wood. A small shrub of beech woods. Rather common.

SANTALACEÆ.—Sandalwood Family.

Comandra umbellata, Nutt. Bastard Toad-flax. Dry open woods of sandy soil. Common. May.

SAURURACEÆ.—Lizard's-tail Family.

Saururus cernuus, L. Lizard's Tail. Moist places along streams in woods. Rather common. July.

EUPHORBIACEÆ.—Spurge Family.

Euphorbia maculata, L. Spurge. A very common weed.

hypericifolia, L. Spurge. Plant one or two feet high. Very common in all cultivated fields.

corrollata, L. Flowering Spurge. Plant two to three feet high. Sandy soil. Very common.

Cyparissias, L. Cypress Spurge. Escaped from gardens to roadsides, and has become quite abundant some places.

commutata, L. Engelm. Spurge. Dry sandy soil. Scarce.

Acalypha Virginica. Three-seeded Mercury. A very common homely weed.

Virginica, var. gracilens. Gray. Three-seeded Mercury. Rich soils. Scarce.

URTICACEÆ.—Nettle Family.

Ulmus fulva, Mich. Slippery or Red Elm. A common forest tree.

Americana, L. White Elm. A very common forest tree.

racemosa, Thomas. Corky White Elm. Common.

Celtis occidentalis, L. Sugarberry. Hackberry. "A small, or middle-sized tree, with the aspect of an elm." Common in the low rich lands along streams.

MORUS RUBRA, L. Red Mulberry. "General but not abundant."

URTICA GRACILIS, Ait. Nettle. A common weed of fence rows and moist grounds.

LAPORTEA CANADENSIS. Gaudichaud. Wood-Nettle. Everywhere in rich woods. July, September.

PILEA PUMILA, Gray. Richweed. Clearweed. Cool shady places in woods.

BOEHMERIA CYLINDRICA, Willd. False Nettle. Common.

CANNABIS SATIVA, L. Hemp. Waste grounds. Common.

HUMULUS LUPULUS, L. Common Hop. Escaped from cultivation at some places, while at others it is probably native.

PLATANACEÆ.—PLANE-TREE FAMILY.

PLATANUS OCCIDENTALIS, L. American Plane-tree. Sycamore. A large and well-known forest tree. Very common in rich soils along streams.

JUGLANDACEÆ.—WALNUT FAMILY.

JUGLANS CINEREA, L. Butternut. White Walnut. A middle-sized forest tree. Common, especially in rich soils along streams.

NIGRA, L. Black Walnut. A valuable forest tree.

CARYA ALBA, Nutt. Shell-bark or Shag-bark Hickory. A common and valuable forest tree.

SULCATA, Nutt. Western Shell-bark Hickory. A valuable forest tree. Not so common as the last.

PORCINA, Nutt. Pig-nut Hickory. A common forest tree.

AMARA, Nutt. Bitter-nut or Swamp Hickory. A forest tree. Common in moist soils.

CUPULIFERÆ.—OAK FAMILY.

QUERCUS ALBA, L. White Oak. A common and very valuable forest tree.

MACROCARPA, Michx. Burr Oak. A common and valuable forest tree.

PRINUS, VAR. ACUMINATA, Michx. Yellow Chestnut Oak. Valuable forest tree. Scarce.

BICOLOR, Willd. Swamp White Oak. This specie also affords excellent timber.

IMBRICARIA, Michx. Laurel or Shingle Oak. A few specimens seen in Orange, Green, Noble and Washington townships. A tree thirty to fifty feet high, with smooth shining leaves.

COCCINEA, Wang. Scarlet Oak. A large or middle-sized forest tree, with much the appearance of the common Red Oak. Scarce.

VAR. TINCTORIA, Gray. Black Oak. A middle-sized tree. Common. Sandy soils. "This is probably entitled to the specific rank that Bartram first assigned it."—Editors of the Indiana Botanical Gazette.

RUBRA, L. Red Oak. A very common and well-known forest tree. Timber used for rails.

PALUSTRIS, Du Roi. Pin Oak. Swamp or Spanish Oak. Scarce.

FAGUS FERRUGINEA, Ait. American Beech. A common forest tree which affords excellent timber for fuel.

CORYLUS AMERICANA, Walt. Wild Hazelnut. Sandy soil. Common.

OSTRYA VIRGINICA, Willd. American. Hop-Hornbeam. Leverwood. A small tree, common in all rich woods. The hop-like fruit very noticeable in August.

CARPINUS AMERICANA, Michx. Hornbeam. Iron-wood. Blue or Water Beech. A small tree growing in rich soil along streams, moist places in woods. Common.

BENTULACEÆ.—BIRCH FAMILY.

BETULA LENTA, L. Cherry Birch. Sweet or Black Birch. A few specimens seen in Orange Township in a low moist woods west of Wolcottville. There is also a marsh of several acres of birch, section 15, York Township; another, section 7, Jefferson Township. A middle-sized tree with cherry-like leaves, and sweet, aromatic bark with the fragrance of Wintergreen. Rare in Indiana.

ALNUS SERRULATA, Ait. Smooth Alder. A small shrub, common on the borders of ponds, in peat bogs.

SALICACEÆ.—WILLOW FAMILY.

SALIX CANDIDA, Willd. Hoary Willow. Usually in bogs. Not common.

DISCOLOR. Glaucous Willow. Borders of ponds, etc. Common.

PETIOLARIS, Smith. Petioled Willow. Common in swamps.

LUCIDA, Muhl. Shining Willow. Most plentiful in the "flats" along the Elkhart River. A handsome species.

ALBA, L., VAR. VITELLINA, Gray. Yellow Willow. A middle-sized tree. Rather common.

MYRTILLOIDES, L. Myrtle Willow. Quite a small shrub growing in cold peat bogs with cranberry vines. Not common.

POPULUS TREMULOIDES, Michx. American Aspen. Quaking Asp. A small tree. Common.

MONILIFERA, Ait. Cotton-wood. A middle-sized or large forest tree. Rather common. Timber not valuable.

CONIFERÆ.—PINE FAMILY.

LARIX AMERICANA, Michx. Tamarack. A tall slender tree growing in swamps. Common.

JUNIPERUS COMMUNIS, L. Common Juniper. A small shrub. Scarce.

JUNIPERUS VIRGINIANA, L. Red Cedar. Several small trees on the north shore of Bear Lake.

ARACEÆ.—ARUM FAMILY.

ARISAEMA TRIPHYLLUM, Torr. Indian Turnip. Jack-in-the-Pulpit. Rich woods. Very common. May.

DRACONTIUM, Schott. Dragon-root. Low rich grounds along streams in woods. Common. June.

PELTANDRA VIRGINICA, Raf. Arrow Arum. Growing in shallow water. Very common at Long Lake, Green Township. Sparingly at Bowen Lake (Green), and Round Lake, Wayne Township. June.

CALLA PALUSTRIS, L. Water Arum. In a swamp, in Orange, west of Wolcottville, on roadside; also on roadside south of Tippecanoe Lake, Noble Township, and section 17, Elkhart Township. A beautiful and interesting plant growing in shallow water. June.

SYMPLOCARPUS FŒTIDUS, Salisb. Skunk Cabbage. Moist grounds of woods and fields many places. April.

ACORUS CALAMUS, L. Sweet Flag. Calamus. Plentiful many places. June.

LEMNACEÆ.—DUCKWEED FAMILY.

LEMNA MINOR, L. Duck-meat. A very small plant floating on the surface of stagnant waters. Very common.

POLYRRHIZA, L. Duck-meat. With the last. Very common.

WOLFFIA COLUMBIANA, Karsten. Wolffia. "The simplest and smallest of flowering plants."—Gray. The plant floating as little grains near the surface of stagnant water.

BRASILIENSIS, Weddell. Wolffia. With the last. Plentiful at places in the lake at Rome City.

TYPHACEÆ.—CAT-TAIL FAMILY.

TYPHA LATIFOLIA, L. Common Cat-tail or Reed-mace. Common. Swamps.

SPARGANUM EURYCARPUM, Engelen. Bur-reed. Along streams and ponds. Common.

SIMPLEX, Hudson. Bur-reed. Not so common as the last.

NAIADACEÆ.—PONDWEED FAMILY.

POTAMOGETON NATANS, L Pondweed. An immersed aquatic plant. Common in lakes and large streams.

CLAYTONII, Tuckerman. Pondweed. Common in lakes. Plant growing under water.

P. COMPRESSUS, L. Pondweed. Lakes. Common.

P. GRAMINENS, L. Pondweed. Lakes. Common.

ALISMACEÆ.—WATER-PLANTAIN FAMILY.

ALISMA PLANTAGO, L., VAR. AMERICANUM. Water Plantain. A common plant of pools and ditches.

SAGITTARIA VARIABILIS, Engelm. Arrow-head. A rather handsome plant of marshes, Common.

VARIABILDS, VAR. AUGUSTIFOLIA, Gray. At places in the western part of the county.

GRAMINEA, Michx. Growing in shallow water and mud. Not common.

HYDROCHARIDACEÆ.—FROG'S-BIT FAMILY.

ANACHARIS CANADENSIS, Planchon. Waterweed. Ditch Moss. Plant growing under water in ponds, streams, and lakes. Plentiful several places.

ORCHIDACEÆ.—ORCHIS FAMILY.

ORCHIS SPECTABILIS, L. Showy Orchis. Rich woods. Scarce. May.

HABENARIA VIRIDIS, R. Br., BRACTEATA. Reichenbach. Rein-Orchis. One specimen.

HOOKERI, Torr. Hooker's Orchis. Three specimens, the only ones that have been found in the State. June.

ORBICULATA, Torr. Great Green Orchis. A few specimens seen in rich woods of Allen Township. June.

LEUCOPHAEA, Gray. White-flowered Prairie Orchis. Common at Pleasant Lake, Noble Township. This plant has not been found at any other place in the State. July.

LACERA, R. Br. Ragged Fringed Orchis. Growing in tamarack marshes. Rather common. July.

PSYCODES, Gray. Purple Fringed Orchis. Low meadows and bogs. Scarce. July, August.

GOODYERA PUBESCENS, R. Br. Rattlesnake Plantain. Growing in oak woods. Scarce. August.

SPIRANTHES LATIFOLIA, Torr. Ladies' Tresses. A few specimens at Wible Lake, Wayne Township, the only ones that have been found in the State. June.

CERNUA, Richard. Ladies' Tresses. Plant growing with cranberry vines on the low shores of lakes. A few places in the county. Scarce. September.

GRACILIS, Bigelow. Ladies' Tresses. Two specimens. Section 15, York Township, August, 1892.

POGONIA OPHIOGLOSSOIDES, Nutt. Pogonia. Plant growing in cranberry marshes and on the low grounds along the Elkhart River in York Township. June. Plentiful.

PENDULA, Lindl. Pogonia Rich woods. Scarce. August.

CALOPOGON PULCHELLUS, R. Br. Calopogon. Grass Pink. Plentiful. June. Calopogon and Pogonia ophioglossoides are always found in the same locality.

LIPARIS LŒSELII, Richard. Tway-blade. A few specimens at one place in a tamarack marsh. Plant very rare. June.

CORALLORHIZA MULTIFLORA, Nutt. Coral-root. Dry woods. Not common. July, September.

APLECTRUM HYEMALE, Nutt. Putty-root. Adam-and-Eve. Rich woods. Scarce. May.

CYPRIPEDIUM PUBESCENS, Willd. Large Yellow Ladies' Slipper. Dry woods. Northern Wayne. Also of Orange, Green and York townships. Rather common. May, June.

SPECTABILE, Swartz. Showy Ladies' Slipper. Moist, shady places of tamarack swamps, bogs, etc. Scarce. Plant two feet high, very handsome, the most beautiful of the genus. June.

PARVIFLORUM, Salisb. Smaller, Yellow Ladies' Slipper. A few specimens in Birch Marsh, section 7, Jefferson Township, June, 1893.

ACAULE, Ait. Stemless Ladies' Slipper. "In a tamarack swamp in Noble County."—Editors of the Botanical Gazette, 1881.

The plants of the Orchis family are among the most interesting of our herbs. All are remarkable for their beauty, and especially for the curious structure of the flowers. Several of these here mentioned were once, probably, quite common; but the pasturing of the woodlands, and the draining of the low grounds, has nearly exterminated them.

AMARYLLIDACEÆ.—Amaryllis Family.

HYPOXYS ERECTA, L. Star-grass. Sandy shores of moist meadows of Sparta and York townships. Rare.

IRIDACEÆ.—Iris Family.

IRIS VERSICOLOR, L. Blue Flag. Wet places. Very common. May, June.

SISYRINCHIUM BERMUDIANA, L. Blue-eyed Grass. A handsome little wild flower, growing in moist meadows among grass. Plentiful, but not everywhere. June, July.

DIOSCOREACEÆ.—Yam Family.

DIOSCOREAVILLOSA, L. Wild Yam-root. In thickets along streams. Not rare.

SMILACEÆ.—Smilax Family.

SMILAX ROTUNDIFOLIA, L. Common Greenbriar. A shrubby, climbing plant armed with prickles. Thickets and fence rows. Common.

HISPIDA, Muhl. Hispid Greenbriar. Much like the last. Thickets along streams. Rather common.

HERBACEA, L. Carrion Flower. Plant not prickly. Not common.

LILIACEÆ.—Lily Family.

TRILLIUM SESSILE, L. Wakerobin. Woods. Common. May.

GRANDIFLORUM, Salisb. Large White Trillium or Wake-robin. Widely scattered, but quite abundant some places. Woods. June.

TRILLIUM RECURVATUM, Beck. Trillium. Rich woods. Sparta Township.

ERECTUM, L. Purple Trillium. Rich woods. Common. May.

MEDEOLA VIRGINICA, L. Indian Cucumber-root. Rich woods. Scarce. June.

TOFIELDIA GLUTINOSA, Willd. False Asphodel. Moist grounds along the Elkhart River in Orange Township. June, August.

UVULARIA GRANDIFLORA, Smith. Bellwort. Rich woods. Common. June.

PERFOLIATA, L. Bellwort. Rich woods. May.

SMILACINA RACEMOSA, Desf. False Spikenard. Woods and copses. Common. Plant flowering in June. Fruit, numerous pale red berries, speckled with purple. Ripe in August.

STELLATA, Desf. False Spikenard. Moist banks. Not common.

BIFOLIA, Ker. Two-leaved Solomon's Seal. A delicate little plant three to five inches high. Moist woods. Common. May.

POLYGONATUM BIFLORUM, Ell. Smaller Solomon's Seal. Woods. Common. May.

GIGANTEUM, Dietrich. Great Solomon's Seal. Western part of county. Plant growing in fence rows, open woods, etc. Not very common.

ASPARAGUS OFFICINALIS, L. Garden Asparagus. Cultivated in gardens, but rarely escaped into waste places.

LILIUM PHILADELPHICUM, L. Wild Orange-red Lily. A showy plant two feet high. Very plentiful in York and Sparta townships. June.

CANADENSE, L. Wild Yellow Lily. Generally distributed, but not abundant. July.

SUPERBURN, L. Turk's-cap Lily. Widely distributed, but not abundant. July.

ERYTHRONIUM AMERICANUM, Smith. Yellow Adder's Tongue. Woods. Common. April, May.

ALLIUM TRICOCCUM, Ait. Wild Leek. Rich woods. Common. June.

CERNUUM, Roth. Wild Onion. Seen at a few places in the western part of the county. Dry banks of open woodlands, etc. Scarce. July.

CANADENSE, Kalm. Wild Garlic. Rich woods. Common. June.

JUNCACEÆ.—Rush Family.

Luzula Campestris, DC. Wood Rush. Open woodlands. Common. May. A grass-like plant a foot high.

Juncus effusus, L. Common or Soft Rush. Low grounds. Very common.

tenuis, Willd. Rush. A wiry-stemmed plant, ten to fifteen inches high. Very common everywhere in moist grounds of fields, roadsides, yards, etc.

nodosus, L. Knotty-Leaved Rush. Plant a foot high, growing in swamps about lakes. Not common. August.

var. megacephalus, Torr. Knotty-Leaved Rush. Plant two feet high, growing on the moist shores of lakes. Not common. August.

Canadensis, J. Gray, var. longicaudatus, Engelm. Knotty-Leaved Rush. Plant two to four feet high, growing in cold peat bogs. Not common. September.

PONTEDERIACEÆ.—Pickerel-weed Family.

Pontederia cordata, L. Pickerel-weed. A showy herb, two feet high, bearing a single stemleaf and a spike of blue flowers. Plant growing in the shallow water of the muddy shores of lakes and ditches. Very plentiful at the lakes, section 30, Green Township. Sparingly at several other places, but mostly of the western part of the county. July, September.

Schollera graminea, Willd. Water Star-grass. A grass-like herb, growing wholly under water or on the muddy shores of lakes. Scarce. July, August.

COMMELINACEÆ.—Spiderwort Family.

Tradescantia Virginica, L. Common Spiderwort. Very plentiful in York and Sparta townships. June, July.

CYPERACEÆ.—Sedge Family.

Cyperus diandrus, L. Moist grounds. Common. August.

strigosus, L. Moist grounds. Common.

Dulichium spathaceum, Pers. Dulichium. Marshy grounds. Common. July, September.

ELEOCHARIS OBTUSA, Schultes. Spike Rush. Muddy places. Very common. June.

PALUSTRIS, R. Br. Spike Rush. Low grassy grounds about lakes. Not common.

TENUIS, Schultes. Spike Rush. Low moist meadows. Rather common. June.

ACICULARIS, R. Br. Spike Rush. Muddy shores of lakes. Scarce. August.

SCIRPUS PUNGENS, Vahl. Bulrush. Stems triangular, four feet high. Plant growing at places along the Elkhart River. Also at Eagle Lake, Sparta Township. July.

VALIDUS, Vahl. Great Bulrush. Very common. June.

FLUVIATILIS, Gray. River Club-rush. Common along the Elkhart River in York Township.

ATROVIRENS, Muhl. Borders of ponds and bogs. Common.

ERIOPHORUM, Michx. Wool-Grass. Plant four and five feet high. Moist place of fields and swamps. Very common. August.

ERIOPHORUM VIRGINICUM, L. Cotton-Grass. Bogs and low grounds about lakes. Rather common. July.

POLYSTACHYON, L. Cotton-Grass. Bogs. Rather common.

GRACILE, Koch. Cotton-Grass. Bogs. Not common.

RHYNCHOSPORA ALBA, Vahl. White Beak-Rush. Low grassy grounds of lakes. Not plentiful. August.

CLADIUM MARISCOIDES, Torr. Twig-Rush. Low grassy grounds of lakes. Rather common. July.

The above five plants are most plentiful in the western part of the county.

CAREX STEUDELII, Kunth. Sedge. Woods. Common. May.

VULPINOIDEA, Michx. Sedge. Common. June.

STIPATA, Muhl. Sedge. Common. June.

CEPHALOPHORA, Muhl. Sedge. Woods. Scarce. May.

ROSEA, Schk. Sedge. Woods. May.

TENELLA, Schk? Sedge. A very slender grass-like plant. Common in tamarack swamps.

STELLULATA, L. Sedge. Rather common. June.

LAGOPODIOIDES, Schk. Sedge. Moist places of fields and roadsides. Very common. July.

STRAMINEA, Schk. Sedge. Common. June.

SCOPARIA, Schk. Sedge. Not common.

CRINITA, Lam. Sedge. Common. May.

GRISEA, Wahl. Sedge. Scarce. May.

GRACILLIMA, Schew. Sedge. Open moist woodlands. Common. June.

PLANTAGINEA, Lam. Sedge. Moist woodlands. Common. May.

LAXIFLORA, Lam. Sedge. Open woodlands. Common. May.

VAR. STYLOFLEXA, Bott. Sedge. With the last. Common. May.

VAR. BLANDA, Carey. Sedge. With the last. Common. May.

VAR. LATIFOLIA, Bott. Sedge. With the last. Common. May.

HITCHCOCKIANA, Dew. Sedge. Woods. Common. May.

PENNSYLVANICA, Lam. Sedge. Not plentiful. Woods. May.

FLAVA, L. Sedge. "Noble County."—Editors Botanical Gazette.

ARISTATA, R. Br. Sedge. Moist open woodlands. Rather common. June.

COMOSA, Bott. Sedge. In swamps. Not plentiful. June.

PSEUDO-CYPERUS, L. Sedge. "Noble County."—Catalogue Indiana Plants.

HYSTRICINA, Willd. Sedge. Scarce. June.

TENTACULATA, Muhl. Sedge. Swamps. Not plentiful. June.

INTUMESCENS, Rudge. Sedge. Moist shady places of woods. Rather common. June.

GRAYII, Carey. Sedge. With the last. Rather common. June.

LUPULINA, Muhl. Sedge. Moist, open places. Very common. June, July.

STENOLEPIS, Torr. Sedge. Moist places. Common. July.

UTRICULATA, Bott. Sedge. Growing in swamps. Rather common. June.

TUCCERMANI, Bott? Sedge. Low places of woods. Rather common.

The Sedges are usually known as "wild grasses."

GRAMINEÆ.—GRASS FAMILY.

LEERSIA ORYZOIDES, Swartz. Rice Cut-Grass. Low wet places. Common. August.

ZIZANIA AQUATICA, L. Indian Rice. Water Oats. Plant six to nine feet high. Common along the Elkhart River in York Township. August.

ALOPECURUS ARISTULATUS, Michx. Wild Foxtail Grass. In water and wet places. A few specimens seen in Orange and Green townships. June. Rare in Indiana.

PHLEUM PRATENSE, L. Timothy. Cultivated for hay. Common everywhere.

AGROSTIS SCABRA, Willd. Hair Grass. Scarce.

VULGARIS, With. Red-top. Wet places. Common.

ALBA, L? White Bent-Grass. Scarce.

CINNA ARUNDINACEA, L. Wood Reed-Grass. Swamps. Not common. August.

MUHLENBERGIA DIFFUSA, Schreber. Drop-seed Grass. Rather common.

CALAMAGROTIS CANADENSIS, Beauv. Blue Joint-Grass. Wet grounds. Rather common.

SPARTINA CYNOSUROIDES, Willd. Fresh-water Cord-Grass. A few specimens seen in a marsh in Noble Township. Plant three to six feet high; leaves narrow, about one-half inch wide, and two to four feet long. Rare in Indiana. August.

DACTYLOCTENIUM ÆGYPTIACUM, Willd. Egyptian Grass. Fields and yards. Common.

ELEUSINE INDICA, Gærtn. Wire Grass. Common. Yards.

DACTYLIS GLOMERATA, L. Orchard Grass. Cultivated. Common.

EATONIA PENNSYLVANICA, Gray. Moist woods. Scarce.

GLYCERIA ELONGATA, Trin. Mana Grass. Moist woods. Scarce. July.

NERVATA, Trin. Fowl-Meadow Grass. Moist meadows. Common.

PALLIDA, Trin. Fowl-Meadow Grass. Common.

POA ANNUA, L. L. Low Spear-Grass. Very common.

COMPRESSA, L. Wire Grass. Common. July.

PRATENSIS, L. Blue Grass. Common. June.

FESTUCA ELATIOR, L. Meadow Fescue. Moist meadows. Common. June.

NUTANS, Willd. Meadow Fescue. Moist copses. Common. June.

BROMUS SECALINUS, L. Cheat or Chess. Too common in wheat fields.

RACEMOSUS, L. Upright Chess. In grainfields. Probably scarce.

CILIATUS, L. Wild Chess. Moist woods. Rather common. July.

PHRAGMITES COMMUNIS, Trin. Reed Grass. Very tall, ten to twelve feet high. Branches of the Elkhart River.

HORDEUM JUBATUM, L. Squirrel-tail Grass. A few specimens seen in the western part of the county. Rare in Indiana.

PANICUM CAPILLARE, L. Old-witch Grass. Sandy soil and cultivated fields in the northern and western part of county. Not abundant.

SANGUINALE, L. Finger-Grass. Cultivated grounds. Common.

LATIFOLIUM, L. Witch Grass. Thickets. July.

CRUS-GALLI, L. Barnyard Grass. Very Common. August, September.

SETARIA GLAUCA. Foxtail Grass. Common.

VIRIDIS. Green Foxtail Grass. Common.

CENCHRUS TRIBULOIDES, L. Bur Grass. Seen at few places on sandy soil, where it has probably been introduced. A troublesome weed.

ANDROPOGON FURCATUS, Muhl. Beard Grass. Sandy soil. Northern and western part of the county. August, September.

EQUISETACEÆ.—HORSE-TAIL FAMILY.

EQUISETUM ARVENSE, L. Common Horsetail. Moist sandy soil. Very common. April, May.

HYEMALE, L. Scouring Rush. Wet banks. Rather common.

FILICES.—FERNS.

POLYPODIUM VULGARE, L. Polypody Fern. A common plant of moist woods.

ADIANTUM PEDATUM, L. Maiden-hair Fern. Moist woods. Common. July, August.

PTERIS AQUILINA, L. Brake Fern. Scarce.

ASPLENIUM ANGUSTIFOLIUM, Michx. Spleenwort Fern. Moist woods. Rather common.

THELYPTEROIDES, Michx. Spleenwort Fern. Rich moist woods. Rather common.

FILIX-FŒMINA, Bernh. Spleenwort Fern. Rich moist woods. Rather common. July.

ASPIDIUM THELYPTERIS, Swartz. Wood Fern. Swamps. Rather common.

NOVEBORACENSE, Swartz. Wood Fern. Moist woods. Common. July.

ACROSTICHOIDES, Swartz. Wood Fern. Woods. Not common. July.

CYSTOPTERIS FRAGILIS, Bernh.? Bladder-Fern. Woods. Not common. July.

ONOCLEA SENSIBILIS, L. Sensitive Fern. Moist woods. Common. July.

OSMUNDA REGALIS, L. Flowering Fern. Found in Noble County. Catalogue Indiana Flora.

CLAYTONIANA, L. Flowering Fern.

CINNAMOMEA, Cinnamon Fern.

These three species grow in low, wet woods, and in swamps; and are the largest of the ferns. Specimens four to six feet in height are common.

BOTRYCHIUM VIRGINIUM, Swartz. Moonwort-Fern. Moist woods. Very common. June, July.

REPORT UPON THE GEOLOGY OF LAGRANGE COUNTY.

BY CHARLES R. DRYER.

The county of Lagrange was organized in 1832, and named from the country seat of Gen. LaFayette in France. It then included Noble County, which was separately organized in 1836, leaving in Lagrange 384 square miles. It is bounded on the north by St. Joseph County, Michigan; on the east by Steuben County, Indiana; on the south by Noble County, and on the west by Elkhart County. It comprises eight whole congressional townships and four fractional, being twenty-four miles long east and west, and nearly sixteen and one-fourth miles wide north and south. The civil and congressional townships are arranged as follows:

Civil Tp.	*Congressional Tp.*	*Range.*	*Sections.*
Van Buren	38	8	7–36
	38	9	7–9, 16–21, 28–33
Lima	38	9	10–15, 22–27, 34–36
	38	10	7–9, 16–21, 28–33
Greenfield	38	10	10–15, 22–27, 34–36
	38	11	7–36
Newbury	37	8	1–36
Clay	37	9	1–36
Bloomfield	37	10	1–36
Springfield	37	11	1–36
Eden	36	8	1–36
Clearspring	36	9	1–36
Johnson	36	10	1–36
Milford	36	11	1–36

Lagrange County is crossed north and south, near the center line, by the Grand Rapids & Indiana Railroad, passing through Wolcottville, Lagrange and Lima; by the Detroit and Chicago division of the Wabash, east and west, near the southern line, passing through south Milford, Wolcottville and Hawpatch, or Topeka, and by the Battle Creek and Goshen branch of the Lake Shore & Michigan Southern across the northwest corner, passing through Shipshewana. The population of the county in 1890 was 15,708, and of the town of Lagrange, the county seat, 1,790. Elevations are as follows:

Wolcottville	959	feet	A. T.
Valentine	973	"	"
Lagrange	927	"	"
Lima	897	"	"
State Line	889	"	"
U. S. Lake Survey Station, Sec. 4, Springfield Tp.	1,027	"	"
U. S. Lake Survey Station, Sec. 33, Tp. 38, R. 8	951	"	"

The general surface slopes gently to the north, except the lake region of Johnson Township, which is drained southward into the Elkhart River, the crest of the divide being near Valentine. The whole area is covered with drift from 100 to 200 feet or more in depth, which has rarely been penetrated to the bottom. It lies entirely upon the Saginaw side of the Saginaw–Erie interlobate moraine of Chamberlain, and contains no Erie drift, except, possibly, at the southeast corner. It is crossed by two terminal moraines of the Saginaw glacier, so that about one-half of the county presents a topography of a distinctly morainic character, but its outlines and distribution are so irregular as almost to defy description in words.

Milford Township lies upon the outer slope of the *fourth Erie moraine*, described in the report upon the geology of Noble County, in this volume, and exhibits strongly the characteristics of that moraine. It presents a succession of irregular hills and depressions, largely composed of sand and gravel, but with some areas of clay upon the uplands. Sections 6, 7, 17, 18 and 20 form a part of a level depression which here cuts into the moraine from the north. The valley of Turkey Creek, with Big Turkey*, Little Turkey and several small tributary lakes, crosses the northeastern portion. This valley is from one-half to one mile in width and about 100 feet below the hilltops. Parallel with the valley of Turkey Creek and tributary to it, in central Milford, lies a row of lakes, not a chain, because they have separate outlets, each completely surrounded by hills. The northermost, known as Clear or Pretty Lake, sections 15 and 16, approaches a circle in outline and covers 300 acres. Its basin forms a perfect washbowl eighty-three feet deep at the center, gradually shallowing to about seventy feet toward the shores in all directions, then rising rapidly to a wide shallow rim all around. The bottom is sand and gravel, and the water clear and free from vegetation except a few rushes. It is one of the clearest and most beautiful symmetrical lakes in Indiana. Long Lake in sections 22, 26 and 27, presents very different but equally attractive features. It is two miles long and nearly half a mile wide

* Big Turkey Lake is described in the 17th Report of the State Geologist, p. 127.

with some variations. Its depth is quite uniform varying from forty-five to sixty feet with a maximum of seventy-eight feet near the south end. The area of marsh is small and serves to give a pleasing undulation to its outline which is bounded for the most part by steep wooded slopes. In section 25, Milford, and 30, Salem, Steuben County, the Lake of the Woods is said to offer attractions fully equal to those just described, and the whole group, including several small ponds, exhibits a variety of beauty seldom found within so small an area.

Johnson Township is occupied in its eastern half by the main ridge of the Pigeon River terminal moraine, which parts from the interlobate in southeastern Johnson and southwestern Milford, and trends northward. It is a ridge of crumpled country, two to three miles in width, and rising to rounded summits in section 34. The western half of Johnson is occupied by a level depression which contains an interesting group of lakes. They are characterized by low, flat shores and extraordinary depth. Oliver and Olin Lakes, in sections 17, 18, 19 and 20, cover about 600 acres. The eastern half of Oliver gave soundings from 60 to 72 feet. On account of a very high wind it was impossible to examine the western half. Olin Lake, though much smaller, shows an equal general depth, with a maximum of 80 feet near the south end. Witmer Lake, in sections 32 and 33, about 300 acres, varies in depth from 40 to 56 feet. It is the head of a chain, of which the second is Westler, sections 29 and 30. It is one mile long and about one-eighth of a mile wide, an expansion and deepening of the channel of the Elkhart River. Its depth is 25 to 35 feet. Third Lake, section 30, is an irregular hole in the midst of an extensive marsh. No water was found less than 75 feet deep, and 96 feet was found within twenty rods of the inlet. The water is almost black, and its depth, in contrast with the absence of elevation around it, was somewhat startling. Dallas, a connected lake in section 25, Clearspring, was not visited. Atwood Lake, in section 31, Johnson, 250 acres, surrounded by moderately high hills, proved to be very shallow, from 20 to 30 feet. Contrasted with this, Adams Lake, sections 23, 24, 25 and 26, in the midst of the morainic ridge, covers 320 acres, and has an irregular bottom, the water varying in depth from 40 to 75 feet, with a maximum of 93 feet off the point of a box which projects from the north shore. Upper Adams Lake, in section 24, 25 acres in area, is said to be 65 feet deep. The Johnson Township lakes upset the supposed rule that lakes with high shores are relatively deep. No estimate of depth can be made from inspection of the surroundings, and a hole in a marsh may be deeper than a basin among the hills. These lakes form the head of the northernmost branch of the Elkhart River, the upper course of which is characterized by passage through very extensive marshes, and lakes of considerable depth in the midst of them.

Clearspring Township is considerably varied in topography. The south-eastern corner is occupied by the valley and marshes of the Elkhart River in sections 24, 25, 26, 35 and 36. An irregular outlying tract of moderately hilly moraine crosses the township from section 1 to section 32 and may be continued to connection with a similar tract in sections 8 and 9, Elkhart Township, Noble County. This tract is quite hilly on the east and gradually fades out westward in sections 19 and 30. On the Noble County line, in section 33, the so-called "Hogsback" is a curved ridge, thirty to forty feet high and half a mile long, composed of gravel with numerous large bowlders. Sections 2–9 and 16–19, Clearspring, form a part of the very level plain which occupies the whole of Eden Township.

Eden Township is the most uniform and monotomous portion of Lagrange County. To the eye it is apparently a dead level, broken only by the horseshoe-shaped "Big Marsh," which can now hardly be called a marsh, since it has been effectually drained and many farms are being carved out of its area The most interesting thing in the region is the "Hawpatch," a tract in sections 25, 26, 34, 35 and 36. It was originally covered with very heavy timber—walnut, sugar and elm. The trees were very high and the ground covered with flowers and blackhaw. The soil is a black loam, in strong contrast with the cold clay on the west of it, underlaid at a depth of thirty feet by a sheet of gravel. Surface drainage appears to be entirely wanting and unnecessary. For agriculture it is one of the most productive and valuable tracts in Indiana. To the geologist its origin is an interesting problem. How such a well-defined area of peculiar character in strong contrast with its surroundings came to exist, and what were the conditions of its formation, are questions which, in the present state of our knowledge, probably can not be answered. It resembles the prairies of northern Lagrange in everything except the presence of forest. Eden Township possesses but one lake, Eden Lake in section 1. It is nearly a mile long, narrow, said to be very deep, and is evidently a portion of an ancient drainage channel, now followed by the Little Elkhart River.

Newbury and Clay townships resemble each other in possessing a surface varied by the presence of the irregular terminal moraine before mentioned, which passes westward through central Clay and northern Newbury. The southern tier of sections in Clay and the southern two tiers in Newbury belong to the level plains of Eden and Clearspring. Sections 7–8 and 15–30, Clay, and 1–18, Newbury, are occupied by the moraine, which itself presents characters varying and inconstant from mile to mile, with frequent intervals of nearly level surface like that around Shipshewana, and groups of quite massive hills like those in sections 22, 27 and 28, Newbury. The southern border of the moraine in these townships is indefinite and elusive. When apparently reached small tracts of a faintly moranic character crop out unexpectedly beyond, so that attempts at its delimitation are unsatisfactory. The usual sag and swell topography degenerates into a sag and level, so that differentiation between ground moraine and terminal moraine, between material deposited by sub-glacial melting and material deposited at the edge of the ice, ceases to be practicable. The northern border of the moraine is bolder and more definite, extending from section 6, Clay, in a slightly curved line to the northern boundary of the town of Lagrange. Northeastern Clay is level and contains Hobb's marsh and a portion of Big marsh. Northern Newbury contains several lakes, of which Shipshewana, in section 4, is the largest. It covers about 200 acres and is very shallow, not more than ten feet of water being found.

Van Buren Township contains, in its western part, a tract of country which exhibits, in a striking manner, the capriciousness of the Saginaw glacier. Here, from some inconceivable cause, the glacier piled up a heap of sand and gravel knobs of the most tumultuous and impressive character, almost equaling the most rugged portions of the fourth Erie moraine in Steuben County. These knobs occupy sections 15–22 and 27–34, township 38, range 8, the highest and most massive ridge being just over the line in York Township, Elkhart County. The United States Lake Survey station in section 33 has an elevation of 951 feet. The county line divides the knobs into two nearly equal portions. Stone Lake, section 18, lies at the northern border of the knobs, being surrounded by them, except at the northeast side. It is clear, though shallow, with a sandy bottom. The deepest water found was 27 feet. The northern border of the knobs approaches the Michigan line in section 9, but trends away to the southeast in sections 15, 22, 26 and 35, township 38, range 8, and 1, Newbury. At the foot of the hills Big Marsh extends along this line for four or five miles Its width is from a quarter to a half mile, and it is now a wet meadow, with several islands of dry land. The remainder of Van Buren belongs to the northern plain, which will be described elsewhere.

Bloomfield Township contains, in its southwestern part, a strong portion of the terminal moraine, which covers sections 20–22 and 27–35 with hills popularly known as "the knobs," although they do not deserve the name in the same sense as the knobs of Van Buren. This portion of the moraine consists of a nearly continuous ridge trending north and south, with a fringe of foot hills on the west. Its culminating point is in section 22, where a massive ridge rises about 150 feet above the valley on the east and north, and marks an angle where the moraine turns sharply to the west. The remainder of the township belongs to the northern plain.

In southern *Springfield Township*, sections 25, 26 and 31–36 present the same characters as Milford, in a milder form, and belong to the interlobate moraine. A level depression a mile and a half wide extends from sections 31, Springfield, and 36, Bloomfield, to sections 19 and 20, Milford, dividing to that extent the terminal from the interlobate moraine.

The remainder of Lagrange County constitutes a base-level plain toward which nearly all the streams south of it flow. It covers the townships of Greenfield and Lima, the greater part of Springfield, the northern half of Bloomfield, the northeastern quarter of Clay and the eastern half of Van Buren. The plain itself slopes to the northwest, and is traversed by two streams roughly parallel to each other. Pigeon River and Fawn River, or Crooked Creek, rise in the large lakes of Steuben County and flow northwestward about forty miles to the St. Joseph. The course of Pigeon River is the more direct, that of the Fawn quite crooked. Five miles apart at the east line of the county, they approach within one mile near their exit into Michigan in Van Buren Township. The Pigeon has no tributaries on the north, and the Fawn none at all of any considerable length. The course of the Pigeon is roughly parallel with the northern face of the Saginaw terminal moraine, yet all its long tributaries rise on the other side of the moraine and cut directly across it. The surface of the Pigeon-Fawn plain is generally very smooth, but diversified by some remarkable features. A series of prairies lie between the two rivers, beginning with Jackson Prairie, in Jackson Township, Steuben County. English and Pretty prairies, in Greenfield, and Mongoquinong, in Lima, of four or five sections each, continue the series to the center line of Lagrange County. The spaces between them, even where narrow, display a recognizable morainic tendency. South of Pigeon River, in sections 20–22 and 27–29, Springfield, Brushy Prairie lies against the border of the moraine. Between the prairies and Fawn River a narrow belt of generally weak moraine forms part of a second Saginaw terminal. It crosses sections 16–18 and 20–26, township 38, range 11. It is less than two miles wide and attains its strongest development at the east end in sections 24 and 25. An isolated morainic outlier occurs near Mongo, in section 4, Springfield, where about one square mile is covered by a prominent hill upon which the U. S. Lake Survey established an observing station. The elevation here is 1027 feet A. T., the highest point in the county. A few lakes help to emphasize the tendency manifested even in the prairies to a sag and level topography.

Twin lakes, sections 23, 26 and 27, township 38, range 9, are about two miles west of Lima. The country between is level prairie with a soil of black loam, and resembles the Hawpatch.

North Twin Lake, section 23, about 200 acres, has an average depth of thirty to forty feet with a maximum of forty-three. South Twin, a little smaller, averages forty-five feet with a maximum of fifty. The surface of both is about thirty feet below the general level of the country.

The water is clear and of a delicate but decided apple green color, peculiar to these lakes, the cause of which is an interesting but unsolved problem. Cedar Lake, sections 21 and 22, township 38, range 10, resembles the twins in shape, size and shores, but is shallow, averaging not over eighteen feet with a maximum of twenty-four. Wall Lake, sections 24 and 25, township 38, range 11, lies in the edge of the Fawn River terminal moraine. On the west side the lake washes the foot of high morainic hills, the other shores being low. Its area is about 300 acres and its depth twenty-five feet with a maximum of thirty-two. It derives its name from a raised beach which bounds it on the hilly side. This beach is about eighty rods long, two or three feet higher than the ground immediately outside of it and six or eight feet above the present water level. The lake has been artificially lowered nearly that amount. The beach is at present covered with sand and not especially remarkable except for a length of about 100 feet where it cuts across a corner leaving a small marsh behind it. Here it is composed almost entirely of bowlders, some of a size too large to be handled. One upon the crest measures 2x2x3 feet. It has the appearance of an artificial wall, and is so regarded by the people of the vicinity. The fact that it forms a part and continuation of a natural and not very unusual beach structure, and the impossibility of conjecturing any reason why men should ever have expended considerable labor in building a hundred feet of beach line to cut off a corner of a lake a few rods in area, render the hypothesis of its human origin highly improbable. At one end of the wall, and continuing it at the same level, there is a terrace cut into a spur of the hills, where the ground is seen to be full of bowlders. It is necessary only to suppose that the waves and ice of the lake transported bowlders a distance of one or two hundred feet to account for the wall by the action of natural agencies. The raised beach occurs only upon the west side, because there the materials were present and the conditions as to high country behind were favorable. Similar raised beaches on a smaller scale were observed at Pretty Lake and at Blackman's Lake, section 29, Milford.

The prominent features of Lagrange County may be summarized as follows:

The Saginaw-Erie interlobate moraine crosses the southeast corner of the county, occupying the greater portion of Milford Township, and presenting the usual pronounced and striking characters of that moraine as described in the reports upon the geology of Whitley, Noble, Dekalb and Steuben counties.

The Pigeon River Saginaw terminal moraine branches from the interlobate in southeastern Johnson and trends northward to central Bloomfield. This portion of it consists of an irregular ridge from two to three miles wide, and attaining its highest elevation at the northern end. From southwestern Bloomfield it turns sharply to the west and northwest through central Clay and northern Newbury, its width remaining about the same. In this portion its characters are subdued and inconstant, varying from sag and swell to sag and level topography. It offers no obstruction to the course of streams, Fly Creek, in Bloomfield, Buck Creek, in Clay, and Shipshewana Creek, in Newbury, cutting directly through it in their northward course to Pigeon River. In western Van Buren and in York Township, Elkhart County, this moraine changes its character and displays a tract of hills and knobs, about twenty square miles in area, which, for tumultuous ruggedness and irregularity, are scarcely surpassed in Indiana. The northern and eastern borders of the Pigeon River moraine are bold and well defined, while its southern and western borders display an extremely irregular apron or fringe, where differentiation and delimitation of ground moraine from terminal moraine prove elusive and baffling. A clearly recognizable tract of terminal moraine, however, extends from the southwest corner of Bloomfield through central Clearspring to the south line of the county.

The lake region of Johnson Township is a level interval, which lies between the above described tract and the main ridge of the moraine on the east, and opens southward into the valley of the north fork of the Elkhart River in Noble County.

The southwestern plain includes Eden and adjoining portions of Clearspring, Clay and Newbury, and is drained by the Little Elkhart River.

The northern plain includes the remaining third of the county. It is traversed lengthwise through its centre by Pigeon River, which drains about three-fourths of the county. This region is characterized by a belt of beautiful prairies.

The Fawn River Saginaw Terminal Moraine crosses the northeast corner of the county. It is about two miles wide, distinct but feeble, except around Wall Lake.

The lakes are not so numerous as in adjoining counties, but are unusually varied and interesting in character. Those of Milford are among the finest typical specimens of morainic lakes. Those of Johnson include three or four which belong to a distinct species. Although their basins occur in a level morainic interval, their phenominal depth defies prediction and upsets all general principles. Stone Lake and Wall Lake are very similar in situation and character, and although twenty-four miles apart, are as much alike as the Twin lakes. The latter again are unlike all others, and present a combination of peculiarities which deserves farther study.

The prevailing soil of Lagrange County is a sandy loam, varied by gravel and gravelly clay. The clay areas occur chiefly in Milford, Bloomfield, Clay, Newbury, Johnson and Eden. About one-half the county was originally oak openings which occupied the plains and mild morainic areas. The relation of heavy timber to soil presents an interesting problem which would require a long and patient investigation into the original condition, surface deposits and underlying strata over a wide area. This would include also the question of the origin of prairies. The causes and conditions which determined the persistence of small, isolated, treeless tracts, which are not marshy, and differ very little in appearance from the timbered country around them, are far from obvious.

The following sections of wells bored within the limits of the town of Lagrange for a public water supply, show the usual irregular alternation of sand, gravel and clay. The occurrence of yellow clay and gravel at various depths testifies to the extent to which the material has been disturbed and redistributed since its glacial deposition, exposed and oxidized strata having been subsequently overlaid by eighty to one hundred feet of unoxidized strata. The four wells are all within the area of an ordinary town lot, yet the majority of strata can not be correlated in any two of them.

I.

Soil	7	feet.	Gravel	1	feet.
Gravel	12	"	Blue clay	0.5	"
Gravelly hardpan	11	"	Gravel	5	"
Blue clay	16	"	Blue clay	3	"
Gravel	2	"	Yellow clay	0.5	"
Blue clay	5	"	Yellow gravel	10	"
Gravel	2	"			
Blue clay	5	"		92	feet.
Hardpan	12	"			

II.

Soil	4	feet.	Blue clay	15	feet.
Fine sand	6	"	Yellow sand	4	"
Gravel	10	"	Gravelly clay	15	"
Blue clay	20	"	Gray gravel	5	"
Gravel	5	"	Yellow gravel	12	"
Blue clay	1	"			
Fine sand and muck	5	"		102	feet.

III.

Soil	4	feet.	Yellow sand	2	feet.
Fine sand	5	"	Blue clay	7	"
Gravel	9	"	Hardpan	5	"
Blue clay	3	"	Gravelly clay	3	"
Yellow clay	9	"	Blue clay	10	"
Yellow gravel	2	"	Hardpan	10	"
Yellow clay	1	"	Yellow gravel	13	"
Gravel	3	"			
Blue clay	12	"		98	feet.

IV.

Soil	2 feet.	Hardpan	7 feet.
Fine sand	2 "	Gray sand	3 "
Yellow clay	12 "	Gravelly clay	26 "
Blue clay	2 "	Hardpan	13 "
Greenish sand	8 "	Yellow gravel	13 "
Yellow clay	10 "		
Gravel	10 "		111 feet.
Blue clay	3 "		

The occurrence of bituminous coal in the drift of Indiana is not very unusual in the form of water worn fragments; nor is it specially remarkable since a large mass of the drift was carried across the Michigan coal fields, and the glacier could hardly avoid picking up bowlders of coal, some of which might escape destruction. The occurrence of genuine anthracite coal is quite a different phenomenon, and, as far as the writer is informed, is now for the first time reported. In 1890 Mr. Warren Carpenter sunk a well upon his farm in section 33, township 36, range 8, near Hawpatch, and, at a depth of 76 feet, bored through a mass of coal three and one-half or four feet thick. It was overlaid by clay and underlaid by gravel. A boring upon a neighboring farm struck black slate at 150 feet. In 1893 he made another boring about fifty feet from the first, and at the same depth found a few small fragments of coal. The second well was sunk to a depth of 105 feet without any result of importance. Mr. William Haller, in section 28, a quarter of a mile north of Carpenter's, found fragments of coal in his well at a depth of 80 feet. Specimens of the coal furnished by Carpenter, upon analysis, show the following composition:

Volatile matter	10.43
Fixed carbon	80.97
Ash	8.60
	100.00

They have the hardness, lustre and fracture of genuine anthracite. The difficulty of accounting for its presence in such a position suggested the suspicion of fraud; but a careful examination of all the circumstances, the testimony of several intelligent and disinterested witnesses, and more than all, the conversation of Mr. Carpenter himself, convinced the writer that the theory of fraud must be abandoned. He has no other to offer in its place, but trusts that future discovery may throw light upon this apparently inexplicable phenomenon.

The wealth of Lagrange County depends almost entirely upon its varied and, in many localities, unusually fertile soil. One other industry, however, is worthy of note as depending upon its economic geology. About three miles north of Wolcottville, in section 21, Johnson, Mr. F. E.

Dickinson is working a stratum of clay of somewhat peculiar qualities. It crops out beneath a few feet of sandy loam, and is from two to sixteen feet thick. The upper portion burns to the ordinary red color and is easily fused. The lower portion at successively higher temperatures passes through pink and delicate cream to a yellowish green color, and is not readily fused. The capacity of his factory is $3,500 worth of drain tile per season, and 20,000 common brick and 10,000 pressed brick per day. The common brick are very durable for outside work. The pressed brick are fine in finish, and their delicate tints render them very desirable for veneering, fire-places, and ornamental work of all kinds.

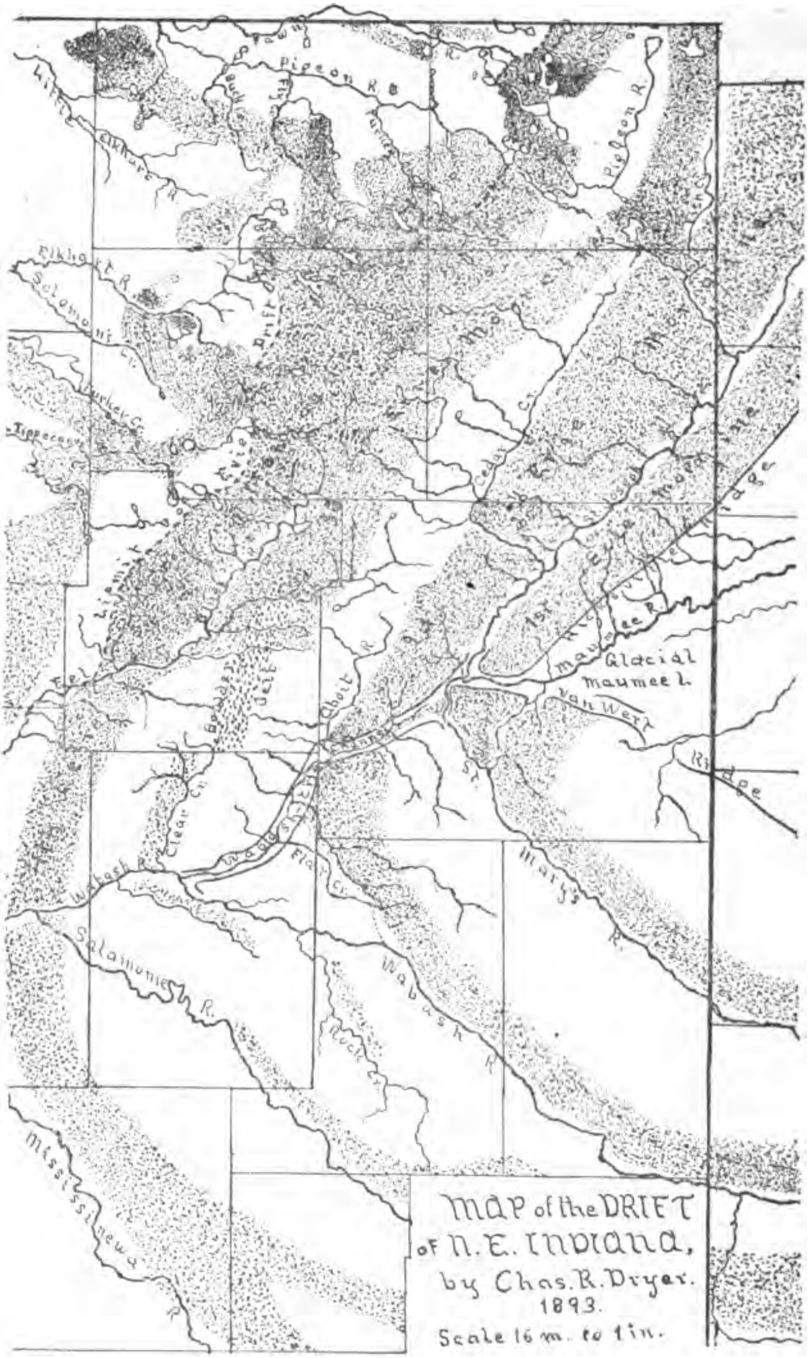
THE DRIFT OF THE WABASH-ERIE REGION—A SUMMARY OF RESULTS.

BY CHARLES R. DRYER.

The Wabash-Erie Region is a part of that shallow trough which continues the basin of Lake Erie southwestward across Ohio and Indiana. Along the axis of the trough extends one uninterrupted river channel, occupied, however, by different streams; from Lake Erie to Fort Wayne by the Maumee, thence for about twenty miles by a marsh known as the Little River prairie; thence by the Little Wabash River to its junction with the main stream below Huntington; and thence by the latter river. Down the sides of the trough nine streams of considerable size flow toward the central axis, arranged opposite each other, the Auglaize and the Tiffin, the St. Mary's and the St. Joseph, the Upper Wabash and the Aboit, the Salimonie and the Mississinewa opposite the Eel. Those upon the southern side occur at regular intervals and flow in symmetrical curves parallel with the southwest shore of Lake Erie. The drainage system as a whole is sagitate resembling an arrow with a four-barbed head. The general course of these tributaries is toward the western end of the trough and according to hydrographical precedents all ought to be tributaries of the Wabash, yet four are on the eastern side of the divide and turn back upon themselves in a remarkable manner. The St. Mary's, after flowing northward sixty miles, and the St. Joseph, after flowing southwestward eighty miles, unite to form the Maumee, which then turns abruptly to the northeast, so that in a course of ten miles the waters of the St. Joseph suffer a change in direction of more than 160 degrees. The behavior of these rivers is sufficiently peculiar to attract the attention of the casual observer of the map.

In the Report of Progress of the Geological Survey of Ohio for 1870, John H. Klippart has a chapter upon the Maumee Valley, in which he attributes the deflection of these rivers to the lake ridges or old shore lines of Lake Erie, which had then just been consecutively traced.

At the meeting of the American Association for the Advancement of Science at Dubuque, in August, 1872, Mr. N. H. Winchell read an



Moraines are represented by shading graduated according to their strength. State and county lines only are shown, and may be identified by comparison with a larger map of Indiana.

elaborate paper upon the Surface Geology of Northwestern Ohio (Proceedings of A. A. A. S., Vol. 21, page 152), in which he described six ridges between the west end of Lake Erie and the Indiana State line, and supposes them all to be moraines of recession made by a glacier which filled and passed up the St. Lawrence Valley across Northern Ohio into Indiana. He describes minutely the St. John's Ridge in Auglaize County, Ohio; the Wabash Ridge from Mercer County east to Crawford County; the St. Mary's Ridge along the east banks of the St. Mary's and St. Joseph Rivers; the Van Wert Ridge inside the St. Mary's and parallel with it; the Blanchard Ridge along the east banks of the Blanchard-Auglaize and Tiffin rivers, and the Belmore Ridge inside of and parallel with the Blanchard.

In the seasons of 1869 and 1870, Mr. G. K. Gilbert located these ridges north of the Maumee River, described two of them in the American Journal of Science and Arts for May, 1871, and in his report upon the Surface Geology of the Maumee Valley, (Geological Survey of Ohio, Geology, Vol. 1, page 572), published in 1873, clearly distinguishes two classes of ridges; lake beaches represented by the Belmore and Van Wert ridges, and moraines. Of the St. Mary's ridge he says: "I conceive that this ridge is the superficial representation of a terminal glacial moraine that rests directly on the rock bed and is covered by a heavy sheet of Erie clay, a subsequent aqueous and ice-berg deposit."

In this interpretation the sagacity of Mr. Gilbert recognized the existence of one of the most obscure moraines in the then unknown morainic belt of North America, and furnished a key to the structure of the Wabash-Erie region which subsequent observers have had only to apply. The moraines of the Maumee Valley were among the first to be recognized upon this continent, the work of Gilbert and Winchell antedating that of Chamberlain upon the kettle moraine of Wisconsin, of Upham upon the moraines of Minnesota and Iowa, of Cook in New Jersey, and of Lewis and Wright in Pennsylvania, Southern Ohio, and Indiana.

In the same report Gilbert describes the upper lake beach known as Van Wert ridge, and the prolongation of its two wings to form the Wabash-Erie channel from New Haven to Huntington, "through which the great Lake basin discharged its surplus waters southwestward into the valley of the Wabash."

The Third Annual Report of the United States Geological Survey, 1881–2, contains the report of T. C. Chamberlain upon the Terminal Moraine of the Second Glacial Epoch, in which what was then supposed to be the outer morainic belt is described and mapped from New Jersey to Dakota, and the hitherto isolated moraines of the Maumee Valley were brought into correlation with the general system.

Such was the state of knowledge when the writer took up the work in 1886, first in Allen County. In that year a careful examination of the

Wabash-Erie channel was made from New Haven to Huntington and the conclusion reached that the channel cuts through at least two moraines. The Wabash ridge was located along the right bank of the St. Joseph River extending to the mouth of the Aboit and the southwestern corner of Allen County. A map was made upon which were placed all the then described moraines of the Wabash-Erie region, including two ridges in Jay County, described by G. S. McCaslin in the Twelfth Report of the State Geologist of Indiana, the levels of the G. R. & I. R. R. from Fort Wayne to Ridgeville and of the F. W. C. & L. R. R. from Fort Wayne to Muncie were noted, and a working hypothesis formed that the courses and parallelism of the St. Mary's, the upper Wabash, the Salimonie the Mississinewa are due to the parallelism of four terminal moraines of the Erie glacier, the northern wings of which are crowded together in Huntington, Whitley, Allen, Dekalb, Noble and Steuben counties. This map was shown and hypothesis stated at the meeting of the Indiana Academy of Science in December, 1886.

In 1887 and '88 the work was continued under the direction of Maurice Thompson, then State Geologist, and was the first geological work done officially by the State upon the great drift region of Northern Indiana, the areas of Allen and Dekalb counties were surveyed and reports submitted which appear in the Sixteenth Report of the State Geologist. In 1889 the work was continued and completed in Whitley and Steuben counties, reports of which appeared in the Seventeenth Report of the State Geologist. In 1890, '91 and '92 some observations were made in Noble and Huntington counties. In 1893 the survey of Noble and Lagrange counties was completed.

In 1889 Mr. Frank Leverett, of the U. S. Geological Survey, examined and mapped the moraines of Northern Indiana. In January, 1890, the writer submitted to him a map showing the moraines as he found them. Mr. Leverett returned the map with additions and comments. Since that time the writer has been indebted to Mr. Leverett for valuable information and suggestions conveyed by correspondence and personal interview. In many instances his general knowledge of a wide area and the writer's minute knowledge of a limited area have happily supplemented each other.

The general result has been to confirm the working hypothesis adopted at the beginning. Four Erie moraines have been distinguished and correlated in Northeastern Indiana, and their relation to the Saginaw moraines determined. They have been named from the rivers along which they lie wholly or in part, and numbered first, second, third and fourth, westward from the St. Mary's, the first one distinguished by Gilbert more than twenty years ago.

The Van Wert Ridge of Gilbert and Winchell is not a moraine, but a former shore line of a glacial lake. It marks the highest level at which the glacial waters of the Erie basin ever stood long enough to form a beach. Its elevation in Indiana is about 220 feet above the present level of Lake Erie. It enters Indiana in the northeast corner of Monroe Township, Allen County, and at the northeast corner of Allen County, the two wings converging to a point four miles east of Fort Wayne, where they do not meet, but turn westward, forming the banks of the Wabash-Erie channel. This channel, with a width varying from a half to one mile, passes from Fort Wayne southwestward to Huntington, and formerly carried the waters of the Erie basin and the St. Joseph and St. Mary's rivers to the Wabash. The height of the present bank on either side varies from forty to one hundred feet. The Van Wert Ridge is double in southern Allen County and, according to Gilbert, in northwestern Ohio, but the complete relations of the two members have not been worked out.* The body of water which formed these ridges has been called by the writer the Maumee Lake. It probably never occupied any part of the present basin of Lake Erie, which was then filled with ice. Its eastern boundary was the ice-foot when it stood along the line of the Blanchard moraine. The lake occupied an arrow-head shaped space, with its point at New Haven, the extremities of its barbs at Adrian, Michigan, and Findlay, Ohio, and the bottom of its notch at Defiance. It was an inter-morainic lake with an area of 800 or 1,000 square miles, and a maximum depth near Emerald, Ohio, of sixty feet.

The St. Mary's and St. Joseph, or First Erie Moraine, the St. Mary's Ridge of Gilbert & Winchell, enters Indiana in the northeastern part of Adams County, and follows closely the east banks of the St. Mary's and St. Joseph rivers to the northeast corner of Williams County, Ohio. In Adams and southern Allen it is perceptible only upon the map by its influence upon the course of streams. "It is like a dead wave upon the surface of the ocean, hardly perceptible to the eye on account of its smoothness, but revealed by its effect upon everything that encounters it." Its inner slope is gentle, its outer more abrupt. It is apparently composed of bowlder clay and its crest is about eighty feet above the level of the river. In Wayne Township, Allen County, it becomes rolling and bluffy, and is bordered by an extensive series of kames or eskers extending westward into the Wabash-Erie channel. In Adams Township it is cut by an old channel of the St. Mary's River, which emptied into the Maumee Lake at New Haven. In Northern Allen it is more strongly defined, has a width of four or five miles, and is bordered by the Van Wert Ridge. Its elevation is 800 feet A. T. at its apex at Fort Wayne, and rises to 900 feet at its extremities in Ohio.

The Wabash-Aboit, or Second Erie Moraine, the continuation of the Wabash ridge of Winchell, enters Indiana at the southeast corner of

*Leverett On the Correlation of Maraines with Raised Beaches of Lake Erie, Am. Journ. of Science, April, 1892.

Adams County and follows the right bank of the Wabash River to Lancaster Township, Wells County, where the present river bends to the west, but an old channel of the Wabash, now occupied in part by Flat Creek, follows the outer face of the moraine to the Wabash–Erie channel at the north line of Union Township, Huntington County. The outer border of the moraine in northern Wells is a line of bluffs fifty to seventy feet high. The moraine widens in Lafayette Township, Allen County, and rises to a level of more than 100 feet above the Wabash–Erie channel. On the north side of that channel, its outer face is marked by the valley of the Aboit River and the Eel River marshes in Lake and Eel River townships. It increases in width to the northeast, from five miles in Allen to eight in Dekalb, and occupies the space between the St. Joseph River and Cedar Creek. Cedar Creek, Fish Creek and other tributaries of the St. Joseph follow the outer face of the moraine for ten or more miles, then, turning at a right angle, cut directly through it to the St. Joseph. The gorge of Cedar Creek is fifty to 100 feet deep and 800 to 1,000 feet wide; that of Fish Creek of smaller dimensions. The moraine is a broad, rolling table land, its general crest-level about 100 feet above the St. Joseph and fifty feet above the interval on the west. The chief material is gravelly clay, but more of sand and gravel appear upon its surface than upon the first moraine, which it resembles, except in being more massive Its elevation increases from 870 feet at its apex to 1,000 feet in Southern Michigan and 950 feet in Hardin County, Ohio.

The first and second moraines are well-defined ridges, but present only occasional evidences of the peculiar topography usually regarded as characteristic of terminal moraines. Hills, knobs, kames, kettle holes and lakes are chiefly conspicuous by their absence.

The valley of the St. Joseph River, about half a mile wide, is hemmed in between the first and second moraines. It is marked by frequent kame-like dunes and by terraces twenty to thirty feet above the present river level, corresponding to the summit-level of the Wabash–Erie channel. The river was once a much larger stream, flowing at a higher level, being, in fact, the Upper Wabash, which the outlet of the Maumee Lake joined at Fort Wayne.

The Salimonie, or Third Erie Moraine, the continuation of the St. John's ridge of Winchell, lies along the right bank of the Salimonie River in Jay, Wells and Huntington counties. Compared with the other moraines, it is weak, diffused and inconstant in character. In Huntington County, it is broken up into several narrow strips; in southern Whitley, it is represented by a mild bowlder belt. Its northern wing extends through northeastern Whitley, northwestern Allen, southeastern Noble, northwestern Dekalb and eastern Steuben counties. It is separated from the second moraine by an interval of three miles, and from the fourth by the valley of Blue River in Whitley and Upper Pigeon River in Steuben. In Noble and Dekalb the third and fourth moraines are contiguous and partially coalescent, but the former is distinguishable by its lower level and milder topography. Its elevation varies from 800 feet in Huntington County to 1,073 feet at the Michigan line, and 1,063 feet at St. John's, Ohio. Its width varies from 4 to 6 miles.

The Mississinewa, or Fourth Erie Moraine, enters Indiana in the southern part of Jay County, follows the right bank of the Mississinewa River to Wabash County, passes through eastern Wabash, western Whitley, eastern Noble, northwestern Dekalb and western Steuben. In Whitley it is bordered on the west by a level interval; in Noble, Lagrange and Steuben, by an irregular fringe of Saginaw drift. It is joined by five terminal moraines of the Saginaw glacier. North of Wabash County it is 6 to 8 miles wide, and of the most rugged and massive character, rising to a climax of elevation and ruggedness in northern Steuben. It is cut by the valley of the Wabash at LaGro; the valley of Eel River in Whitley, and the valleys of Turkey Creek, Pigeon River and Fawn River in Steuben. Its elevation varies from 700 feet at LaGro to 1,200 in northern Steuben and 1,050 in southern Jay. In Noble County it has a vertical thickness of nearly 500 feet.

The approximate limit of Erie drift can be traced from the northeast corner of Wabash County through South Whitley, Larwill, the foot of Crooked Lake in Noble County, Albion, Brimfield, Rome City, Tamarack, Hogback, Grass and Gage lakes to a point near the middle of the north line of Steuben County.

The four Erie moraines show progressively a change of form from sagittate to crescentic, a depression of their apices, an elevation of their extremities, a crowding together of their northern wings and a shifting of their apices southward. Most of these phenomena are the result of the obstruction offered by the Saginaw glacier, which, though comparatively feeble, had pre-occupied the country north of the Wabash River. The northern curve of the extremity of Erie lobe impinged against the side of the Saginaw lobe, hence the Saginaw-Erie interlobate moraine of Chamberlain is interlobate or lateral only with reference to the Saginaw lobe, but strictly terminal with reference to the Erie lobe, and by far the greater part of its bulk was contributed by the latter.

The less massive Saginaw glacier retreated first and left the country open for free and rapid drainage from the melting Erie ice, which for a long time continued to occupy its bed, and to discharge drift-laden streams into the present valleys of the St. Joseph of Lake Michigan and the Kankakee. Thus the material upon the Saginaw side was extensively washed and redistributed, many original features were obliterated by removal or burial and a system of deep channels established which were subsequently partially filled. After the ice had retreated to the line of the second moraine, drainage was through Cedar Creek and the Aboit and Eel rivers into the Wabash. During the formation of the first moraine the St. Joseph-Wabash channel was opened, into which the St. Mary's emptied. The gorge of Cedar Creek probably at first transmitted water westward until the filling up of the interval between the second and third moraines and the opening of the St. Joseph channel reversed the current. Out of the present Maumee basin there was no drainage until the ice began its retreat from the St. Mary's moraine leaving behind the growing Maumee Lake, which found an outlet into the St. Joseph. The Erie glacier advanced up hill and during the whole period of retreat from the fourth moraine, the waters, failing to find adequate outlet, were set back under the ice, establishing conditions favorable to the deposition of sub-glacial and lacustrine clays, the Erie clay of Logan.

The advance of the Erie ice into that part of Indiana north of the Wabash-Erie channel was marked by a prolonged period of obstruction, struggle and confusion, followed by a slow and disorderly retreat. In the region south of that channel each step was taken with good order and precision. A periodic retreat of fifteen miles, the building of a morainic breastwork in front of its outer line, and the establishment of a drainage channel along the outer face of the moraine were four times repeated. Hence the symmetrical parallelism of the southern tributaries of the Wabash. As soon as ice and water had retreated to the present basin of Lake Erie the Maumee River came into existence and attained its maturity by the piratical appropriation from the Wabash of the St. Mary's and St. Joseph.

The work of the Saginaw glacier, so far as it can now be distinguished in Noble and Lagrange counties, was feeble, fitful and capricious. Besides its comparatively trifling contribution to the interlobate moraine, it has left vestiges of four or five terminal moraines, broken and irregular in their course, and characterized by diffused aprons and fringes, isolated outliers and local developments of unaccountable magnitude and strength. The glacial invasion of northeastern Indiana is a story of advance in double but unequal columns, of prolonged struggle between them, of defeat and evacuation on the part of the weaker forces and of deliberate but final retreat of the stronger from the field of battle.

REPORT OF INSPECTOR OF MINES.

OFFICE OF THE INSPECTOR OF MINES,
BRAZIL, IND., March 10, 1893.

Hon. S. S. Gorby, State Geologist, Indianapolis, Ind.:

SIR—I herewith transmit my report as Inspector of Mines for calendar year 1892. Also report of Assistant Inspector of Mines.

Respectfully,

THOMAS McQUADE,
Inspector of Mines Indiana.

REPORT OF INSPECTOR OF MINES.

In beginning this report, it is deemed proper to state that the division of territory (spoken of in my last report), giving the Assistant Inspector immediate supervision over the coal producing counties in the southwestern part of our territory was continued up to the present time. I am more than ever convinced that in making this division a step in the right direction was taken to enable the Inspector and assistant to be convenient to the mines in all parts of the State at all times, thus enabling the miners to frequently see the men who are appointed for their protection, and at the same time enabling the officers to reach any mine in the State promptly.

This report is for the full calendar year 1892, and is different from the time previous reports were made, as all prior reports were made up to the year ending October 31. The time of beginning and ending reports was changed so our mine reports would correspond with the exact time the report is presumed to cover. This change was made easy this year because a strike in the mines took place on November 1, 1891, that extended over the entire State and lasted until the latter part of December. In speaking of strikes let me say here, that strikes are a thing to be avoided by all. They seem to be unavoidable at times, but they can and should be a thing of the past. There is in them an element of brute force that does naught but injure all the participants.

The condition of the trade this year has been very good. The demand for coal throughout the entire year was first class. In this connection I can produce no more effective argument to prove the condition of trade than the following tabulated statement taken from the monthly reports made by operators to this office.

COAL PRODUCTION BY COUNTIES, 1892.

COUNTIES.	Total Tons of Screened Coal Produced.	Total Tons of Mine Run Coal Produced.	Total Tons of Slack Produced.	Total Tons Produced as Per Reports on File for 1892.	Estimated Total Tons Produced for 1892 by Mines not Reported.	Total Production of Coal for 1892.
Clay	1,216,164	41,131	264,076	1,521,371	6,000	1,527,371
Parke	322,514	50,322	101,810	474,646	5,040	479,686
Vermillion	235,124	24,012	80,571	339,707	5,325	345,032
Vigo	246,108	35,865	90,689	372,662	9,600	382,262
Fountain	1,049	10,753	430	22.232	9,450	31,682
Owen	33,058	.....	11,945	45,003	2,620	47,623
Warren	...	.....	...	.....	2,880	2,880
Perry	5,516	32,448	2,232	40,196	8,000	48,196
Vanderburgh	65,508	62,232	23,330	151,070	......	151,070
Warrick	10,000	5,600	3,320	18,920	6,400	25,320
Pike	27,168	108,132	......	135,300	5,400	140,700
Greene	.....	325,408	......	325,408	3,000	328,408
Gibson	..	36,000	..	36,000	1,025	37,025
Daviess	159,640	95,720	36,000	291,360	1,600	292,960
Knox	12,288	21,960	8,232	42,480	2,400	44,880
Sullivan	287,604	250,200	46,272	584,076	6,300	590,376
Spencer	2,640	4,200	1,200	8,040	4,200	12,240
Dubois	......	......	......	......	5,600	5,600
Martin	.....	.....	.....	......	1,500	1,500
Total	2,624,381	1,103,983	670,107	4,408,471	86,340	4,494,811

This shows the amount actually reported is 4,408,471 tons. The amount estimated as the production of the small mines, from which no reports are received, is 86,340 tons, making a grand total of 4,494,811 tons of 2,000 pounds. This shows an increase over last year of 675,211 tons, and credits 1892 with the greatest production of coal ever mined in one year. Below is given a table showing the number of persons working in and around the mines, as per monthly reports. Also the estimated number of persons working in and around the small mines, from which no monthly reports are received, the total number being 7,600 against 6,975 reported last year, showing an increase of 625 men over last year.

NUMBER MEN EMPLOYED BY COUNTIES.

COUNTIES.	Total No. of persons employed inside for 1892, averaged.	Total No. of persons employed outside for 1892, averaged.	Total No. pers'ns employed for 1892, shown by reports on file.	Estimated total No. of persons employed for 1892, not rep't'd	Total No. of persons employed for 1892.
Clay	2,543	208	2,751	75	2,826
Parke	565	80	645	28	673
Vermillion	417	65	482	25	507
Vigo	421	43	464	40	504
Fountain	40	6	46	35	81
Owen	70	5	75	15	90
Warren	.....	.....	.....	24	24
Perry	78	7	85	40	125
Vanderburgh	221	46	267	.....	267
Warrick	71	20	91	80	171
Pike	205	35	240	30	270
Greene	387	49	436	10	446
Gibson	75	3	78	5	83
Daviess	410	44	454	40	494
Knox	81	17	98	12	110
Sullivan	675	122	797	30	827
Spencer	20	2	22	35	57
Dubois	.....	.....	.....	35	35
Martin	.....	.....	.....	10	10
Total	6,279	752	7,031	569	7,600

List of fatal accidents which occurred in the Northern District during 1892:

January 12, 1892. Thomas Dewyre, killed by descending cage in Columbia mine, owned by Zeller & Sigler, in Clay County.

January 26, 1892. Henry Perkins, killed by fall of slate in Gartside mine, owned by Watson, Little & Co., in Clay County.

January 30, 1892. Wright Kay, killed while returning to shot that he was trying to fire in Diamond mine, owned by Coal Bluff Co., in Vigo County.

February 5, 1892. Noah Shafer, killed by fall of slate in No. 3 mine, owned by Brazil Block Coal Co., in Clay County.

April 15, 1892. Robert Neel, killed by fall of slate in No. 6 mine, owned by Brazil Block Coal Co., in Clay County.

May 1, 1892. Henry Lloyd, killed by fall of slate in No. 6 mine, owned by Parke County Coal Co., in Parke County.

May 13, 1892. N. Anderson, killed by fall of slate in Diamond mine, owned by Zeller & Sigler, in Clay County.

July 25, 1892. Smith Maxwell, killed by fall of slate in Gartside mine, owned by Watson, Little & Co., in Clay County.

October 5, 1892. David Blackater, killed by fall of slate in No. 6 mine, owned by Parke County Coal Co., in Parke County.

October 11, 1892. John Gallagher, fatally injured by falling down shaft from top to bottom vein at No. 10 mine, owned by Brazil Block Coal Co., in Clay County.

November 10, 1892. Peter Prester, killed by fall of slate in No. 3 mine, owned by Brazil Block Coal Co., in Parke County.

November 22, 1892. Wm. Miles, killed by fall of slate in No. 2 mine, owned by New Kentucky Coal Co., in Parke County.

List of accidents, not fatal, which occurred in the Northern District during 1892:

January 11, 1892. Lawrence Smith, leg broken by falling in front of moving car in Seelyville mine, owned by P. Ehrlich & Co., in Vigo County.

January 22, 1892. Samuel Chaney and Wm. Wiggle burned and bruised by premature blast in No. 6 mine, owned by Brazil Block Coal Co., in Clay County.

January 22, 1892. Jeff. Rolston, collar bone broken by fall of coal in Nickel Plate mine, owned by Jackson Coal Co., in Clay County.

January 23, 1892. August Johnston, ankle fractured by fall of slate in Oak Hill mine, owned by P. Ehrlich & Co., in Clay County.

April 25, 1892. William Kennedy, ankle fractured by falling down shaft from top to bottom vein in No. 7 mine, owned by Brazil Block Coal Co., in Clay County.

April 25, 1892. Thomas McKinney, ankle fractured by fall of coal in Newbury mine, owned by P. Ehrlich & Co., in Clay County.

April 26, 1892. W. H. McDonald, leg broken by fall of coal in Star mine, owned by Coal Bluff Coal Co., in Vigo County.

April 27, 1892. John Lark, leg broken and internal injuries by fall of slate in Chicago mine, owned by Nickel Plate Coal Co., in Clay County.

May 16, 1892. M. Finnegan, leg broken by cage in mine No. 1, owned by New Kentucky Coal Co., in Parke County.

June 17, 1892. Allen Campbell, injured in back by fall of slate in Hoosier mine, owned by Hoosier Coal Co., in Clay County.

July 7, 1892. Wm. Frost, collar bone broken by fall of coal in No. 2 mine, owned by Crawford Coal Co., in Clay County.

August 13, 1892. John Godfrey, internally injured by fall of slate in Hoosier mine, owned by Hoosier Coal Co., in Clay County.

September 14, 1892. John Louis, both legs broken by fall of slate in No. 8 mine, owned by Brazil Block Coal Co., in Clay County.

September 19, 1892. Timothy Donahue, seriously injured about the head and shoulders by fall of slate in Gartside mine, owned by Watson, Little & Co., in Clay County.

September 28, 1892. Thomas Raynolds was seriously injured by fall of slate in Nellie mine, owned by Otter Creek Coal Co., in Clay County.

October 19, 1892. Grant Goff, ankle bruised by bank cars in No. 9 mine, owned by Brazil Block Coal Co., in Clay County.

November 22, 1892. Peter Allain, internally injured, and R. Rondoni, leg broken, by some fall of slate in No. 2 mine, owned by New Kentucky Coal Co., in Parke County.

November 22, 1892. James Cashner, leg broken by fall of slate in Seelyville mine, owned by P. Ehrlich & Co., in Vigo County.

December 6, 1892. M. S. Canday, burned in Fume Hill mine, owned by Hazel Creek Coal Co., in Vermillion County.

Total number of accidents from Northern District, 32; number fatal, 12; number not fatal, 20. Total number of accidents in State, 48, nineteen being fatal and twenty-nine not fatal. Of these accidents I have little to say. In the Northern District, I visited the scene of each fatal accident, and carefully inquired into the cause of such accident, with a view of finding out if it had occurred by reason of another's carelessness or ignorance. These accidents are due, in almost every instance, to carelessness or ignorance of applying proper safeguards against accidents by those who are continually exposed to the danger. For instance, in the case of William Miles, who was killed in Parke County: He was putting up timber at the bottom of a new mine. The slate above where the timber was to be put up was dangerously loose. Mr. Miles, being an experienced miner, must have known the slate was loose and dangerous, but he took no precaution against possible accident. No temporary timbers were put in to protect himself and companions, and while they were in the act of putting up the first permanent timber the slate fell, and Mr. Miles lost his life. Two of his companions were also very seriously injured.

There is another case of gross carelessness, that of Peter Prester, killed at No. 3 mine, near Coxville. This man was instructed to timber the slate. He went as directed, prepared the place for the timber, then stood talking with the entry man for a moment without getting from under the slate he knew was loose. Without warning the slate fell, and Mr. Prester was almost instantly killed. I visited the scene the next day after the accident, and am satisfied that Mr. Prester could have saved his life if he had put up one temporary timber. This seeming criminal carelessness applies to the miners as a class. They too often put off putting up a needed timber until they "load a car," or "mine a block," or until evening, just before starting for home, so as not to be bothered by the timbers being in their way during working hours. This delay should be avoided. For the safety of men employed in coal mines, everything should be dropped until a timber is put in whenever the need of one presents itself.

A number of the less serious accidents are largely due to this same careless and reckless disposition. A timber is needed; the miner knows it; he perhaps makes the discovery when he is in a hurry loading a car. He mentally resolves to put up the timber right away after the car is loaded or when he finishes drilling the hole, but before this is done the slate falls, and he is dead or perhaps a cripple for life. To the miners in our State I say, see that timbers are put up in your working places whenever there is any apparent need for them. Reverse the rule by which most mines are now governed, and delay anything excepting the putting up of a timber under a loose stone.

Below is given a list of scales tested, total number for Northern District being twelve, seven being found correct and five incorrect. The five found incorrect were not used again until corrected, excepting the scale at Banner mine, near Carbon. This scale was worn out and in such bad shape that it had to be replaced with a new one, the old one being used (by mutual agreement between operator and miner) until the new one was gotten on the ground, when it was at once put in.

CLAY COUNTY.

January 28, 1892. Gartsherrie No. 1 scales tested and found weighing 400 pounds to the ton light.
February 3, 1892. Vandalia scales tested and found correct.
March 26, 1892. Gartsherrie No. 2 scales tested and found correct
March 25, 1872. P. Ehrlich & Co. scale at south shaft tested and found 100 pounds to the ton light.
June 2, 1892. Nellie mine scales tested and found correct.
July 18, 1892. Banner scales tested and found correct.
September 15, 1892. Columbia scales tested and found correct.
September 6, 1892. Banner scales tested and found incorrect.
September 7, 1892. Banner scales tested and found incorrect.
August 20, 1892. Anchor mine scales tested and found correct.

The change at the Banner mine proved very satisfactory. The change mentioned above is the only one of importance that came under my notice. Before giving a brief statement of the condition of the mines, etc., in the Northern District, I respectfully call your attention to the following tables, which may be interesting:

GENERAL SUMMARY IN CLAY COUNTY.

1892.	Total No. of Persons Employed on Inside.	No. of Persons Employed on Outside.	No. of Mules and Horses Used.	Total No. of Days Worked.	Total Amount of Money Invested in Improvem'ts.	Total Tons of Screened Coal Produced.	Total Tons of Mine Run Coal Produced.	Total Tons of Slack Produced.	Total No. of Tons of Coal Mined.
January . . .	2,393	202	153	691	$2,725	99,973	9,080	22,508	131,561
February . . .	2,561	212	152	552	2,000	86,625	4,374	17,054	109,053
March	2,543	213	167	448½	1,398	99,726	2,313	20,832	122,871
April	2,370	196	156	587½	772	94,669	2,914	19,087	116,670
May.	2,291	181	149	535	823	85,102	2,969	18,282	106,353
June	2,411	190	147	538	7,583	84,134	3,313	18,045	105,492
July	2,449	181	150	525	1,640	88,030	2,360	19,670	110,060
August	2,510	210	156	714½	1,723	108,299	3,399	24,358	136,056
September . .	2,658	221	163	762	3,685	112,112	2,991	23,966	139,069
October. . . .	2,684	223	159	681½	1,266	114,938	1,335	26,672	142,945
November . .	2,725	225	171	641½	1,944	117,636	3,183	24,759	145,578
December. . .	2,926	239	169	789	5,708	124,920	2,900	27,843	155,663
Total . . .	30,521	2,493	1,892	7,465½	$31,267	1,216,164	41,131	264,076	1,521,371

GENERAL SUMMARY OF PARKE COUNTY.

1892.	Total No. of Persons Employed Inside.	Total No. of Persons Employed Outside.	No. of Mules and Horses Used.	Total No. of Days Worked.	Total Amount of Money Invested in Improvem'ts.	Total No. of Tons of Screened Coal Produced.	Total No. of Tons of Mine Run Coal Produced.	Total No. of Tons of Slack Produced.	Total No. of Tons of Coal Mined.
January . . .	624	64	42	138	$700	27,063	1,518	7,896	36,477
February . . .	617	70	43	111	1,000	27.545	1,308	7,476	36,329
March	538	74	42	143	250	30.719	721	9,109	40,549
April	539	75	42	140	700	22,201	4,337	7,829	34,367
May.	511	81	42	121	500	21,184	4,600	6,100	31,884
June	615	84	43	142	500	24,677	5,421	8,831	38,929
July	560	74	45	127	203	22,064	4,663	7,627	34,354
August . . .	508	75	44	158	1,148	27,068	5,512	9,229	41,809
September . .	535	75	44	172	. . . .	27,331	6,185	9,569	43,085
October. . . .	561	74	45	171	. . . .	27,628	7,814	9,928	45,370
November . .	593	100	46	185	1,300	26,716	7,023	8,902	42,641
December. . .	574	94	57	202	750	38,318	1,220	9,314	48,852
Total . . .	6,775	940	535	1,810	$7,051	322,514	50,322	101,810	474,646

GENERAL SUMMARY OF VERMILLION COUNTY.

1892.	Total No. of Persons Employed Inside.	Total No. of Persons Employed Outside.	No. of Mules or Horses Used.	Total No. of Days Worked.	Total Amount of Money Invested in Improvem'ts.	Total No. of Tons of Screened Coal Produced.	Total No. of Tons of Mine Run Coal Produced.	Total No. of Tons of Slack Produced.	Total No. of Accidents.	Total No. of Tons of Coal Mined.
January	341	84	33	82	$823	14,777	1,823	4,512	. .	21,112
February	420	65	37	79	500	15,568	1,892	5,593	. .	23,053
March	475	72	39	93	100	20,972	2,071	7,814	. .	30,857
April	418	50	38	93½	865	19,242	349	7,260	. .	26,851
May	468	64	40	102	315	17,595	1,732	7,213	. .	26,540
June	402	52	33	62	175	13,386	2,174	4,084	. .	19,644
July	387	64	34	61	75	12,219	2,826	3,777	. .	18,822
August.	405	63	32	79	75	17,289	1,955	5,423	. .	24,667
September	389	66	33	107	300	23,386	2,734	7,810	. .	33,930
October	415	70	33	104	525	24,573	2,673	9,507	. .	36,753
November	437	74	85	101	500	27,498	. . . .	8,530	. .	36,028
December	444	61	37	107	1,695	28,619	3,783	9,048	. .	41,450
Total	5,001	785	424	1,070½	$5,948	235,124	24,012	80,571	. .	339,707

GENERAL SUMMARY OF VIGO COUNTY.

1892.	Total No. of Persons Employed Inside.	Total No. of Persons Employed Outside.	No. of Mules and Horses Used.	Total No. of Days Worked.	Total Amount of Money Invested in Improvem'ts.	Total No. of Tons of Screened Coal Produced.	Total No. of Tons of Mine Run Coal Produced.	Total No. of Tons of Slack Produced.	Total No. of Accidents.	Total No. of Tons of Coal Mined.
January	308	33	22	65	. . . .	11,186	1,334	5,095	1	17,615
February . . .	432	49	33	127	$40	22,522	1,905	10,120	1	34,547
March	448	43	35	139	175	27,009	25	11,282	. .	38,316
April	409	22	34	119	. . . .	23,392	635	2,939	1	26,966
May	378	40	33	112	. .	19,005	2,158	8,035	. .	29,198
June	377	41	32	106	125	17,710	1,860	7,080	. .	26,650
July	407	48	35	142	. . . .	18,094	4,057	7,610	. .	29,761
August.	408	48	35	123	. . . .	20,460	2,013	7,870	. .	30,343
September . . .	428	48	34	128	. . . .	19,389	2,073	7,575	. .	29,037
October	456	48	35	134	. . . .	22,126	2,920	9,530	. .	34,576
November . .	482	48	36	138	. . . .	23,167	4,980	8,947	1	37,094
December . . .	521	54	40	155	300	22,048	11,905	4,606	. .	38,559
Total. . .	5,054	522	404	1,488	$640	246,108	35,865	90,689	4	372,662

Gartsherrie No. 1.

Owned by Brazil Block Coal Company; located on the North Branch of the T. H. & I. R. R., one and one-half miles north of Knightsville. This mine was visited twice. On my first visit I took all the men out of the first east entry in top vein. This action was made necessary on account of the roof in that entry being in an unsafe condition for the men to pass under it. I also ordered the bank boss to see that the entry was properly timbered before the men were again allowed to return to work. I then went to the office of the company in this city and requested them to change the fan from north of the shaft to a point about 400 yards south of the shaft. This request was granted and the fan at once removed. The change is very beneficial to the men. On my second visit, I found 15,000 cubic feet of air in circulation instead of the 8,160 cubic feet as found on my first visit. In other respects the condition of the mine was good.

Gartsherrie No. 2.

Owned by the Brazil Block Coal Company; located one mile north of Harmony on the North Branch of the T. H. & I. R. R. This mine was visited twice and found in fair condition, excepting in the southeast part of the mine where several men were at work on pillars, they being troubled at times with black damp from the old works. In places where men were found ahead of air, they were taken back to where there was a volume of air passing, thus getting into good air to continue their labors. This mine is pretty near worked out, and will likely be finished this year.

Gartsherrie No. 3.

Owned by Brazil Block Coal Company; located one and one-half miles north of Harmony on the Harmony Branch of the T. H. & I. R. R. This mine was visited twice. Upon my first, I stopped first west entry off of first south entry in top vein until the air course could be driven up. I also requested a special effort to be made to more properly ventilate the works in main west entry. Upon my second visit, I asked that doors be put on two rooms in fourth entry on west side of shaft in top vein, and that an air course be driven in parallel with the entry. The bank boss agreed to do this work at once.

No. 4.

Owned by Brazil Block Coal Company; located one mile north of Knightsville on the Harmony Branch of the T. H. & I. R. R. This is a new mine. It was visited twice and found in excellent condition, the law being complied with in every particular.

No. 6.

Owned by Brazil Block Coal Company; located one and one-half miles west of Cardonia. This mine was visited three times. On my first visit, I found insufficient air in bottom vein. To remedy this I asked the bank boss to change the air course. I also requested the work done in five days. At the expiration of this time, I returned and found everything in a satisfactory condition. On my third visit the ventilation of the mine was fair; but I asked the bank boss to timber Gilmore's entry near the face; also to drive an air course back to main entry. This work he promised to do at once.

No. 7.

Owned by Brazil Block Coal Company; located one mile west of Cardonia. This mine was visited twice. The general condition of the mine was good on both visits. This mine is about exhausted, and will be abandoned about February 15, 1893.

No. 8.

Owned by Brazil Block Coal Company; located one mile northwest of Perth. This mine was visited twice. The top vein of coal is being worked. This mine has covered a larger area. Perhaps there is no other mine in this country, now in operation, with a greater area; but there are few, if any, where the ventilation is better than here. The roof is generally good, but there is an immense amount of water. The bottom vein is opened out, but it is not being operated at this time.

No. 9.

Owned by Brazil Block Coal Company; located four miles south of Knightsville on the Knightsville south branch of T. H. & I. R. R. This mine was visited twice. On my first visit I found the ventilation on main north and west entries very poor. To remedy this, I asked that the door on east side of main north entrance be nailed up, and for the west a separate supply of air, and that the door on main entry that is used in directing the volume west be taken off. On my second visit this work was all done, and everything found satisfactory.

No. 10.

Owned by Brazil Block Coal Company; located two miles northwest of Perth. This mine was visited twice. On my first visit the general condition of the top vein was good, excepting the first north entry west of shaft. There the roof was very bad, and to prevent accidents, I stopped the workmen until the entrance could be timbered. In the bottom vein there are eighteen men at work, most of whom are preparing places to work along the wall. This vein is about three feet four inches high, but it is troubled with rock spars to such an extent that the miners would not work it according to former methods. On my second visit the bottom vein was not in operation. Everything in the top vein was in a very satisfactory condition.

Chicago.

Owned by Brazil Block Coal Company; located just south of Carbon. This mine was visited once and found in fair condition. The company did not expect to operate it after October 1. In July it accidentally caught fire and burned down. The company did not rebuild, but abandoned the mine at once.

Crawford No. 2.

Owned by Crawford Coal Company; located three and one-half miles northwest of Harmony, on Harmony branch of the T. H. & I. R. R. This mine was visited twice. The ventilation was good on my first visit, but the escape shaft could not be reached on account of cave. I ordered escape shaft changed at once. On my second visit the escape shaft had been cleaned up and everything was in a satisfactory condition. The entries are all driven to the boundary lines, and the mine will likely be worked out and abandoned about January 1, 1894.

No. 4.

Owned by Crawford Coal Company; located one and one-half miles north of Brazil on the Furnace branch of the T. H. & I. R. R. This mine was visited twice. On both visits everything was satisfactory.

No. 3.

Owned by Crawford Coal Company; located four miles south of Knightsville, on the Knightsville south branch of the T. H. & I. R. R. This mine was visited twice. On my first visit everything was satisfactory except the escape shaft, which had no stairway in. On my return visit the stairs were in the escape shaft and everything was all right.

No. 5.

Owned by Crawford Coal Company; located four miles south of Brazil, on the south branch of the T. H. & I. R. R. This is a new mine. It is a shaft and is sixty-four feet deep. The top vein is being worked. The average height of the coal is three feet eight inches. There are two hundred acres of coal land here leased by this company. This was finished August 1, 1892. It was only visited once. They needed covers and safety catches on cages; also escape shaft. The company agreed to make these improvements at once. My information now is that they have complied with their agreement.

No. 6.

Owned by Crawford Coal Company; located one half mile north of No. 5. This mine was formerly operated by P. Ehrlich & Co. The present owners took charge August 1, 1892. Since that time they have put down new air escape shaft. The mine was only visited once. Then everything was found satisfactory, excepting the covers on the cages, which the bank boss agreed to fix at once.

Chicago.

Owned by Nickel Plate Coal Company; located just east of Benwood on north branch of the T. H. & I. R. R. This mine was visited twice and found on both visits in fairly good condition. The mine is pretty well worked out now and will be abandoned about July 1, 1893.

New Nickel Plate.

Owned by Jackson Coal Company; located one and one-half miles north of Knightsville on north branch of the T. H. & I. R. R. This is a new shaft. It is down to the top vein. The average height of the coal is about four feet. The shaft is sixty-three feet deep. It is ventilated by a fan. The shaft was finished about August 1, 1892, some thirty days before my visit. I requested an escape shaft to be put down, and on December 17, 1892, the date of my visit, the shaft was within five feet of being through, and ten days afterwards was completed. Everything else about the mine was strictly in accordance with law.

Newburgh.

Owned by P. Ehrlich & Co.; located one mile northwest of Newburgh on a branch of the T. H. & I. R. R. This mine was visited twice, and, although there is very little system about the general management of the mine, still the ventilation of the mine was good on both visits. This mine is a shaft, but there is an entry driven out in the hollow just north of the shaft. This makes a good escapement, and is used by both men and mules for that purpose.

Ehrlich's South Shaft.

This mine is now operated by Crawford Coal Company, and is known as Crawford No. 6. It was visited once this year, during the time it was owned by P. Ehrlich & Co. Some changes were asked for, but were not made (as the shaft was shut down) until after the present owners took charge.

Nellie Mine.

Owned by Otter Creek Coal Company; located one-half mile south of Brazil. This mine was visited twice. On my first visit I asked that the air course following the west entry off of the first south entry on the west side be cleaned out, and that some loose stone on the east be taken down. On my return visit the general appearance of the mine was fair, but there were very bad pieces on the entries. There were two men at work timbering these, and I am told that the work was prosecuted until completed.

Gartside.

Owned by Watson, Little & Co.; located one mile north of Knightsville on the north branch of the T. H. & I. R. R. This mine was visited three times. On the first two visits the general condition of the mine was good, but on the third visit, September 12, 1892, I asked that another air shaft be put down and an additional fan be put up, to supply the men then working in what is known as the new tunnel to the top vein. The company, recognizing the necessity of such an improvement, in a comparatively short time had the work done, and a new fan erected, which is giving a splendid supply of air to all parts of the mine.

Columbia.

Owned by Zeller & Sigler; located one mile southwest of Knightsville. This mine was visited twice. On neither visit was I satisfied with the condition of the mine, and yet the law was being complied with; but there seemed to be a disposition on the part of the bank boss to get out coal, and neglect many little things that should have been done.

Diamond.

Owned by Zeller & Sigler; located four miles east of Knightsville, on the Knightsville south branch of the T. H. & I. R. R. This is a new mine. It was visited once. It is a shaft sixty-three feet deep. Coal is being worked. The average height of the coal is four feet. This company finished sinking this shaft September 1, 1892. At the time of my visit, December 29, an escape shaft was down, but stairs had not yet been put in. The boss assured me that this work would be done at once. In other respects the condition of the mine was good.

Banner.

Owned by Eureka Block Coal Company; located one-half mile east of Carbon. This mine was visited twice. On my first visit, I gave orders to cover cages and put on safety catches; also for cross bars to be put in the main entry air course on north side of the mine. On visiting the mine a second time, I found things generally satisfactory, excepting the south-east portion of the mine. I ordered an additional split of air for the men in this part of the mine, and ten days were given to do the work in. At the expiration of the time given the work was done, and everything is now in a satisfactory condition.

Morris.

Owned by Sherborn Block Coal Company; located nine miles south of Brazil, on the south branch of the T. H. & I. R. R. This mine was visited once and found in a satisfactory condition. It was worked out and abandoned July 1, 1892.

World's Fair.

Owned by D. H. Davis Coal Company; located one mile northeast of Brazil, on a switch off of the T. H. & I. R. R. This mine was visited twice. It has a new shaft, seventy-five feet deep. The top vein of coal is being worked. The average height of the coal is about four feet. On my second visit, I ordered the speed of the fan increased to eighty revolutions a minute, more attention given to shutting of doors, air courses following first north and first south on west side enlarged, props sent in to men regularly when called for, and also covers on cages.

CHURCHILL.

Owned by Weaver, Getz & Co.; located one and one-half miles west of Center Point. This mine was visited twice. On both visits, almost all of the men were found working on pillars, and the general condition of the mine was fairly good. The company expect to work out and abandon this mine about February 1, 1893.

LOUISE.

Owned by Weaver, Getz & Co.; located one-half mile northwest of Center Point, on the Knightsville south branch of the T. H. & I. R. R. This mine was visited four times, but I failed to get into it on two occasions. On July 27 I visited and inspected this mine, and found that the shaft was 100 feet deep, and ventilated by a fan; average height of coal three feet six inches, and that coal was being worked. I also found that there were no safety catches on cages, and no escape shaft. On my next visit I found the escape shaft completed, except putting in the stairway, but this work was being pushed, and would be completed in a few days. The safety catches and covers were already on the cages. In other respects the general condition of the mine was fair.

VANDALIA.

Owned by Zeller & Sigler, and operated by R. Owens; located one and one-half miles west of Center Point. This mine was visited twice. It is an old mine, having been abandoned for a time, and reopened in the latter part of 1891. Since that time a tunnel has been driven to the top vein. On my second visit this tunnel was almost abandoned, and nearly all of the men were working in the bottom vein. Everything found in a satisfactory condition.

BRIER HILL.

Owned by Morrier Coal Company; located one mile northeast of Clay City. This mine was visited twice and found all satisfactory.

NEWBURGH NO. 2.

Owned by Gartsherrie Coal Company; located one mile west of Newburgh, on a switch of the T. H. & I. R. R. This mine was visited twice and found in good shape.

PRATT MINE.

Owned by Coal Bluff Company; located one and one-half miles west of Perth, on the I. & St. L. R. R. This mine was visited twice, and on both visits was found in good shape.

Anchor.

Owned by Coal Bluff Company; located one mile southeast of Perth on a switch from the I. & St. L. R. R. This mine was visited twice, and although the general condition of the mine was bad on my first visit, I found no cause for complaint when I visited it the second time.

Diamond.

Owned by Diamond Coal Company; located one mile northwest of Clay City on the E. & I. R. R. This mine was visited three times. On each visit fault was found with the manner the doors were kept in, also with the breaks-through, and the general ventilation of the mine. The bank boss did not seem to heed instructions given. I therefore filed an affidavit against him. When he arrived in court he pleaded guilty, as charged, and promised to do better.

Hoosier.

Owned by Hoosier Coal Company; located one mile northwest of Perth on a branch from the I. & C. R. R. This mine was visited twice. On my first visit I found that the company had driven a tunnel from the bottom to the top vein. This tunnel was rather poorly ventilated. On my second visit the general condition of the mine was good.

Shefferman.

Owned by Shefferman Coal Company; located one and one-half miles south of Brazil on the south branch of the T. H. & I. R. R. This mine was opened during June. It is an old mine that has been abandoned since 1873. The top vein is being worked here. The mine was ventilated by a furnace. On my second visit the dump buildings had burned down, and they have not yet been rebuilt.

Somers.

Owned by Somers Coal Company; located one mile north of Stanton on a branch of the T. H. & I. R. R. This shaft is new, having been put down in April. It is fifty-three feet deep, seven feet high, and the coal is bituminous. The mine is ventilated by a fan. At the time of my last visit Messrs. Somers agreed to put down an escape shaft at once.

Harrison No. 1.

Owned by Chicago & Indiana Coal Company; located three miles northeast of Clay City on a branch of the E. & I. R. R. This mine was visited twice, but on both visits it was not in operation. However, I went through the mine, and have no hesitancy in saying here that had I the power this mine should not be operated. The roof is of such a character that a man is taking a big chance on his life whenever he enters the mine. The company, however, seem to make an honest effort to secure their men against accident.

Harrison No. 2.

Owned by Chicago & Indiana Coal Company; located a half mile west of No. 1. It is a new mine, seventy-five feet deep, and is ventilated by a fan. Coal is about four feet high. At the time of my visit in December, they had not completed the partings, but would finish in a few days. This company expects to operate on a large scale.

FOUNTAIN COUNTY.

Silverwood Mine.

Owned by Shipman Coal Mining Company; located one mile northwest of Silverwood on the Clover Leaf Railroad. This mine was visited twice. On my first visit I requested an escape shaft made; also, fan moved and fan-house properly erected; also, covers on cages. On returning, I found that the company had driven a drift or rather a slope into the coal and had moved the fan to the mouth of it. This slope was also used for a traveling way for men and mules. This shaft is an old one, it having been sunk several years, but never operated to any very great extent until this year. It is twenty-eight feet deep. The coal is bituminous and is from four to six feet high.

Note.—The above mine was the only one in operation in Fountain County in 1892 that employed enough men to bring it within the provisions of our mining laws. There are, however, several mines in this county. The Norton Creek Coal Company of Clinton, I am informed, has put down a shaft near Silverwood, and has leased several hundred acres of land, expecting to do business on a large scale in the near future.

OWEN COUNTY.

Lancaster No. 3.

Owned by Lancaster Coal Company; located four miles northeast of Clay City. This mine was visited twice and found in a satisfactory condition on both visits. During the year they abandoned their escape shaft on the west side of the mine and put down one on the east side.

Eagle Creek.

Owned by J. H. Hyett; located just west of Coal City on the E. & I. R. R. This mine is a shaft fifty feet deep. The coal is three feet six inches high. It is ventilated by a fan. This mine was visited twice and found in good condition on both visits.

Note.—The two mines mentioned above are the only mines in this county that come under the law. I believe the number of mines in the county will be increased in the near future, since it is generally understood that some railroad extensions will be made to reach Lancaster, thus opening a coal field that up to this time is practically untouched.

PARKE COUNTY.

Coxville No. 3.

Owned by Brazil Block Coal Company; located one mile west of Coxville, on a branch of the C. & I. C. R. R. This mine was visited twice. On my first visit, I found the fan near the top of shaft had not been properly erected; also, that proper splits in air were not made, and that break-throughs were being made seventy-five feet apart instead of forty-five feet. On my second visit the things complained of on my first visit were all adjusted, and the general condition of the mine was good.

New Otter Creek.

Owned by Brazil Block Coal Company; located two miles northeast of Carbon on a branch on the I. & St. L. R. R. This work was only visited once, it being a new mine opened in October. There are both a drift and shaft here. The drift takes coal out of top vein, while the shaft is down to the bottom vein. Shaft and drift are ventilated by a fan. The shaft is thirty-eight feet deep. The average height of coal in both places is four feet.

No. 6.

Owned by Parke County Coal Company; located one mile northwest of Rosedale on a branch of the T. H. & L. R. R. This mine was visited twice. On my first visit everything was in a satisfactory condition. On my second visit, I ordered some loose slate taken down on west entry off of first south entry on west side of mine. I also ordered timber put up in tenth south entry on west side; also doors on the same side were ordered repaired. On the east side of the mine the general condition of the thing was fair.

No. 7.

Owned by Parke County Coal Company; located one mile south of Minchell, on a branch of the T. H. & L. R. R. This mine was visited twice, and both times found in good condition.

No. 8.

Owned by Parke County Coal Company; located one and one-half miles northwest of Rosedale, on a branch of the T. H. & L. R. R. This mine was visited twice and found all satisfactory.

No. 9.

Owned by Parke County Coal Company; located one-half mile south of Coxville, on the I. & C. R. R. This mine was visited twice. The general condition was satisfactory, but there were several bad pieces of roof on main entry air course. I called the boss's attention to those, and he promised to fix them at once.

Mecca Mine.

Owned by Mecca Mining Company; located one mile east of Mecca. This mine was visited twice. On my first visit I asked that an escape shaft be made at once, and the stairs that were in the air shaft be taken out. On my second visit the escape shaft was completed and everything found in a very satisfactory condition.

Hudnut No. 1.

Owned by New Kentucky Coal Company; located near Clinton Locks. This mine was visited twice. On my first visit I asked this company to put down an escape shaft at once. On my second visit the escape shaft was down, but the stairs were not in. The work would all be done in a few days. I noticed that a large volume of air escaped to the partition in the main shaft. This partition I asked changed and made air tight. Also that the break-through nearest face of working place be kept free from dirt and other obstructions, until another break-through farther in is made. This the bank boss promised to do without delay.

Hudnut No. 2.

Owned by New Kentucky Coal Company; located at Clinton Locks. This is a new mine and was visited twice, but I was only at the bottom once. The double partitions were not finished then. The shaft is 155 feet deep. Coal is being worked. It is six feet thick, with slate roof. This company has gone to perhaps greater expense to rig up this mine than any other company in the State. They expect after the mine is properly opened to get out more coal here than at any other mine in Indiana.

VERMILLION COUNTY.

Norton Creek No. 1.

Owned by Norton Creek Coal Company; located four miles north of Clinton. This mine was visited twice. On my first visit I found forty-six men working inside the mine, and everything in a satisfactory condition. On visiting the mine a second time I found it shut down, and it has not been reopened to my knowledge.

Norton Creek No. 2.

Owned by Norton Creek Coal Company; located near No. 1. This mine is a slope and was visited twice. On my last visit objections were made to canvass being made to answer for doors, and orders were given to have doors erected in their proper places. This company, at the time of my last visit, had begun to sink a new shaft just south of the slope. When it is done they intend to abandon the slope and take the coal all out of the shaft.

Norton Creek No. 3.

Owned by Norton Creek Coal Company; located one mile southwest of Clinton. This mine is a shaft. It was visited twice and on both visits found in excellent condition. The ventilation of the mine, the roof, roads and coal are all good, and the mine is comparatively free from water, making this mine one of the most pleasant in Indiana for men to work in.

Hazel Creek No. 1.

Owned by Hazle Creek Coal Company; located one mile west of Clinton. This mine is a drift and was visited twice. On both visits the general condition of the mine was good. The only changes asked for were that temporary curtains be put up to turn the air current into the rooms, thus giving men in rooms (which, as a rule, are a long way in) better air. The company agreed to do this work, and while I have had no complaints since my last visit, I am not advised whether or not the work was done.

Fern Hill.

Owned by Hazel Creek Coal Company; located one-half mile west of Clinton. This mine was visited three times. On my first visit I asked the company to put in an escape shaft, and to take stairs out of fan shaft. On my second visit I found the work asked for on my former visit all done. I then asked this company to split the air current; also to increase the velocity of the fan. On my third visit, I went to the mine at the request of the men, who were afraid of an explosion of fire damp, or some other explosive, but after a careful examination I could find no positive ground for fear. The mine is a very dry one, however, and an immense amount of powder is used. As a precaution against dust, I requested the company to sprinkle the roads. Since that time I have heard no further complaints.

Thompson Hill.

Owned by Thompson Hill Coal Company; located one mile northwest of Clinton. This mine was formerly operated by M. V. Brow, who operated it for several years. It was visited twice and found in pretty good condition. It is ventilated by a furnace. This company contemplates sinking a shaft here in the near future.

VIGO COUNTY.

Hercules.

Owned by Coal Bluff Mining Company; located one mile northwest of Fountain. This mine was visited twice and found in good shape. The company has gotten an immense amount of coal out of this mine, but it is pretty well exhausted now. This company owns more coal land north of this mine, and will sink another shaft there in the near future.

Star Mine.

Owned by Coal Bluff Mining Company. Located one-half mile south of Fountain. This mine was visited twice. On my first visit I requested an additional split made in air current, and iron covers put on cages. On my return visit I found the improvements asked for were completed, and the general condition of the mine was good.

Edgar No. 2.

Owned by Coal Bluff Mining Company. Located one mile southwest of Coal Bluff. It was worked out and abandoned in July, 1892.

Diamond.

Owned by Coal Bluff Mining Company. Located one mile south of Coal Bluff. This mine was visited twice. On both visits the general condition of the mine was fair, though they are at times troubled with smoke from a burning dirt pile. When the wind is blowing from the west or northwest, the smoke is carried to and past the air shaft. The fan catches a part of this and throws it down the shaft to the men.

In addition to the mine mentioned above, the Coal Bluff Company has put down a new mine near the old Edgar. It is a shaft, and is thirty-four feet deep. The coal is about five feet high. They ventilate by a fan. I visited the mine December 15, 1892, but there were not enough men at work at that time to bring it within the limit of the law.

Woodrough.

Owned by Woodrough & Trunkey Brothers. Located near Grant. This mine was visited twice and found all right. On December 1 the company was succeeded by the Grant Coal Mining Company. This new company has purchased a large tract of land here, and is now engaged in erecting a number of new houses. I am informed that this new company will, in the spring, put down at least two new mines.

Seelyville.

Owned by P. Ehrlich & Co. Located at Seelyville. This mine was visited twice and found all right on both visits.

Peerless.

Owned by Western Indiana Coal Company. Located one mile north of Coal Bluff. This mine is a new one, and was only visited once. It is a shaft, and is 102 feet deep. The coal is seven feet thick. It is the same vein worked at Fountain. At the time of my visit, they were employing sixty men and had three mules hauling coal. The mine was ventilated by a fan. I asked the company to put down an escape shaft and to properly cover cages; also to put safety catches on cages. This work is now being done, and will be completed in a few days.

REPORT OF MINES IN VIGO COUNTY FOR THE MONTH OF JANUARY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Hercules	Coal Bluff Co., Terre Haute	Feb. 24,'92	193	17	15	22			6,555		3,275			
Woodruff	Woodruff & T. Bros, Grant	Feb. 18,'92	60	7	4	22	9,700		2,239	1,334	700			
Seelyville	P. Ehrlich & Co., Turner P. O.	Feb. 18,'92	55	9	3	21	20,250		2,392		1,120		1	Fell in front of car.
Total			308	33	22	65			11,186	1,334	5,095		1	
FEBRUARY, 1892.														
Hercules	Coal Bluff Co., Terre Haute	Mar. 11,'92	132	22	14	25	38,125		7,918.10	1,905	2,300			
Star	Coal Bluff Co., Terre Haute	Mar. 11,'92	82	4	6	22	32,000		3,721		2,620			
Diamond	Coal Bluff Co., Terre Haute	Mar. 11,'92	90	6	4	20	12,540		4,793.7		2,260		1	Injured by premature blast.
Edgar	Coal Bluff Co., Terre Haute	Mar. 11,'92	15	3	2	24	8,400		1,500		800			
Seelyville	P. Ehrlich & Co., Turner	Mar. 12,'92	51	7	3	14	21,600		1,965		1,040			
Woodruff	Woodruff & T. Bros., Burnett	Mar. 14,'92	62	7	4	22	8,900	$40	2,625		1,080			
Total			432	49	33	127		$40	22,522	1,905	10,120		1	
MARCH, 1892.														
Hercules	Coal Bluff Co., Terre Haute	Apr. 12,'92	145	16	15	27	47,920		8,540		2,527			
Star	Coal Bluff Co., Terre Haute	Apr. 12,'92	87	5	6	27	23,400		5,181.10		2,688			
Diamond	Coal Bluff Co., Terre Haute	Apr. 12,'92	100	6	4	25	13,200		6,285	25	2,640			
Edgar	Coal Bluff Co., Terre Haute	Apr. 12,'92	16	3	2	23	25,410		1,238		480			
Seelyville	P. Ehrlich & Co., Turner P. O.	Apr. 12,'92	50	7	4	14	22,000		2,137.6		1,822			
W. & T. Bros	Woodruff & T. Bros., Terre Haute	Apr. 28,'92	50	6	4	23	7,200	$175	3,628.15		1,125			
Total			448	43	35	139		$175	27,009⅛	25	11,282			

APRIL, 1892.

Hercules	Coal Bluff Co., Terre Haute	June 17,'92	120	..	15	25	45,825	....	7,633.10	635	204	..	..	
Star	Coal Bluff Co., Terre Haute	June 17,'92	86	.	7	20	19,775	....	5,082	....	111	..	1	Leg fractured.
Diamond	Coal Bluff Co., Terre Haute	June 17,'92	90	5	4	21	9,300	....	4,940.13	....	110	..	..	
Edgar	Coal Bluff Co., Terre Haute	June 17,'92	6	2	..	21		....	731.15	....	360	..	..	
Seelyville	P. Ehrlich & Co., Turner P.O.	May 7,'92	52	8	4	17	22,000	....	2,805	....	1,024	..	..	
W. & T. Bros.	Woodruff & T. Bros., Terre Haute	May 31,'92	55	7	4	15	6,500	....	2,206.16	....	1,130	..	..	
Total	....	......	409	22	34	119	....	....	23,392½	635	2,939	..	1	

MAY, 1892.

Hercules	Coal Bluff Co., Terre Haute	Sept. 17,'92	107	15	14	25	33,700	.	6,334	2,090.10	1,240	..	..	
Star	Coal Bluff Co., Terre Haute	Sept. 17,'92	75	4	6	22	21,000	....	3,795	....	2,340	..	..	
Diamond	Coal Bluff Co., Terre Haute	Sept. 17,'92	90	4	4	23	11,600	....	4,946.19	68.19	2,580	..	..	
Edgar	Coal Bluff Co., Terre Haute	Sept. 17,'92	11	3	2	15	....	...	517.18	....	220	..	..	
W. & T. Bros.	Woodruff & T. Bros., Terre Haute	June 24,'92	51	7	4	14	7,000	....	1,767.10	....	920	..	..	
Seelyville	P. Ehrlich & Co., Turner P.O.	June 9,'92	44	7	3	13	20,000	....	1,646.12	....	735	..	..	
Total	....	.....	378	40	33	112	...	....	19,005⅛	2,158⅛	8,035	..	..	

JUNE, 1892.

Hercules	Coal Bluff Co., Terre Haute	Sept. 17,'92	100	14	13	23	34,000	....	5,354.10	1,860.10	1,100	..	..	
Star	Coal Bluff Co., Terre Haute	Sept. 17,'92	79	5	6	19	22,700	....	4,349.10	....	2,700	.	..	
Diamond	Coal Bluff Co., Terre Haute	Sept. 17,'92	90	4	4	19	11,500	....	4,122.17	....	1,480	..	..	
Edgar	Coal Bluff Co., Terre Haute	Sept. 17,'92	10	3	2	15	....	....	476.9	....	140	..	..	
Woodruff	Woodruff & T. Bros., Terre Haute	July 27,'92	55	7	4	16	7,500	$125	1,784	....	865	..	..	
Seelyville	P. Ehrlich & Co., Turner P.O.	July 18,'92	43	8	3	14	11,200	....	1,625.12	....	880	..	..	
Total	....	......	377	41	32	106	....	$125	17,710½	1,860 1/10	7,080	..	..	

Blanks for August sent out August 15, 1892.

REPORT OF MINES IN VIGO COUNTY FOR THE MONTH OF JULY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Hercules . . .	Coal Bluff Co., Terre Haute . .	Sept. 17,'92	110	15	15	19	36,300	. . . .	4,380	909.10	1,360	. .	. .	
Star.	Coal Bluff Co., Terre Haute . .	Sept. 17,'92	85	5	7	22	22,900	. . . .	5,403.10	. . . .	2,780	. .	. .	
Diamond . . .	Coal Bluff Co., Terre Haute	Sept. 17,'92	97	4	4	21	12,900	. . . .	4,390.19	. . . .	1,960	. .	. .	
Edgar.	Coal Bluff Co., Terre Haute . .	Sept 17,'92	11	3	2	15	. . . .	. . . .	517.13	. . . .	220	. .	. .	Abandoned.
Woodruff . . .	Woodruff & T. Bros., Terre Haute	Aug. 20,'92	51	6	4	22	6,700	. .	804.10	2,870	435	. .	. .	
Seelyville. . .	P. Ehrlich & Co., Turner P. O.	Sept. 1,'92	41	7	3	19	11,000	. . .	1,881.2	. . . .	795	. .	.	
Peerless . . .	The Western Ind. Coal Co., Terre Haute	Dec. 20, '92	12	8	. .	24	16,500	. . .	309.18	278.12	60	. .	. .	
Total . .	. . . .	. . . . . .	407	48	35	142	. . .	. . . .	18,094¾	4,057¼	7,610	. .	. .	

Blanks for September sent out September 16, 1892.

AUGUST, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Hercules . .	Coal Bluff Co., Terre Haute . .	Sept. 17,'92	115	16	16	24	39,000	. . . .	5,933.10	1,891.10	720	. .	. .	
Star.	Coal Bluff Co., Terre Haute .	Sept. 17,'92	87	5	7	21½	19,800	. . . .	4,698	. .	2,840	. .	. .	
Diamond .	Coal Bluff Co., Terre Haute . .	Sept. 17,'92	95	4	4	20½	13,000	. . . .	4,709.17	16.15	1,840	. .	. .	
Woodruff. . .	Woodruff & T. Bros., Terre Haute	Sept. 21,'92	44	7	3	22	6,000	. . . .	2,296.10	. . . .	1,200	. .	. .	
Seelyville. .	P. Ehrlich & Co., Turner P. O.	Sept. 27,'92	50	8	4	23	11,000	. . . .	2,390.14	. . . .	900	. .	. .	
Peerless	The Western Ind. Coal Co., Terre Haute	Dec. 20, '92	17	8	1	12	16,500	. .	434	5	370	. .	.	
Total	. . . .	. . . .	408	48	35	123	. . . .	. . . .	20,460	2,013.25	7,870	. .	.	

Blanks for October reports sent out October 19, 1892.

SEPTEMBER, 1892.

Hercules . . .	Coal Bluff Co., Terre Haute . .	Dec. 22, '92	140	16	13	21	50,700	. . . .	5,589	1,905	560	. .	. .	
Star.	Coal Bluff Co., Terre Haute . .	Dec. 22, '92	90	7	8	19	26,000	. . . .	4,658	. . . .	2,360	. .	. .	
Diamond . . .	Coal Bluff Co., Terre Haute	Dec. 22, '92	68	5	4	17	16,500	. . . .	3,718	. . . .	1,680	. .	. .	
Woodruff. . .	Woodruff & T. Bros, Terre Haute	Dec. 27, '92	51	7	4	23	7,300	. . . .	2,108.7	. . . .	1,540	. .	. .	
Seelyville. . .	P. Ehrlich & Co., Turner P.O.	Jan. 24, '93	47	8	4	24	. . .	. . . .	2,393	. . . .	795	. .	. .	
Peerless.	The Western Ind. Coal Co., Terre Haute	Dec. 20, '92	32	5	1	24	. . . .	. . . .	893	168	640	. .	. .	
Total . . .	. . . .	. . . .	428	48	34	128	. . .	. . . .	19,389	2,073	7,575	. .	. .	

OCTOBER, 1892.

Hercules . . .	Coal Bluff Co., Terre Haute . .	Dec. 22, '92	147	16	13	22	50,000	. . . .	5,580	1,350	1,540	. .	. .	
Star.	Coal Bluff Co., Terre Haute	Dec. 22, '92	99	7	8	22	27,000	. . . .	5,064	. . . .	2,860	. .	. .	
Diamond . . .	Coal Bluff Co., Terre Haute . .	Dec. 22, '92	70	5	4	21	17,500	. . . .	4,880	. . . .	2,320	. .	. .	
Woodruff .	Woodruff & T. Bros., Terre Haute	Dec. 27, '92	46	7	4	22	7,500	. . .	2,861	. . . .	1,330	. .	. .	
Seelyville. . .	P. Ehrlich & Co., Turner P.O.	Nov. 8, '92	46	8	4	25	10,275	. .	2,652.9	. . .	795	. .	. .	
Peerless. . . .	The Western Ind. Coal Co., Terre Haute	Dec. 20, '92	48	5	2	22	. . . .	. . . .	1,089.4	1,570	685	. .	. .	
Total . . .	. . . .	. . . .	456	48	35	134	. . .	. . . .	22,126	2,920	9,530	. .	. .	

Blanks for November and December sent out December 9, 1892.

NOVEMBER, 1892.

Hercules . . .	Coal Bluff Co., Terre Haute . .	Dec. 22, '92	140	15	12	22	42,500	. . .	5,816	1,900	860	. .	.	
Star.	Coal Bluff Co., Terre Haute . .	Dec. 22, '92	90	7	8	23	35,000	. . . .	5,250	. . . .	2,920	. .	. .	
Diamond . . .	Coal Bluff Co, Terre Haute . .	Dec. 22, '92	75	5	4	23	18,200	. . . .	5,018	. . . .	2,160	. .	. .	
Woodruff . . .	Woodruff & T. Bros., Terre Haute.	Jan. 23, '93	64	8	5	23	7,500	. . .	3,350	903	1,547	. .	. .	
Seelyville . . .	P. Ehrlich & Co., Turner P.O.	Dec. 8, '92	58	7	5	23	20,000	. . . .	2,606	. . . .	800	. .	1	Not fatal.
Peerless	The Western Ind. Coal Co., Terre Haute	Dec. 20, '92	55	6	2	24	16,500	. . . .	1,127.16	2,177.12	660	. .	. .	
Total	. . . .	. . . .	482	48	36	138	. .	. . . .	23,167	4,980	8,947	. .	1	

REPORT OF MINES IN VIGO COUNTY FOR THE MONTH OF DECEMBER, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Hercules	Coal Bluff Co., Terre Haute	Jan. 31,'93	128	14	13	24	42,000	....	5,706	1,852.10	760	..	..	
Star	Coal Bluff Co., Terre Haute	Jan. 31,'93	90	7	10	24	35,000	....	5,497	2,200	...	..	..	
Diamond	Coal Bluff Co., Terre Haute	Jan. 31,'93	85	5	4	22	15,000	....	4,740	1,860	....	..	..	
Woodruff	Grant Coal Mining Co., Burnett	Jan. 12,'93	80	10	6	21	8,000	$300	1,020	3,721	2,051	..	..	
Seelyville	P. Ehrlich & Co., Turner P.O.	Feb. 11,'93	58	8	4	23	20,000	....	3,222.5	....	1,020	..	..	
Peerless	The Western Ind. Coal Co., Terre Haute	Jan. 14,'93	60	7	2	19	16,500	....	1,245.17	1,872	775	..	..	
Victor	Coal Bluff Co., Terre Haute	Jan. 31,'93	20	3	1	22	...	....	618.12	400	....	..	..	
Total	....	......	521	54	40	155	....	$300	22,048	11,905	4,606	..	..	

REPORT OF MINES IN PARKE COUNTY FOR THE MONTH OF JANUARY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Coxville No. 3.	Brazil Block Coal Co., Brazil	Feb. 12,'92	144	15	8	20	30,160	$300	6,883 15	518.15	2,160	..	..	
Otter Creek	Brazil Block Coal Co., Brazil	Feb. 12,'92	56	4	3	18	7,500	...	2,318.11	....	340	..	..	
No. 6.	Parke C'ty Coal Co., Rosedale	Mar. 16,'92	146	17	12	22	....	....	7,395.19	....	1,827.10	..	..	
No. 7.	Parke C'ty Coal Co, Rosedale	Mar. 16,'92	75	9	6	17¾	...	....	4,037.2	....	1,197.10	..	..	
No. 9.	Parke C'ty Coal Co., Rosedale	Mar. 16,'92	135	13	8	18¾	.	....	5,093.11	....	1,752.10	..	..	
Mecca.	Mecca Mining Co., Rockville	Mar. 12,'92	41	3	3	24	14,800	....	1,337	.	620	..	..	
No. 1 Hudnut.	New Ky Coal Co, Clinton	Apr. 14,'92	27	3	2	18	....	400	......	1,000	....	..	..	
Total	....	......	624	64	42	138	....	$700	27,063	1,518	7,896	..	..	

FEBRUARY, 1892.

Coxville No. 3.	Brazil Block Coal Co., Brazil .	Mar. 28,'92	128	10	9	21	18,490	$300	7,589.2	. . . .	2,540	. .	. .
Otter Creek . .	Brazil Block Coal Co., Brazil .	Mar. 28,'92	63	4	3	14	13,920	. . . .	2,587	. . . .	380	. .	. .
No. 6.	Parke C'ty Coal Co, Rosedale	Apr. 2,'92	135	18	13	21½	. .	. . . .	8,073.9	. . . .	2,042.10	. .	. .
No. 7.	Parke C'ty Coal Co., Rosedale	Apr. 2,'92	68	9	6	9½	. . . .	. . . .	2,587.8	. . . .	932.10	. .	. .
No. 9.	Parke C'ty Coal Co., Rosedale	Apr. 2,'92	161	18	8	17	. . . .	.	5,830.10	. . . .	1,132.10	. .	. .
Mecca	Mecca Mining Co., Rockville .	Mar. 15,'92	44	3	3	18	14,800	200	879	485	450	. .	. .
No. 1.	New Ky. Coal Co., Clinton. . .	Apr. 4,'92	18	8	1	10	. . . .	500	. . . .	823.8	. .	. .	. .
Total	. . . .	. . . . . .	617	70	43	111	. . . .	$1,000	27,545	1,308	7,476	. .	. .

MARCH, 1892.

Cox No 3 . . .	Brazil Block Coal Co., Brazil .	Apr. 22,'92	151	12	8	26	24,500	. . .	8,642.14	. . . .	3,140	. .	. .
Otter Creek . .	Brazil Block Coal Co., Brazil .	Apr. 20,'92	56	4	3	10	22,350	. . . .	1,839	. . . .	280	. .	. .
No. 6	Parke Co. Coal Co., Rosedale .	Apr. 19,'92	114	18	12	19¾	29,000	. . . .	7,947.14	. . . .	2,247.10	. .	. .
No. 7	Parke Co. Coal Co., Rosedale .	Apr. 19,'92	55	8	5	8	32,840	. . .	2,281.2	. . . .	787.10	. .	. .
No. 8	Parke Co. Coal Co., Rosedale .	Apr. 19,'92	21	5	2	26	15,600	. . . .	1,091.4	. . . .	450	. .	. .
No. 9	Parke Co. Coal Co, Rosedale .	Apr. 19,'92	76	14	7	20	24,960	. . .	6,735	. . . .	2,335	. .	. .
No. 1 Hudnut.	New Ky. Coal Co., Clinton . . .	Apr. 4,'92	30	10	2	24	. . . .	$250	2,019.8	.	. .	. .	. .
Mecca Mine .	Mecca Mining Co., Mecca Mills	Apr. 12,'92	35	3	3	9½	. . . .	. .	165	721	50	. .	. .
Total . . .	. . . .	. . . . . .	538	74	42	143	. . . .	$250	30,719	721	9,109	. .	. .

Report for May sent out May 6, 1892.

APRIL, 1892.

Cox No. 3 . .	Brazil Block Coal Co., Brazil .	May 11,'92	138	15	9	18	30,000	. . . .	6,950.11	. . . .	2,820	. .	. .
Otter Creek . .	Brazil Block Coal Co., Brazil .	May 11,'92	48	3	3	17	22,000	. . . .	2,355.4	. . . .	320	. .	. .
No. 6	Parke Co. Coal Co., Rosedale .	May 7, '92	120	18	11	19½	27,000	. . . .	7,558	. . .	2,022.10	. .	. .
No. 7 . . .	Parke Co. Coal Co., Rosedale .	May 7, '92	43	7	5	9½	28,000	. . . .	3,124.3	. . .	38	. .	. .
No. 8	Parke Co. Coal Co., Rosedale .	May 7, '92	23	5	2	18½	11,200	. . . .	885.10	. . .	325	. .	. .
No. 9	Parke Co. Coal Co., Rosedale .	May 7, '92	94	12	7	18⅞	23,700	. . . .	5,089.4	. .	1,579.10	. .	. .
No. 1 Hudnut .	New Ky. Coal Co., Clinton .	May 3, '92	35	12	2	23¾	17,000	$700	1,000	3,300	600	. .	. .
Mecca Mine .	Mecca Mining Co., Mecca Mills	May 9, '92	38	3	3	15	13,600	. . .	240	1,037	125	. .	. .
Total . . .	. . . .	. . . . . .	539	75	42	140	. . . .	$700	22,201	4,337	7,839	. .	. .

Reports for June sent out June 7, 1892.

REPORT OF MINES IN PARKE COUNTY FOR THE MONTH OF MAY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Person Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Am't Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Cox No. 3	Brazil Block Coal Co., Brazil	June 20, '92	160	12	8	16½	21,700	....	5,686.14	..	2,500	.	..	
Otter Creek	Brazil Block Coal Co., Brazil	June 20, '92	46	5	3	12	12,000	...	1,562.8	...	200	..	.	
No. 6	Parke Co. Coal Co., Rosedale	June 14, '92	103	18	12	14¼	24,000	..	5,298.11	..	1,448	..	1	Killed by fall of slate.
No. 7	Parke Co. Coal Co., Rosedale	June 14, '92	38	8	5	5½	27,000	....	1,534.5	....			..	
No. 8	Parke Co. Coal Co., Rosedale	June 14, '92	21	5	2	18¾	15,000	....	787.3	....	297		..	
No. 9	Parke Co. Coal Co., Rosedale	June 14, '92	70	13	7	18¼	23,000	....	4,567.11		1,58[illegible]			
No. 1 Hudnut	New Ky. Coal Co., Clinton	June 7, '92	32	15	2	18	36,000	$350	1,500	3,100	..		2	1 leg broken by falling cage; 1 sprained ankle.
Mecca Mine	Mecca Mining Co., Mecca Mills	June 8, '92	41	3	3	18	12,160	150	160	1,500	70	.	..	
Total			511	81	42	121	....	$500	21,184	4,600	6,100	..	3	

Blanks for July sent out July 18, 1892.

JUNE, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Person Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Am't Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Cox No. 3	Brazil Block Coal Co., Brazil	July 15, '92	170	12	8	19	28,320	....	7,128	....	3,360	..	..	
Otter Creek	Brazil Block Coal Co., Brazil	July 15, '92	60	4	3	13	14,330	...	1,911	....	300	..	..	
No. 6	Parke Co. Coal Co., Rosedale	Aug. 7, '92	110	18	12	24¼	23,000	...	8,802.13	...	2,705	..	..	
No. 7	Parke Co. Coal Co., Rosedale	Aug. 7, '92	40	5	5	9	26,000	...	1,707.7	..	642.10	..	..	
No. 8	Parke Co. Coal Co., Rosedale	Aug. 7, '92	27	5	3	24	16,000	...	956.17	.	367.10	..	.	
No. 9	Parke Co. Coal Co., Rosedale	Aug. 7, '92	68	12	7	15⅛	22,000	...	4,088.18		1,417.10	.	..	
No. 1 Hudnut	New Ky. Coal Co., Clinton	July 7, '92	100	25	2	25	35,000	$500	..	3,781	....		.	
Mecca Mine	Mecca Mining Co., Mecca Mills	July 23, '92	39	3	3	12	14,200	....	85	1,640	40	.	..	
Total			615	84	43	142	178,850	$500	24,677	5,421	8,831	..		

Blanks for August sent out August 15, 1892.

JULY, 1892.

Cox No. 3	Brazil Block Coal Co., Brazil	Sept. 5,'92	128	10	8	15	29,600		5,602		2,700			
Otter Creek	Brazil Block Coal Co., Brazil	Sept. 5,'92	71	5	3	24	13,000		3,863		600			
No. 6	Parke Co'ty Coal Co., Rosedale	Sept. 16 '92	107	18	12	19¾	21,800		7,879.14		2,395.10			
No. 7	Parke Co'ty Coal Co., Rosedale	Sept. 16,'92	45	5	5	7¼	23,000		1,623.17		517.10			
No. 8	Parke Co'ty Coal Co., Rosedale	Sept. 16,'92	32	5	3	20⅓	16,000		944.03		351.10			
No. 9	Parke Co'ty Coal Co., Rosedale	Sept. 16,'92	63	12	6	11¼	21,000		2,585.15		1,035			
No. 1 Hudnut	New Ky. Coal Co., Clinton	Aug. 20,'92	75	16	5	21½	70,000	$203		3,771				
Mecca Mine	Mecca Mining Co., Mecca	Aug. 26,'92	39	3	3	8	14,200		76	892	25			
Total			560	74	45	127		$203	22,064	4,663	7,627			

Blanks for September sent out September 16, 1892.

AUGUST, 1892.

Cox No. 3	Brazil Block Coal Co., Brazil	Sept 30,'92	117	12	8	22	27,320		6,380		3,160		1	
Otter Creek	Brazil Block Coal Co., Brazil	Sept. 30,'92	52	5	3	26	10,000		4,093		620			
No. 6	Parke Co'ty Coal Co., Rosedale	Oct. 13,'92	97	17	12	24	22,000		8,696.02		2,500			
No. 7	Parke Co'ty Coal Co., Rosedale	Oct. 13,'92	45	5	5	11¾	21,000		2,537.05		867.10			
No. 8	Parke Co'ty Coal Co., Rosedale	Oct. 13,'92	35	5	3	23	16,000		1,098.04		425			
No. 9	Parke Co'ty Coal Co., Rosedale	Oct. 13,'92	62	11	6	17	22,000		3,931.05		1,512.10			
No. 1 Hudnut	New Ky. Coal Co., Clinton	Sept. 7,'92	60	17	4	21⅓	60,000	$133		4,728				Escape shaft finished.
Mecca Mine	Mecca Mining Co., Mecca	Sept. 21,'92	40	3	3	13	14,380	1,015	331	784	145			Air shaft finished.
Total			508	75	44	158		$1,148	27,063	5,512	9,229		1	

Blanks for October sent out October 19, 1892.

SEPTEMBER, 1892.

Cox No. 3	Brazil Block Coal Co., Brazil	Oct. 23,'92	130	13	7	21	28,700		5,995		2,860			
Otter Creek	Brazil Block Coal Co., Brazil	Oct. 23,'92	62	5	3	24	10,000		3,701		420			
No. 6	Parke Co'ty Coal Co., Rosedale	Nov. 26,'92	95	16	12	24	27,000		8,463.04		2,665			
No. 7	Parke Co'ty Coal Co., Rosedale	Nov. 26,'92	30	5	3	24¼	18,000		1,283.14		537.10			
No. 8	Parke Co'ty Coal Co., Rosedale	Nov. 26,'92	43	5	4	12¾	23,000		2,546.09		870			
No. 9	Parke Co'ty Coal Co., Rosedale	Nov. 26,'92	63	10	6	22	24,000		4,263.17		1,597.10			
No. 1 Hudnut	New Ky. Coal Co., Clinton	Oct. 21,'92	70	17	5	23	30,000			5,400				
Mecca Mine	Mecca Mining Co., Mecca	Oct. 28,'92	42	4	4	21	17,280		1,280	785	620			
Total			535	75	44	172			27,331	6,185	9,569			

REPORT OF MINES IN PARKE COUNTY FOR THE MONTH OF OCTOBER, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air Per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured Into Coke.	No. Accidents.	REMARKS.
Cox No. 3	Brazil Block Coal Co., Brazil	Nov. 16,'92	135	12	8	24	27,180	....	6,990	....	3,440	..	..	
Otter Creek	Brazil Block Coal Co., Brazil	Nov. 16,'92	46	5	1	17	10,000	....	2,160	....	340	..	..	
No. 6	Parke Co'ty Coal Co., Rosedale	Nov. 26,'92	100	17	13	22¼	28,000	....	8,653.04	....	2,587.10	..	1	Killed by slate.
No. 7	Parke Co'ty Coal Co., Rosedale	Nov. 26,'92	45	5	4	17½	23,000	....	2,989.19	....	1,052.10	..	..	
No. 8	Parke Co'ty Coal Co., Rosedale	Nov. 26,'92	32	5	3	23⅓	18,000	....	1,554.08	....	647.10	..	..	
No. 9	Parke Co'ty Coal Co., Rosedale	Nov. 26,'92	65	10	7	20⅓	24,000	....	4,218.13	....	1,457.10	..	..	
No. 1 Hudnut	New Ky. Coal Co., Clinton	Nov. 24,'92	93	17	5	22¼	30,000	....	....	6,914.05	....	..	..	
Mecca Mine	Mecca Mining Co., Mecca	Jan. 18,'93	45	3	4	24	19,780	....	1,064	900	405	..	..	
Total	....	......	561	74	45	171	....	....	27,628	7,814	9,928	..	1	

Blanks for November and December sent out December 14, 1892.

NOVEMBER, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air Per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured Into Coke.	No. Accidents.	REMARKS.
Cox No. 3	Brazil Block Coal Co., Brazil	Jan. 17,'93	150	14	8	21	34,420	$300	7,017	....	2,520	..	..	
Otter Creek	Brazil Block Coal Co., Brazil	Feb. 3,'93	50	17	2	20	10,000	1,000	1,526	....	....	..	..	
No. 6	Parke Co'ty Coal Co., Rosedale	Feb. 3,'93	98	16	12	21¾	27,800	....	8,877.19	....	2,795	..	..	
No. 7	Parke Co'ty Coal Co., Rosedale	Feb. 3,'93	47	5	4	16¼	22,700	....	2,680.14	....	1,027.10	..	..	
No. 8	Parke Co'ty Coal Co., Rosedale	Feb. 3,'93	33	5	3	21¼	17,000	....	1,854.19	....	235	..	..	
No. 9	Parke Co'ty Coal Co., Rosedale	Feb. 3,'93	67	10	7	23	23,000	....	4,535.06	....	1,530	..	..	
No. 1 Hudnut	New Ky. Coal Co., Clinton	Dec. 16,'92	86	16	6	17	30,000	....	....	5,965	....	..	..	
No. 2 Hudnut	New Ky. Coal Co., Clinton	Dec. 16,'92	13	13	.	23	....	....	....	30	....	..	3	1 killed, 2 seriously [injured.
Mecca Mine	Mecca Mining Co., Mecca	Jan. 18,'93	49	4	4	22	19,780	....	1,227	1,028	495	..	..	
Total	....	......	593	100	46	185	....	$1,300	26,716	7,023	8,902	..	3	

DECEMBER, 1892.

Cox No. 3 . .	Brazil Block Coal Co., Brazil .	Jan. 17,'93	148	16	9	24	28,240	$400	8,793	. . .	1,920	. .	. .
Otter Creek . .	Brazil Block Coal Co., Brazil .	Jan. 17,'93	50	6	2	20	10,000	200	2,299	. . . .	340	. .	. .
No. 6	Parke C'ty Coal Co., Rosedale.	Feb. 3,'93	93	17	12	23¾	26,000	. . . .	9,476 5	. . . .	2,770	. .	. .
No. 7	Parke C'ty Coal Co., Rosedale.	Feb. 3,'93	44	5	13	17¾	23,000	. . . .	3,391.2	. . . .	1,170.10	. .	. .
No. 8	Parke C'ty Coal Co., Rosedale.	Feb. 3,'93	38	5	3	22½	18,000	. . . .	2,181.3	. .	927.10	. .	. .
No. 9	Parke C'ty Coal Co., Rosedale.	Feb. 3,'93	63	10	6	23	22,000	. . . .	5,083	. . . .	1,677.10	. .	. .
No. 1 Hudnut.	New Ky. Coal Co., Clinton . .	Jan. 11,'93	67	18	7	19	30,000	. . . .	5,375	. . . .	. . . .	. .	. .
No. 2 Hudnut.	New Ky. Coal Co., Clinton . .	Jan. 11,'93	18	13	. .	27	. .	. . . .	627	. . . .	. . . .	. .	. .
Mecca Mine .	Mecca Mining Co., Mecca . . .	Feb. 8,'93	53	4	5	24	20,800	150	1,140	1,220	510	. .	. .
Total . . .	. . . .	. . . . . .	574	94	57	202	. . . .	$750	38,318	1,220	9,314	. .	. .

REPORT OF MINES IN FOUNTAIN COUNTY FOR THE EIGHT MONTHS ENDING DECEMBER 31, 1892.

Shipman . . .	Shipman Coal Co., Cayuga . .	Aug. 11,'92	28	6	2	5½	. . . .	$365	. . . . .	388	. . .	. .	. .
Shipman . . .	Shipman Coal Co., Cayuga . .	Aug. 11,'92	37	6	2	11	. . . .	120	. . . .	1,003	. . . .	. .	. .
Shipman . . .	Shipman Coal Co., Cayuga . .	Aug. 11,'92	33	6	2	11½	. . .	. . . .	. . . . .	1,036.4	. . . .	. .	. .
Shipman . . .	Shipman Coal Co., Cayuga . .	Sept. 8,'92	36	6	2	21	. . . .	220	. . . . .	1,806.10	. . . .	. .	. .
Shipman . . .	Shipman Coal Co., Cayuga . .	Oct. 26,'92	31	6	3	22½	5,160	336	283	1,101	85	. .	. .
Shipman . . .	Shipman Coal Co., Cayuga . .	Nov. 18,'92	32	6	3	18½	4,800	265	135	1,070	120	. .	. .
Shipman . . .	Shipman Coal Co., Cayuga . .	Dec. 31,'92	38	7	3	19	8,200	. . . .	351.10	1,965	100	. .	. .
Shipman . . .	Shipman Coal Co., Cayuga . .	Jan. 13,'93	43	7	3	13½	9,800	550	280.15	2,384	125	. .	. .
Total . . .	. . . .	. . . . . .	318	50	20	. . .	. . . .	. . . .	1,049	10,753	430	. .	. .

REPORT OF MINES IN OWEN COUNTY FOR THE TWELVE MONTHS ENDING DECEMBER 31, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Lancaster. . .	Lancaster Coal Co., Clay City .	Feb. 18,'92	70	6	5	21	. . . .	. . . .	3,800	. . . .	1,200	. .	. .	
Lancaster. . .	Lancaster Coal Co., Clay City .	Apr. 22,'92	60	5	7	13	. . . .	. . . .	2,531.40	. . . .	940	. .	. .	
Lancaster. . .	Lancaster Coal Co., Clay City .	Apr. 22,'92	63	5	7	13	. . . .	. . . .	3,160.6	. . . .	1,133.8	. .	. .	
Lancaster. . .	Lancaster Coal Co., Clay City .	May 18,'93	62	5	6	17	. . . .	. . . .	3,038	. . . .	1,172	. .	. .	
Lancaster. .	Lancaster Coal Co., Clay City .	Aug. 11,'93	50	5	3	19	. . . .	. . . .	1,716.11	. . . .	1,083.6	. .	. .	
Lancaster. . .	Lancaster Coal Co , Clay City .	Aug. 11,'93	60	5	3	12	. . . .	. . . .	1,840.12	. . . .	687.4	. .	. .	
Lancaster. . .	Lancaster Coal Co., Clay City .	Sept. 3,'92	60	5	3	21	. . . .	. . . .	2,357.12	. . . .	922.12	. .	. .	
Lancaster. . .	Lancaster Coal Co., Clay City .	Oct. 5,'92	52	5	3	21	. . . .	. . . .	2,402.18	. . . .	871.5	. .	. .	
Lancaster. . .	Lancaster Coal Co., Clay City .	Nov. 16,'92	60	5	4	22	. . . .	. . . .	2,155.6	. . . .	845.15	. .	. .	
Lancaster.	Lancaster Coal Co., Clay City .	Dec. 21,'92	45	5	4	21	. . . .	. . . .	2,420	. . . .	807	. .	. .	
Lancaster. . .	Lancaster Coal Co., Clay City .	Dec. 21,'92	47	5	4	22	. . . .	. . . .	2,713	. . . .	892	. .	. .	
Lancaster. . .	Lancaster Coal Co., Clay City .	Feb 7,'93	48	5	5	21	. . . .	. . . .	2,686.16	. . . .	893.9	. .	. .	
Eagle Creek .	J. F. Hyatt, Coal City	Aug. 20,'92	13	3	1	21¼	6,970	. . . .	353	. . . .	100	. .	. .	
Eagle Creek .	J. F. Hyatt, Coal City	Oct. 12,'92	15	4	2	27	. . . .	. . . .	532	. . . .	. . . .	. .	. .	
Eagle Creek .	J. F. Hyatt, Coal City	Nov. 7,'92	7	1	1	25	5,200	. . . .	349	. . . .	150	. .	. .	
Eagle Creek .	J. F. Hyatt, Coal City	Nov. 7,'92	7	1	1	19½	. . . .	. . . .	171	. . . .	25	. .	. .	
Eagle Creek .	J. F. Hyatt, Coal City	Dec. 23,'92	16	4	2	19	9,700	. . . .	217	. . . .	75	. .	. .	
Eagle Creek .	J. F. Hyatt, Coal City	Feb. 13,'93	24	3	2	23	3,400	. . . .	598	. . . .	100	. .	. .	
Total . . .	. . . .	. . . . . .	759	77	. .	. . .	. . . .	. . . .	33,058	. . . .	11,945	. .	. .	

REPORT OF MINES IN VERMILLION COUNTY FOR THE MONTH OF JANUARY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
No. 1	Norton Creek Coal Co., Clinton	Feb. 11,'92	62	18	7	13	. . . .	. . . .	1,809.4	. . . .	570	. .	. .	
No. 2	Norton Creek Coal Co., Clinton	Feb. 11,'92	40	27	5	20	. . . .	. . . .	3,871.9	. . . .	770	. .	. .	
No. 3 . . .	Norton Creek Coal Co., Clinton	Feb. 11,'92	83	20	5	15	. . . .	$322.98	4,286.6	. . . .	1,150	. .	. .	
Hazel Creek .	Hazel Creek Coal Co., Clinton	Mar. 11,'92	101	12	13	21	. . . .	500	3,376	. . .	1,219	. .	. .	
Thomson . . .	Thomas Hill Coal Co., Clinton	May 16,'92	55	7	3	13	5,225	. . .	1,435	1,823	803	. .	. .	
Total . . .	. . . .	. . . . . .	341	84	33	82	. . .	$823.98	14,777	1,823	4,512	. .	. .	

REPORT OF MINES IN VERMILLION COUNTY FOR THE MONTH OF FEBRUARY, 1892.

Nort'n Creek—													
No. 1 . . .	Norton Creek Coal Co., Clinton	July 20,'92	58	20	6	16	. . . .	. . . .	2,521	. . . .	1,176	. .	. .
No. 2 . . .	Norton Creek Coal Co., Clinton	July 20,'92	76	10	8	21	. . . .	. . . .	3,778	. . . .	1,225	. .	. .
No. 3 . . .	Norton Creek Coal Co., Clinton	July 20,'92	120	14	7	13	. . . .	. . . .	4,559	. . . .	1,210	. .	. .
Hazel Creek .	Hazel Creek Coal Co., Clinton.	Mar. 11,'92	106	14	13	18	. . . .	$500	3,425	. .	1,267	. .	. .
Thomson Hill	Thomson Hill Coal Co., Clinton	May 16,'92	60	7	3	11	5,225	. . . .	1,285	1,892	715	. .	. .
Total . .	. . . .	. . . . . .	420	65	37	79	. . . .	$500	15,568	1,892	5,593	.	. .

MARCH, 1892.

Nort'n Creek—													
No. 1 . . .	Norton Creek Coal Co., Clinton	July 20,'92	56	20	6	18	. . . .	. . . .	2,291	. . . .	975	. .	. .
No. 2 .	Norton Creek Coal Co., Clinton	July 20,'92	104	14	9	19	. . . .	. . . .	4,511	. . . .	1,425	. .	. .
No. 3 . . .	Norton Creek Coal Co., Clinton	July 20,'92	120	16	7	19	. . . .	. . . .	7,066	248	2,401	. .	. .
Hazel Creek .	Hazel Creek Coal Co., Clinton.	Apr. 12,'92	90	10	12	12	. . . .	$100	3,190	. . . .	1,180	. .	.
Fern Hill . . .	Hazel Creek Coal Co., Clinton.	Apr. 12,'92	50	5	2	12	. . . .	. . . .	2,479	. . . .	1,030	. .	. .
Thomson Hill	Thomson Hill Coal Co., Clinton	May 16,'92	55	7	3	13	5,225	. . . .	1,435	1,623	803	. .	. .
Total . . .	. . . .	. . . . . .	475	72	39	93	. . .	$100	20,972	2,071	7,814	. .	. .

Blanks for May Sent out May 6, 1892.

APRIL, 1892.

Nort'n Creek—													
No. 1 . . .	Norton Creek Coal Co., Clinton	July 20,'92	48	8	7	20	. . . .	. . . .	2,507	. . . .	1,045	. .	. .
No. 2 . . .	Norton Creek Coal Co., Clinton	July 20,'92	86	11	9	15	. . . .	. . . .	2 880	. . . .	1,145	. .	. .
No. 3 .	Norton Creek Coal Co., Clinton	July 20,'92	114	12	7	20	. . . .	. . . .	6,460	. . . .	2,305	. .	. .
Hazel Creek .	Hazel Creek Coal Co., Clinton.	May 11,'92	80	10	10	19	. . . .	. . . .	4,369	. . . .	1,615	. .	. .
Fern Hill . . .	Hazel Creek Coal Co., Clinton.	May 11,'92	50	5	2	12½	. . . .	$340	2,326	. . . .	845	. .	. .
Thomson Hill	Thomson Hill Coal Co., Clinton	May 16,'92	40	6	3	7	5,225	525	700	349	305	. .	. .
Total . . .	. . . .	. . . .	418	50	38	93½	. . . .	$865	19,242	349	7,260	. .	. .

Blanks for June sent out June 7, 1892.

REPORT OF MINES IN VERMILLION COUNTY FOR THE MONTH OF MAY, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Nort'n Creek—														
No. 1 . . .	Norton Creek Coal Co., Clinton	July 20, '92	32	5	5	13	. . . .	. . . .	1,104	. . . .	660	. .	. .	
No. 2 . .	Norton Creek Coal Co., Clinton	July 20, '92	114	12	9	13	. . . .	. . . .	2,474	. . . .	1,145	. .	. .	
No. 3 . . .	Norton Creek Coal Co., Clinton	July 20, '92	128	14	7	14	. . . .	. . . .	4,999	. . . .	1,635	. .	. .	
Hazel Creek .	Hazel Creek Coal Co., Clinton.	June 18, '92	80	15	13	21	. . . .	. . . .	2,914	. . . .	1,200	. .	. .	
Fern Hill. . .	Hazel Creek Coal Co., Clinton.	June 18, '92	57	10	3	21	. . . .	. . . .	4,528	. . . .	1,598	. .	. .	
Thomson Hill	Thomson Hill Coal Co., Clinton	June 9, '92	57	8	3	20	5,525	$315	1,576	1,732	975	. .	. .	
Total . . .	. . . .	. . . . . .	468	64	40	102	. . . .	$315	17,595	1,732	7,213	. .	. .	

Blanks for July sent out July 18, 1892.

JUNE, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Nort'n Creek—														
No. 1 . . .	Norton Creek Coal Co., Clinton	July 20, '92	. . .	. .	. .	. . .	. . . .	. . . .	. . . .	. . . .	. . . .	. .	. .	Shut down.
No. 2 . . .	Norton Creek Coal Co., Clinton	July 20, '92	108	12	9	9	. . . .	. . . .	2,384	830	840	. .	. .	
No. 3 . . .	Norton Creek Coal Co., Clinton	July 20, '92	114	14	7	14	. . . .	. . . .	4,482	879	1,307	. .	. .	
Hazel Creek .	Hazel Creek Coal Co., Clinton.	Aug. 20, '92	70	15	12	9	. . .	. . . .	1,735	. . . .	602	. .	. .	
Fern Hill. . .	Hazel Creek Coal Co., Clinton.	Aug. 20, '92	65	5	2	10	.	. . . .	2,785	. .	910	. .	. .	
Thomson Hill	Thomson Hill Coal Co., Clinton	July 19, '92	45	6	3	20	5,550	$175	2,000	465	425	. .	. .	
Total . . .	. . . .	. . . . . .	402	52	33	62	. . . .	$175	13,386	2,174	4,084	. .	. .	

Blanks for August sent out August 15, 1892.

JULY, 1892.

Norton Creek—													
No. 1	Norton Creek Coal Co., Clinton	. . . . . .	. . .	. .	. .	. . .	. . . .	. . . .	. . . . . .	. . . .	. . . .	. .	. .
No. 2	Norton Creek Coal Co., Clinton	Dec. 14, '92	106	20	8	10	. . . .	. . . .	1,100	1,200	500	. .	. .
No. 3	Norton Creek Coal Co., Clinton	Dec. 14, '92	106	17	7	13	. . . .	. . . .	4,252	267	670	. .	. .
Hazel Creek .	Hazel Creek Coal Co., Clinton.	Aug. 20, '92	60	14	12	9	. . . .	. . . .	2,561	. . . .	840	. .	. .
Fern Hill. . .	Hazel Creek Coal Co., Clinton.	Aug. 20, '92	70	7	3	11	. . . .	. . . .	2,797	. . . .	932	. .	. .
Thomson Hill	Thomson Hill Co., Clinton . .	Sept. 1, '92	45	6	4	18	5,517	$75	1,509	1,359	835	. .	. .
Total . . .	. . . .	. . . . . .	387	64	34	61	. . . .	$75	12,219	2,826	3,777	. .	. .

Blanks for September sent out September 16, 1892.

AUGUST, 1892.

Norton Creek—													
No. 1	Norton Creek Coal Co., Clinton	. . . . . .	. . .	. .	. .	. . .	. . . .	. . . .	. . . . . .	. . . .	. . . .	. .	. .
No. 2	Norton Creek Coal Co., Clinton	Dec. 14, '92	92	20	8	13	. . . .	. . . .	2,337	87	1,331	. .	. .
No. 3	Norton Creek Coal Co., Clinton	Dec. 14, '92	108	18	7	12	. . . .	. . . .	2,511	1,868	702	. .	. .
Hazel Creek .	Hazel Creek Coal Co., Clinton.	Sept. 20, '92	80	10	11	15	. . . .	. . . .	3,996	. . . .	1,332	. .	. .
Fern Hill. . .	Hazel Creek Coal Co., Clinton.	Sept. 20, '92	75	7	2	18	. . . .	. . . .	4,334	. . . .	1,082	. .	. .
Thomson Hill.	Thomson Hill Co., Clinton . .	Oct. 25, '92	50	8	4	21	5,000	$75	3,511	. . . .	975	. .	. .
Total . . .	. . . .	. . . . . .	405	63	32	79	. . . .	$75	17,289	1,955	5,423	. .	. .

Blanks for October sent out October 19, 1892.

SEPTEMBER, 1892.

Norton Creek—													
No. 1	Norton Creek Coal Co., Clinton	. . . . . .	. . .	. .	. .	. . .	. . . .	. . . .	. . . . . .	. . . .	. . . .	. .	. .
No. 2	Norton Creek Coal Co., Clinton	Dec. 14, '92	85	20	8	23	. . . .	. . . .	3,941	. . . .	1,800	. .	. .
No. 3	Norton Creek Coal Co., Clinton	Dec. 14, '92	108	19	7	21	. . . .	. . .	5,308	2,734	1,685	. .	. .
Hazel Creek .	Hazel Creek Coal Co., Clinton.	Oct. 12, '92	65	12	11	19	. . . .	. . . .	4,189	. . . .	1,300	. .	. .
Fern Hill. . .	Hazel Creek Coal Co., Clinton.	Oct. 12, '92	80	7	3	21	. . . .	. . . .	6,186	. . . .	2,000	. .	. .
Thomson Hill.	Thomson Hill Co., Clinton . .	Oct. 25, '92	51	8	4	23	5,100	$300	3,762	. . . .	1,025	. .	. .
Total . . .	. . . .	. . . . . .	389	66	33	107	. . . .	$300	23,386	2,734	7,810	. .	. .

REPORT OF MINES IN VERMILLION COUNTY FOR THE MONTH OF OCTOBER, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air Per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured Into Coke.	No. Accidents.	REMARKS.
NortonCreek—														
No. 1 . .	Norton Creek Coal Co., Clinton	. . . .				. . .	. . . .	. . . .	. . . .	. . . .	. . . .	. .	. .	
No. 2 . .	Norton Creek Coal Co., Clinton	Dec. 14, '92	93	20	8	23	. . . .	. . .	3,965	. . .	1,918	. .		
No. 3 . .	Norton Creek Coal Co., Clinton	Dec. 14, '92	103	19	7	20	. . . .	. . .	5,278	. . . .	2,159	. .	. .	
Hazel Creek .	Hazel Creek Coal Co., Clinton.	Nov. 16, '92	72	12	10	19	. . .	. . .	4,990	. . . .	1,995	. .	. .	
Fern Hill. .	Hazel Creek Coal Co., Clinton.	Nov. 16, '92	90	10	4	21	. . . .	. . . .	6,690	. . . .	2,230	. .	. .	
Thomson Hill.	Thomson Hill Co., Clinton . .	Jan. 23, '93	57	9	4	21	6,000	$525	3,650	2,673	1,205		. .	
Total . . .	. . . .	. . . .	415	70	33	104	. . .	$525	24,573	2,673	9,507	. .	.	

Blanks for November and December sent out December 9, 1892.

NOVEMBER, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air Per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured Into Coke.	No. Accidents.	REMARKS.
NortonCreek—														
No. 1	Norton Creek Coal Co., Clinton	Dec. 14, '92	.	. .	. .	. . .	. . . .	. .	. . .	. . . .	. . .	. .	. .	
No. 2	Norton Creek Coal Co., Clinton	Dec. 14, '92	93	24	8	23	. . . .	. . . .	3,935	. . .	1,478	. .	. .	
No. 3	Norton Creek Coal Co., Clinton	Dec. 14, '92	103	18	7	19	. . .	. . .	6,687	. . . .	2,127	. .	. .	
Hazel C'k No. 1	Hazel Creek Coal Co., Clinton.	Jan. 20, '93	85	12	11	18	. . .	. . .	5,113	. . . .	1,370	. .	. .	
Fern Hill. .	Hazel Creek Coal Co., Clinton.	Jan. 20, '93	101	10	5	19	. . . .	. . . .	7,610	. . . .	2,250	. .	. .	
Thomson Hill.	Thomson Hill Co., Clinton . .	Dec. 21, '92	55	10	4	22	5,500	$500	4,153	. . . .	1,305	. .	. .	
Total . . .	. . . .	. . . . . .	437	74	35	101	5,500	$500	27,498	. . . .	8,530	.	. .	

DECEMBER, 1892.

Norton Creek—														
No. 2	Norton Creek Coal Co., Clinton	Jan. 23, '93	87	14	8	21	. . . .	. . . .	3,850	. . . .	1,456	. .	. .	
No. 3 .	Norton Creek Coal Co., Clinton	Jan. 23, '93	106	15	7	21	. .	. . .	6,635	1,275	2,387	. .	. .	
Hazel C'k No. 1	Hazel Creek Coal Co., Clinton.	Jan. 20, '93	87	12	12	21	12,300	. .	5,823	. . . .	1,630	. .	. .	
Fern Hill. . .	Hazel Creek Coal Co., Clinton.	Jan. 20, '93	105	11	6	22	12,400	$370	9,097	. . . .	3,030	.	. .	
Thomson Hill.	Thomson Hill Co, Clinton . .	Jan. 23, '93	59	9	4	22	6,300	1,325	3,224	2,508	1,545	. .	. .	
Total . . .	. . . .	. . . . .	444	61	37	107	. . . .	$1,695	28,619	3,783	9,048	. .	. .	

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF JANUARY, 1892.

Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil .	Feb. 12, '92	78	5	3	22	11,520	. . . .	3,768.3	. . . .	760	. .	. .	
No. 2 . . .	Brazil Block Coal Co., Brazil .	Feb. 12, '92	41	4	2	21	7,5 0	. . . .	1,764.5	. . . .	180	. .	. .	
No. 3	Brazil Block Coal Co., Brazil .	Feb. 12, '92	55	5	3	23	8,250	. . . .	3,988.9	. . . .	580	. .	. .	
No. 4	Brazil Block Coal Co., Brazil .	Feb. 12, '92	55	5	1	24	6,480	$500	2,475.8	. . . .	520	. .	. .	
No. 6	Brazil Block Coal Co., Brazil .	Feb. 12, '92	33	5	4	22	7,650	. . . .	1,649.12	. . . .	240	. .	2	By premature blast.
No. 7 . . .	Brazil Block Coal Co., Brazil .	Feb. 12, '92	45	4	4	23	6,760	. . . .	2,210.13	. . . .	280	. .	. .	
No. 8	Brazil Block Coal Co., Brazil .	Feb. 12, '92	137	9	10	24	19,920	. . . .	4,145.4	2,091	520	. .	1	Falling slate.
No. 9	Brazil Block Coal Co., Brazil .	Feb. 12, '92	154	8	10	22	21,390	. . . .	7,460	189.10	1,600	. .	. .	
No. 10 . . .	Brazil Block Coal Co., Brazil .	Feb. 12, '92	62	6	6	23½	10,777	. . .	3,209.8	266.10	400	. .	. .	
Chicago. . .	Brazil Block Coal Co., Brazil .	Feb. 12, '92	62	8	8	19½	10,500	. . .	1,995.7	. . .	100	. .	. .	
Crawford No. 2	Crawford Coal Co., Brazil . . .	Mar. 5, '92	126	6	9	25	27,530	. . . .	5,706.15	546.10	1,026	. .	. .	
Crawford No. 3	Crawford Coal Co., Brazil .	Mar. 5, '92	64	6	1	23	16,530	. . . .	2,327.15	. . .	396	. .	.	
Crawford No. 4	Crawford Coal Co., Brazil	Mar. 5, '92	30	6	4	25	9,690	. . . .	4,940.4	3,991.11	504	. .	. .	
Nickle-Plate .	Jackson Coal Mining Co., Brazil	Feb. 24, '92	70	5	4	25	9,000	. . . .	2,695.11	. . . .	440	.	1	Falling slate.
Chicago. . .	Nickel-Plate Mining Co., Brazil	Feb. 24, '92	120	7	8	25	15,000	. . . .	4,125.19	. . . .	800	.	.	
Newburg . . .	P. Ehrlich & Co., Turner .	Feb. 18, '92	113	9	4	22	44,100	. . .	4,194.9	. . . .	3,360	.	. .	
Oak Hill .	P. Ehrlich & Co., Turner .	Feb. 18, '92	45	5	2	13	730	. .	919.3	. . . .	200	. .	1	Falling slate.
Nellie	Otter Creek Coal Co, Brazil . .	Feb. 15, '92	105	7	4	24	. . .	. . .	4,407	. . . .	660	.	. .	
Gartside . . .	Watson, Little & Co., Brazil .	Feb. 11, '92	141	8	11	23	. . . .	. . . .	5,601	. . . .	1,400	. .	2	Bank cars and falling slate.
Columbia . . .	Zeller & Sigler, Knightsville .	Feb. 11, '92	100	5	6	20	18,000	1,500	5,500	. . . .	1,475	. .	1	Cage.
Diamond . . .	Zeller & Sigler, Knightsville .	Feb. 11, '92	20	3	2	20	15,500	150	1,200	. . . .	150	. .	. .	
Eureka	Eureka Block Coal Co., Carbon	Feb. 19, '92	97	8	4	26	13,000	450	4,287	. . . .	1,027	. .	. .	
Morris . . .	Sherburn Coal Co., Brazil . . .	Feb. 20, '92	45	6	4	23	. . . .	. . . .	2,340	. . . .	600	.	. .	
Hoosier	Hoosier Coal Co., Brazil . . .	Mar. 5, '92	45	5	1	22	. . . .	. . .	1,943.15		.	.	. .	
Reddies .	C. B. Reddee & Son, Brazil . .	Feb. 12, '92	10	3	. .	22	. . . .	. . .	478	. . . .	50	. .	. .	
World's Fair .	D. H. Coal Co., Knightsville . .	Feb. 18, '92	100	6		25	10,000	. . . .	3,690	. . . .	640	. .	. .	
Church Hill .	Weaver, Getz & Co., Center Pt.	Feb. 24, '92	. . .	5	5	16	. . . .	125	1,377.7	. . . .	260	. .	. .	

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF JANUARY, 1892—Continued.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Vandalia	Williams & Givens, Center Pt.	Feb. 18, '92	35	4	2	20			1,000					
Briar Hill	Morrier Coal Co., Clay City	Feb. 24, '92	64	7	5	26	12,800		1,300		400			
Newburg	Gartsherre Coal Co., Brazil	Feb. 22, '92	92	11	3	20			3,824.10		2,240			
Pratt Mine	Coal Bluff Co., Terre Haute	Feb. 24, '92	99	8	9					2,060				
Anchor	Coal Bluff Co., Terre Haute	Feb. 24, '92	72	5	6				2,876		700			
Harrison	Ind. Block Coal Co., Terre Haute	Sept. 1, '92	78	8	8	22	23,000		1,956.11	27.16	1,000			
Total			2,393	202	153	691		$2,725	99,973	9,080	22,508		8	

FEBRUARY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	Mar. 28, '92	91	5	5	10½	10,800		2,033.3		260			
No. 2	Brazil Block Coal Co., Brazil	Mar. 28, '92	54	5	3	21	80,700		1,998.6		240			
No. 3	Brazil Block Coal Co., Brazil	Mar. 28, '92	61	5	4	14	7,260			2,545.6	420		1	Killed by falling slate.
No. 4	Brazil Block Coal Co., Brazil	Mar. 28, '92	26	4		13	9,000	$800	1,889.6		320			
No. 6	Brazil Block Coal Co., Brazil	Mar. 28, '92	56	5	4	20	8,740		2,138.13		240			
No. 7	Brazil Block Coal Co., Brazil	Mar. 28, '92	56	5	4	20	7,240		2,309.3		260			
No. 8	Brazil Block Coal Co., Brazil	Mar. 28, '92	135	9	11	18	2,100	100	5,547.11		240			
No. 9	Brazil Block Coal Co., Brazil	Mar. 28, '92	135	8	10	14	25,140		4,260.12		720			
No. 10	Brazil Block Coal Co., Brazil	Mar. 28, '92	63	6	7	20	16,720		3,312.5		400			
Chicago	Brazil Block Coal Co., Brazil	Mar. 28, '92	61	7	7	15	14,150		2,016.18		140			
Crawford No. 2	Crawford Coal Co., Brazil	Mar. 31, '92	146	6	9	24	27,530		4,469.7	1,539.17	810			
Crawford No. 3	Crawford Coal Co., Brazil	Mar. 31, '92	59	6	2	14	16,000		2,571.5		504			
Crawford No. 4	Crawford Coal Co., Brazil	Mar. 31, '92	89	6	4	19	9,410		2,548.3	106	360			
Nickle-Plate	Jackson Coal Co., Brazil	Mar. 11, '92	51	5	4	17	7,500		2,369.13		420			
Chicago	Nickle-Plate Coal Co., Brazil	Mar. 11, '92	97	7	8	15	15,000		3,184.4		580			
Newburg	P. Ehrlich & Co., Turner	Mar. 12, '92	115	9	4	16	38,000		4,097.13		2,160			

Slope	P. Ehrlich & Co., Turner	Mar. 12, '92	31	8	2	5	4,100	....	588.7	....	140	..	..	
Nellie	Otter Creek Coal Co., Brazil	Mar. 7, '92	108	7	4	23	13,920	....	5,154.15	....	960	..	..	
Gartside	Watson, Little & Co., Brazil	Mar. 16, '92	164	12	14	15	...	....	4,505	....	900	..	..	
Columbia	Zeller & Sigler, Knightsville	Mar. 14, '92	125	6	6	16	...	150	4,286	....	1,100	..	..	
Diamond	Zeller & Sigler, Knightsville	Mar 14, '92	40	4	4	18	....	200	1,215	....	200	..	..	
Eureka	Eureka Block Coal Co., Carbon	Mar. 18, '92	98	7	4	22	13,000	450	4,587	....	900	..	..	
Morris	Sherburne Bl'k Coal Co., Brazil	Mar. 12, '92	45	6	4	16	....	....	1,795	....	460	..	..	
Hoosier	Hoosier Block Coal Co., Brazil	Mar. 14, '92	71	5	2	25	....	....	3,011.6	....	....	..	..	
World's Fair	D. H. Davis Coal Co., Knightsv.	Mar. 23, '92	100	7		17	10,000	....	3,931	....	800	..	..	
Church Hill	Weaver, Getz & Co., Center Pt.	Mar. 11, '92	40	5	4	13	....	....	1,198.10	....	260	..	..	
Louise	Weaver, Getz & Co., Center Pt.	Mar. 11, '92	40	4	1	18	....	300	1,731.18	....	500	..	..	
Vandalia	Williams & Givens, Center Pt.	Mar. 28, '92	35	4	2	18	22,000	....	1,100	....	125	..	..	
Briar Hill	Morrier Coal Co., Clay City	April 9, '92	62	7	5	22	80,000	....	1,894	....	575	..	..	
Newburg No. 2	Gartsherre Coal Co., Brazil	Mar. 14, '92	83	12	3	8	22,750	....	1,617.9	133.11	600	..	..	
Pratt	Coal Bluff Co., Terre Haute	Mar. 11, '92	70	7	8	14	18,200	...	1,892.2	22.13	320	..	..	
Anchor	Coal Bluff Co., Terre Haute	Mar. 11, '92	70	5	5	13	10,260	....	2,239	....	340	..	..	
Harrison	Ind. Block Coal Co., Terre Haute	Sep. 1, '92	84	8	8	19	25,000	....	2,143.15	30.8	1,800	..	.	
Total	....	....	2,561	212	152	552	....	$2,000	86,627.96	4,375.55	18,054	..	1	

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF MARCH, 1892.

Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	Apr. 20, '92	88	5	5	10	10,000	....	2,004	...	200	..	..	
No. 2	Brazil Block Coal Co., Brazil	Apr. 20, '92	75	5	5	18	7,715	....	3,046	....	720	..	..	
No. 3	Brazil Block Coal Co., Brazil	Apr. 20, '92	77	5	5	11	9,840	....	2,225	....	300	..	..	
No. 4	Brazil Block Coal Co., Brazil	May 20, '92	18	7	1	1	10,000	$800	27.15	....	....	..	..	
No. 6	Brazil Block Coal Co., Brazil	Apr. 20, '92	56	5	5	22	6,900	....	2,578	....	500	..	..	
No. 7	Brazil Block Coal Co., Brazil	Apr. 20, '92	89	5	5	21	12,400	....	4,206	....	500	..	..	
No. 8	Brazil Block Coal Co., Brazil	Apr. 20, '92	109	8	12	18	23,000	....	6,675	....	880	..	..	
No. 9	Brazil Block Coal Co., Brazil	Apr. 20, '92	79	4	4	9	16,140	....	2,508	....	320	..	..	
No. 10	Brazil Block Coal Co., Brazil	Apr. 20, '92	68	5	8	18	25,622	....	4,049	....	780	..	..	
Chicago	Brazil Block Coal Co., Brazil	Apr. 20, '92	52	7	7	17	9,510	....	2,271	....	180	..	..	
Crawford—														
No. 2	Crawford Coal Co., Brazil	Apr. 19, '92	157	6	9	..	29,680	....	6,180.17	1,033.15	1,256	..	1	Falling coal.
No. 3	Crawford Coal Co., Brazil	Apr. 19, '92	76	6	2	...	17,300	....	3,120.6	...	624	..	..	
No. 4	Crawford Coal Co., Brazil	Apr. 19, '92	92	6	5		9,410	....	2,114.14	825	422	..	..	
Nickle-Plate	Jackson Coal Co., Brazil	Apr. 11, '92	48	5	4	15	10,000	....	2,829.5	....	400	..	..	
Chicago	Nickel-Plate Coal Co., Brazil	Apr. 11, '92	93	7	8	16	16,000	....	3,495.14	....	560	..	..	
Newburg	Pete Ehrlich Coal Co., Turner.	Apr. 9, '92	101	9	4	13	35,000	....	3,278.4	....	2,000	..	..	
Slope	Pete Ehrlich Coal Co., Turner.	Apr. 9, '92	36	5	2	14	5,250	....	1,308	....	320	..	..	
Nellie Mine	Otter Creek Coal Co., Brazil	Apr. 15, '92	125	5	5	25	13,680	....	6,780.11	....	1,200	..	..	
Gartside	Watson, Little & Co., Brazil	May 20, '92	183	11	14	17	14,250	....	5,669	....	1,200	..	..	
Columbia	Zeller & Sigler Coal Co., Knightsville	Apr. 9, '92	125	6	6	17	15,000	....	6,700	....	2,000	..	..	

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF MARCH, 1892—Continued.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Diamond	Zeller & Sigler Coal Co., Knightsville	Apr. 9, '92	36	5	4	17	8,000	....	1,600	...	150	..	..	
Eureka	Eureka Block Coal Co., Carbon	May 9, '92	89	6	4	18	14,500	278	4,200	....	1,000	..	..	
Morris Mine	Sherburn Block Coal Co., Brazil	Apr. 6, '92	35	5	3	14	8,400	....	1,540	....	380	..	..	
Hoosier Mine	Hoosier Coal Co., Brazil	Apr. 9, '92	75	6	3	22	12,570	30	3,500	....	....	..	..	
World's Fair	D. H. Davis Coal Co., Knightsville	Apr. 22, '92	100	7	3	8	11,000	....	2,200	....	550	..	..	
Churchill	Weaver, Getz & Co., Center Point	Apr. 22, '92	90	6	6	23½	....	25	4,121.14	...	1,000	..	..	
Louise	Weaver, Getz & Co., Center Point	Apr. 22, '92	40	5	1	5	....	200	653.17	....	175	..	..	
Vandalia	Williams & Givens, Center P't	Apr. 11, '92	40	4	2	22	2,200	....	1,300	....	....	..	..	
Briar Hill	Morrier Coal Co., Clay City	Apr. 9, '92	57	7	4	19	60,000	65	1,665	....	480	..	..	
Newburg No. 2	Gartsherre Coal Co., Brazil	May 12, '92	80	12	3	9	22,750	....	1,332.16	458.11	675	..	..	
Pratt	Coal Bluff Coal Co., Terre Haute	Apr. 12, '92	20	5	5	12	17,800	....	1,145	...	180	..	..	
Anchor	Coal Bluff Coal Co., Terre Haute	Apr. 12, '92	45	5	5	..	10,800	....	1,376	....	180	..	..	
Diamond	Diamond Block Coal Co., Clay City	....	.	..	..	.	....	....	....	....	....	..	..	
Harrison	Indiana Block Coal Co., Terre Haute	Sept. 1, '92	89	8	8	17	22,000	....	2,051.7	....	1,700	..		
Total	....	......	2,543	213	167	448½	....	$1,398	99,726.40	2,313.26	20,832	..	1	

Reports for May sent out May 6, 1892.

APRIL, 1892.

Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	May 20, '92	76	6	4	17	11,770		3,206.17					
No. 2	Brazil Block Coal Co., Brazil	May 20, '92	44	5	4	18	10,600		2,903.15		500			
No. 3	Brazil Block Coal Co., Brazil	May 20, '92	50	5	5	15	8,140		2,320		360			
No. 4	Brazil Block Coal Co., Brazil	May 20, '92	21	2	1	10	10,000		770.4		180			
No. 6	Brazil Block Coal Co., Brazil	May 20, '92	62	5	6	22	8,970		2,736.8		600		1	Killed by falling slate.
No. 7	Brazil Block Coal Co. Brazil	May 20, '92	79	5	6	20	9,525		3,808.17		660		1	Sprain by falling down shaft from top to bottom vein.
No. 8	Brazil Block Coal Co., Brazil	May 20, '92	126	9	9	24	22,000		6,209.12		440			
No. 9	Brazil Block Coal Co., Brazil	May 20, '92	76	4	5	16	14,720		2,909.18		400			
No. 10	Brazil Block Coal Co., Brazil	May 20, '92	66	5	7	22	15,300		4,217.9		520			
Chicago	Brazil Block Coal Co., Brazil	May 20, '92	44	7	7	21	10,000		1,983.5		100			
Crawford—														
No. 2	Crawford Coal Co., Brazil	June 24, '92	165	6	9	21	29,100		4,744	1,352.13	948.4			
No. 3	Crawford Coal Co., Brazil	June 24, '92	63	5	2	17	13,610		2,961.9		592.17			
No. 4	Crawford Coal Co., Brazil	June 24, '92	67	6	4	21	13,048		2,077.19	1,178.10	415.2			
Nickel-Plate	Jackson Coal Co., Brazil	June 13, '92	43	6	3	29	15,000		2,997		600			
Chicago	Nickle-Plate Coal Co., Brazil	June 13, '92	110	8	7	23	20,000		4,604		800		1	Leg broke by fall of slate.
Newburg	P. Ehrlich & Co., Turner P. O.	May 7, '92	96	9	4	13	38,600		3,501		2,114		1	Sprain by falling coal.
Slope	P. Ehrlich & Co., Turner P. O.	May 7, '92	36	5	2	2	5,250		190		36			
Nellie	Otter Creek Coal Co., Brazil	May 10, '92	100	6	4	25	12,400		5,044		920			
Gartside	Watson, Little & Co., Brazil	May 20, '92	149	12	14	17½	15,920		6,270		1,400			
Columbia	Zeller & Sigler, Knightsville	May 13, '92	130	6	7	19		$150	7,000		2,000			
Diamond	Zeller & Sigler, Knightsville	May 13, '92	30	5	2	17		50	1,350		200			
Banner	Eureka Block Coal Co., Carbon	May 9, '92	95	7	4	16	16,000	309	4,032		900			
Morris	Sherburn Block Co., Brazil	May 6, '92	30	4	2	20	8,400		1,550		400			
Hoosier	Hoosier Coal Co., Brazil	May 21, '92	70	6	3	26	16,493	135	2,959					
World's Fair	D. H. Davis Coal Co., Knightsville	May 26, '92	80	6	2	11	10,000		2,414		650			
Churchill	Weaver, Getz & Co., Center Point	Sept. 1, '92	99	5	4	22	14,500		3,936.3		927			
Louise	Weaver, Getz & Co., Center Point	Sept. 1, '92												Not in operation.
Vandalia	Williams & Givens, Center P't	May 23, '92	40	4	3	18	22,000		1,300					
Briar Hill	Merrier Coal Co., Clay City	May 18, '92	44	6	4	24	60,000	128	1,440		460			
Newburg No. 2	Gartsherre Coal Co., Brazil	May 12, '92	72	12	3	6	22,700		947.11	384.2	525			
Pratt	Coal Bluff Coal Co., Terre Haute	June 7, '92	55	6	6	21	11,250		2,142.11		480			
Anchor	Coal Bluff Coal Co., Terre Haute	June 7, '92	80	5	5	13	11,690		1,095.5		160			

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF APRIL, 1892—Continued.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Black Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Diamond . . .	Diamond Block Coal Co., Clay City . . .	. . . . . .	. . .	. .	. .	. . .	. . . .	. . . .	. . . . .	. . . .	. . . .	. .	. .	
Harrison . . .	Indiana Block Coal Co., Terre Haute	Sept. 1, '92	72	8	8	11	23,000	. . . .	1,060.5	. . . .	100	. .	. .	
Total . . .	. . . .	. . . . .	2,370	196	156	587½	. . . .	$772	94,669.57	2,914.82	19,087¼	.	8	

Reports for June sent out June 7, 1892.

MAY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Black Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Gartsherre—														
No. 1 . . .	Brazil Block Coal Co., Brazil .	June 20,'92	71	5	5	18	12,500	. . . .	2,611	. . . .	360	. .	. .	
No. 2 . . .	Brazil Block Coal Co., Brazil .	June 20,'92	30	4	3	24	12,246	. . . .	1,736.5	. . . .	120	. .	. .	
No. 3 . . .	Brazil Block Coal Co., Brazil .	June 20,'92	56	5	4	18	9,200	. . . .	2,476.10	. . . .	420	. .	. .	
No. 4 . . .	Brazil Block Coal Co., Brazil .	June 20,'92	21	4	1	18	10,000	$350	984	. . . .	200	. .	. .	
No. 6 . . .	Brazil Block Coal Co., Brazil .	June 20,'92	51	5	6	20	10,235	. . . .	2,483.3	. . . .	560	. .	. .	
No. 7 . . .	Brazil Block Coal Co., Brazil .	June 20,'92	75	5	6	20	11,300	. . . .	3,362.9	. . . .	360	. .	. .	
No. 8 . . .	Brazil Block Coal Co., Brazil .	June 20,'92	126	9	10	21	22,000	. . . .	6,075.6	. . . .	740	. .	. .	
No. 9 . . .	Brazil Block Coal Co., Brazil .	June 20,'92	96	4	5	19	22,300	. . . .	3,523.11	. . . .	580	. .	. .	
No. 10. . .	Brazil Block Coal Co., Brazil .	June 20,'92	59	6	7	21	16,000	. . . .	3,640.17	. . . .	500	. .	. .	
Chicago	Brazil Block Coal Co., Brazil .	June 20,'92	45	7	4	20	9,800	. . .	1,598.6	. . . .	60	. .	. .	
Crawford—														
No. 2 . . .	Crawford Coal Co., Brazil	June 24,'92	154	6	9	20	25,610	. . . .	4,617.18	2,464.8	923.18	. .	. .	
No. 3 . . .	Crawford Coal Co., Brazil . . .	June 24,'92	65	5	2	15	19,230	. . . .	2,156.3	. . . .	431.13	. .	. .	
No 4 . .	Crawford Coal Co., Brazil . .	June 24,'92	70	6	5	18	12,127	. . . .	1,811.1	478.11	563.11	. .	. .	
Nickel-Plate .	Jackson Coal Co., Brazil. . . .	June 13,'92	40	4	3	12	15,100	. . . .	891	. . .	175	. .	. .	Abandoned May 15, '92.
Chicago. . . .	Nickel-Plate Co., Brazil .	June 13,'92	100	8	7	24	20,000	. . . .	4,137	. . . .	150	. .	. .	
Newburg . .	P. Ehrlich & Co., Turner, P. O.	June 9,'92	97	8	5	13⅓	46,000	. . . .	8,224.14	. . . .	1,260	. .	. .	
Slope	P. Ehrlich & Co., Turner, P. O.	June 9,'92	. . .	. .	. .	. . .	. . . .	. . . .	. . . . .	. . . .	. . . .	. .	. .	Not in operation.

Nellie	Otter Creek Coal Co., Brazil	June 8,'92	80	5	8	22	11,600	. . . .	3,700.9	. . . .	580	. .	. .	
Gartside	Watson, Little & Co., Brazil	June 8,'92	161	9	14	.	15,607	. . . .	6,088	. . . .	1,500	. .	. .	
Columbia	Zeller & Sigler, Knightsville	June 21,'92	140	6	7	16	15,000	. . . .	7,000	. . . .	2,000	. .	. .	
Diamond	Zeller & Sigler, Knightsville	June 21,'92	28	4	2	21	15,000	. . . .	1,338	. . . .	300	. .	1	Killed by fall of slate.
Banner	Eureka Block Coal Co., Carbon	June 15,'92	128	8	4	18	34,445	250	4,050	. . . .	1,100	. .	. .	
Morris	Sherburn Coal Co., Brazil	July 29,'92	23	3	1	12	2,800	. . . .	1,200	. . . .	300	. .	. .	
World's Fair	D. H. Davis Coal Co., Knghts'v	July 23,'92	100	8	2	9	12,000	. . . .	2,200	. . . .	600	. .	. .	
Church Hill	Weaver, Getz & Co., Center Pt	Sept. 1,'92	85	3	3	16	12,500	. . . .	2,198.18	. . . .	500	. .	. .	
Louise	Weaver, Getz & Co., Center Pt	Sept. 1,'92	22	3	1	3	6,000	. . . .	227.15	. . . .	50	. .	. .	
Vandalia	Williams & Givens, Center Pt.	Sept. 2,'92	. .	. .	. .	9	. . . .	. . . .	450	. . . .	. . . .	. .	. .	
Briar Hill	Monier Coal Co., Clay City	July 28,'92	42	7	4	25	5,600	90	1,815	. . . .	600	. .	. .	
Newburg No. 2	Gartsherre Coal Co., Brazil	Aug. 7,'92	72	12	3	4	22,750	. . . .	907.17	. . . .	400	. .	. .	
Pratt	Coal Bluff Co., Terre Haute	Sept. 17,'92	50	5	5	21½	19,700	. . . .	2,755.15	. . . .	660	. .	. .	
Anchor	Coal Bluff Co., Terre Haute	Sept. 17,'92	65	4	5	20	12,000	. . . .	2,630.18	. . . .	480	. .	. .	
Diamond	Diamond Bl'k C. Co., Clay City	. . . .	. .	. .	. .	. .	. . . .	. . . .	. . . .	. . . .	. . . .	. .	. .	
Hoosier	Hoosier Coal Co., Brazil	Aug. 1,'92	65	5	3	14	15,290	135	1,697.14	. . . .	. . . .	. .	. .	
Harrison	Ind. Bl'k Coal Co., Terre Haute	Sept. 1,'92	74	8	8	23	24,000	. . . .	1,521.2	27.12	1,200	. .	. .	
Total	. . . .	. . . . . .	2,291	181	149	535	. . . .	823	85,102.04	2,969.31	18282.42	. .	1	

Reports for July sent out July 18, 1892.

JUNE, 1892.

Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	July 15,'92	75	5	5	14½	10,000	. . . .	2,783	. . . .	380	. .	. .	
No. 2	Brazil Block Coal Co., Brazil	July 15,'92	38	4	4	23	7,740	. . . .	2,060	. . . .	240	. .	. .	
No. 3	Brazil Block Coal Co., Brazil	July 15,'92	59	5	4	17	11,015	. . . .	2,413	. . . .	480	. .	. .	
No. 4	Brazil Block Coal Co., Brazil	July 15,'92	33	4	1	20	6,780	$500 00	1,161	. . . .	320	. .	. .	
No. 6	Brazil Block Coal Co., Brazil	July 15,'92	69	5	6	23	8,500	. . . .	2,555	. . . .	640	. .	. .	
No. 7	Brazil Block Coal Co., Brazil	July 15,'92	74	6	5	23	12,750	. . . .	3,520	. . . .	440	. .	. .	
No. 8	Brazil Block Coal Co., Brazil	July 15,'92	156	10	11	21	35,712	. . . .	5,152	. . . .	320	. .	. .	
No. 9	Brazil Block Coal Co., Brazil	July 15,'92	130	6	7	23	18,000	. . . .	5,622	. . . .	960	. .	. .	
No. 10	Brazil Block Coal Co., Brazil	July 15,'92	69	6	6	20	14,835	. . . .	3,480	. . . .	500	. .	. .	
Chicago	Brazil Block Coal Co., Brazil	July 15,'92	42	6	4	23	10,500	. . . .	1,967	. . . .	60	. .	. .	
Crawford No. 2	Crawford Coal Co., Brazil	July 22,'92	159	6	9	17	26,750	. . . .	3,386.17	1,656.17	677	. .	. .	
Crawford No. 3	Crawford Coal Co., Brazil	July 22,'92	60	5	3	13	9,680	. . . .	2,623.15	. . . .	525	. .	. .	
Crawford No. 4	Crawford Coal Co., Brazil	July 22,'92	70	7	5	10	11,906	. . . .	354.3	1,657	71	. .	. .	
Chicago	Nickel-Plate Coal Co., Brazil	Sept. 21,'92	80	6	6	19	15,000	. . . .	2,987.15	. . . .	620	. .	. .	
Newburg	P. Ehrlich & Co., Turner, P. O.	July 28,'92	94	9	4	14	22,320	. . . .	3,174.11	. . . .	2,600	. .	. .	
Slope	P. Ehrlich & Co., Turner, P. O.	July 28,'92	. .	. .	. .	. .	. . . .	. . . .	. . . .	. . . .	. . . .	. .	. .	Not in operation.
Nellie	Otter Creek Coal Co., Brazil	July 20,'92	82	6	3	25	11,350	. . . .	3,274.17	. . . .	. . . .	. .	. .	
Gartside	Watson, Little & Co., Brazil	July 22,'92	140	10	11	18½	21,960	. . . .	5,681	. . . .	1,300	. .	. .	
Columbia	Zeller & Sigler, Knightsville	July 27,'92	150	6	7	11	16,000	300 00	5,481	. . . .	1,200	. .	. .	['92.
Diamond	Zeller & Sigler, Knightsville	July 27,'92	25	4	2	19	16,000	. . . .	1,166	. . . .	200	. .	. .	Worked out June 30,
Banner	Eureka Block Coal Co., Carbon	Aug. 30,'92	129	7	4	15	36,485	295 60	3,241.8	. . . .	960.5	. .	. .	['92.
Morris	Sherburn Bl'k Coal Co., Brazil	July 29,'92	20	2	1	15	3,100	. . . .	1,100	. . . .	220	. .	. .	Worked out June 30,

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF JUNE, 1892—Continued.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
World's Fair	D. H. Davis Coal Co., Knights'v	July 23,'92	100	8	2	13	12,000		3,240		800			
Church Hill	Weaver, Getz & Co., Center Pt	Sept. 1,'92	55	3	3	13	12,500		1,217.10		350			
Louise	Weaver, Getz & Co., Center Pt	Sept. 1,'92	60	3	2	21	9,837	200 00	2,752.15		600			
Vandalia	Williams & Givens, Center Pt	Sept. 2,'92				12			720					
Briar Hill	Morrier Coal Co., Clay City	July 28,'92	49	7	4	22	6,800	140 00	2,360		720			
Newburg No. 2	Gartsherre Coal Co., Brazil	Aug. 7,'92	72	12	3	2	22,750		354.1		162			
Pratt	Coal Bluff Co., Terre Haute	Sept. 17,'92	45	5	4	17	21,600		2,347.10		680			
Anchor	Coal Bluff Co., Terre Haute	Sept. 17,'92	60	4	5	12	11,025		1,696.18		220			
Diamond	Diamond Bl'k Co., Clay City	Aug. 17,'92	81	10	6	18	12,500	131 83	2,989		900			
Hoosier	Hoosier Coal Co., Brazil	July 23,'92	60	5	2	13	15,290	17 90	1,701.7				1	Falling slate.
Shiperman														
Harrison	Ind. Bl'k Coal Co., Terre Haute	Sept. 1,'92	76	8	8	12	23,000		1,478.7		1,200			
Total			2,411	190	147	538		$7583 53	84,134.54	3,313.12	1,804.5		1	

Reports for August sent out August 15, 1892.

JULY, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	Sept. 5,'92	95	5	6	21	12,000		3,947		400			
No. 2	Brazil Block Coal Co., Brazil	Sept. 5,'92	39	5	3	23	7,840		1,393		220			
No. 3	Brazil Block Coal Co., Brazil	Sept. 5,'92	67	5	4	23	8,525		3,192		580			
No. 4	Brazil Block Coal Co., Brazil	Sept. 5,'92	39	4	2	24	19,004		1,113		150			
No. 6	Brazil Block Coal Co., Brazil	Sept. 5,'92	54	5	5	23	9,950		2,221		420			
No. 7	Brazil Block Coal Co., Brazil	Sept. 5,'92	56	6	5	22	8,740		2,615		280			
No. 8	Brazil Block Coal Co., Brazil	Sept. 5,'92	160	10	11	15	35,020		6,132		920			
No. 9	Brazil Block Coal Co., Brazil	Sept. 5,'92	155	7	8	24	19,000		7,387		1,460			
No. 10	Brazil Block Coal Co., Brazil	Sept. 5,'92	68	7	6	21	25,401	$400 00	2,889		320			
Chicago	Brazil Block Coal Co., Brazil	Sept. 21,'92	48	6	6	1	10,000		155					
Crawford No. 2	Crawford Coal Co., Brazil	Aug. 30,'92	149	6	9		25,000		4,249.12	1,727.14	845		1	Falling coal.
Crawford No. 3	Crawford Coal Co., Brazil	Aug. 30,'92	51	6	2		16,500		2,507		501			

Crawford No. 4	Crawford Coal Co., Brazil	Aug. 30,'92	55	5	4	...	11,744	...	1,423	388.4	284	..	..	
Chicago	Nickel-Plate Coal Co., Brazil	Sept. 21,'92	82	6	5	22	15,000	....	3,245.7	....	600	..	..	
Newburg	P. Ehrlich & Co., Turner	Sept. 1,'92	97	7	4	16	22,400	....	3,492.12	...	2,328	.		
Slope	P. Ehrlich & Co., Turner													Not in operation.
Nellie	Otter Creek Coal Co., Brazil	Aug. 5,'92	75	6	3	25	12,480	....	3,297	....	600	..	..	
Gartside	Watson, Little & Co., Brazil	Aug. 11,'92	179	10	12	21½	21,630		5,880	...	1,500		1	Killed by falling slate.
Columbia	Zeller & Sigler, Knightsville	Aug. 2,'92	150	8	7	17	23,000	300 00	6,200	....	2,000	.		
Banner	Eureka Block Coal Co., Carbon	Aug. 30,'92	124	8	5	23	31,200	375 00	4,926.11	....	1,231.10	.		
World's Fair	D. H. Davis Coal Co., Knightsv	Sept. 19,'92	140	7	3	16	22,000	...	3,697	....	1,100	..	.	
Church Hill	Weaver, Getz & Co., Center Pt	Oct 18,'92	26	3	2	19	11,500	....	1,465.14	....	275	..	.	
Louise	Weaver, Getz & Co., Center Pt	Oct. 18,'92	50	4	1	10	13,500	150 00	1,570	....	400	..	..	
Vandalia	Williams & Givens, Center Pt.	Aug. 7,'92	40	3	3	18	22,000	...	800	....	....	..	..	
Briar Hill	Morrior Coal Co., Clay City	Aug. 30,'92	53	8	4	24	7,200	50 00	2,081	...	700	..	..	
Newburg No. 2	Gartsherre Coal Co., Brazil	Aug. 18,'92	72	12	3	4	22,750	....	575.14	....	204	..	..	
Pratt	Coal Bluff Co., Terre Haute	Sept. 17,'92	55	5	5	20	23,400	....	2,411.3	223.10	100	..	..	
Anchor	Coal Bluff Co., Terre Haute	Sept. 17,'92	65	5	5	17	12,500	....	2,259.17	22.6	380	..	..	
Diamond	Diamond Block Co., Clay City	Sept. 1,'92	76	6	6	17	12,500	65 65	2,778	...	892	..	..	
Hoosier	Hoosier Coal Co., Brazil	Aug. 20,'92	45	5	2	23	13,837	.	2,322.18	....	....	..	..	
Sheperman	Sheperman Coal Co., Brazil	Oct. 20,'92	8	3	1	22	2,300	300 00	428.13	...	80	..	..	
Harrison	Indiana Bl'k Coal Co., Terre H	Sept. 1,'92	76	8	8	14	22,000	....	1,180.6	....	900	..	..	
Total	....	......	2,449	181	150	525½	....	$1640 65	88,030.27	2,360.34	19670.10	..	2	

Blanks for September sent out September 14, 1892.

AUGUST, 1892.

Gartsherre—													
No. 1	Brazil Block Coal Co., Brazil	Sept. 30,'92	80	5	6	26	14,000	....	5,014	...	720	.	..
No 2	Brazil Block Coal Co., Brazil	Sept. 30,'92	42	3	3	21	10,410	...	1,832	....	220	.	..
No 3	Brazil Block Coal Co., Brazil	Sept. 30,'92	51	4	3	23	8,200	...	3,572	....	560	.	..
No. 4	Brazil Block Coal Co., Brazil	Sept. 30,'92	118	8	4	24	23,160	....	5,522	....	1,100	..	..
No. 6	Brazil Block Coal Co., Brazil	Sept. 30,'92	43	4	5	25	9,360	....	2,012	....	460	..	..
No. 7	Brazil Block Coal Co., Brazil	Sept. 30,'92	69	5	5	26	10,600	....	3,442	....	340	..	..
No. 8	Brazil Block Coal Co., Brazil	Sept. 30,'92	149	10	14	26	31,337	....	7,557	....	1,100	.	..
No. 9	Brazil Block Coal Co., Brazil	Sept. 30,'92	169	7	9	24½	17,000	....	8,206	...	1,600	..	..
No. 10	Brazil Block Coal Co., Brazil	Sept. 30,'92	66	7	8	24	14,377	....	2,882	....	240	..	..
Crawford's—													
No. 2	Crawford Coal Co., Brazil	Sept. 21,'92	135	6	8	26	25,700	...	4,317.3	1,072.15	860.16	.	..
No. 3	Crawford Coal Co., Brazil	Sept. 21,'92	76	6	2	26	17,400	...	3,583.5	.	716	.	..
No. 4	Crawford Coal Co., Brazil	Sept. 21,'92	55	5	4	26	11,730	...	644.3	1,461.3	129	..	..
Chicago	Nickel-Plate Coal Co., Brazil	Sept. 6,'92	73	6	4	24	15,000	.	3,391.2	....	625	..	..
Newburg	P. Ehrlich & Co., Turner	Sept. 27,'92	82	8	4	23½	22,500	.	4,318.4	....	2,880	..	..
Nellie	Otter Creek Coal Co., Brazil	Sept. 18,'92	75	6	4	23	11,500	.	3,537.8	....	680	..	..
Gartside	Watson, Little & Co., Brazil	Sept. 12,'92	169	11	15	25	18,830	....	7,525	...	1,780	..	..
Columbia	Zeller & Sigler, Knightsville	Sept. 26,'92	142	7	6	25	23,000	....	7,800	....	2,500	..	..

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF AUGUST, 1892—Continued.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Am'an Beauty	Zeller & Sigler, Knightsville	Sept. 26,'92	20	5	.	26	23,000	$1000 00	40.13	....	25	..	..	New mine, just opened.
Banner	Eureka Block Coal Co., Carbon	Sept. 17,'92	129	8	5	24	27,850	431 31	5,982	....	1,495.10	..	..	
World's Fair	D. H. Davis Coal Co., Knights'v	Sept. 19,'92	180	7	4	20	22,000	....	5,109.5	....	1,410	..	..	
Church Hill	Weaver, Getz & Co., Center Pt	Nov. 12,'92	26	3	2	17	8,000	....	1,332.17	....	325	..	..	
Louise	Weaver, Getz & Co., Center Pt	Nov. 12,'92	72	4	3	19	12,500	....	3,050.9	....	700	..	..	
Vandalia	Robert Givens, Center Point	Sept. 2,'92	35	3	2	18	22,000	....	750	....	....	..	..	
Briar Hill	Morrier Coal Co., Clay City	Sept. 21,'93	50	7	4	21	7,000	65 00	1,803	...	700	..	..	
Newburg No. 2	Gartsherre Coal Co., Brazil	Sept. 2,'92	65	12	3	15	22,750	....	2,396	.	975	..	..	
Pratt	Coal Bluff Co., Terre Haute	Sept. 17,'92	60	5	5	25½	19,800	...	3,883.6	447.18	120	..	..	
Anchor	Coal Bluff Co., Terre Haute	Sept. 17,'92	75	5	5	19	12,900	....	2,456.13	....	420	..	..	
Diamond	Diamond Block Co., Clay City	Oct. 22,'92	66	9	6	26	15,000	126 75	2,621	....	880	..	..	
Hoosier	Hoosier Coal Co., Brazil	Sept. 24,'92	35	5	2	25	13,426	.	2,295.11	66.11	....	..	1	Slate.
Sheperman	Sheperman Coal Co., Brazil	Oct. 20,'92	8	3	1	23	2,300	100 00	338.16	....	48	..	..	
Harrison	Chicago & Ind. Bl'k Coal Co., Terre Haute	Sept. 21,'92	50	7	7	18	22,000	....	1,839.8	103.12	750	..	..	
Crawford No. 5	Crawford Coal Co., Brazil	Jan. 13,'93	17	9	.	..	8,000	....	......	....	.....	..	..	
Crawford No. 6	Crawford Coal Co., Brazil	Jan. 13,'93	28	10	3	..	5,000	....	......	250.15	.....	..	..	
Total	....	......	2,510	210	156	714½	....	$1723 06	108,299.23	3,399.64	24358.26	..	1	

Blanks for October sent out October 19, 1892.

SEPTEMBER, 1892.

Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	Oct. 22,'92	65	5	5	20	10,000		2,954		260			
No 2	Brazil Block Coal Co., Brazil	Oct. 22,'92	42	4	4	25	10,600		2,173		180			
No. 3	Brazil Block Coal Co., Brazil	Oct. 22,'92	50	4	3	23	8,310		2,604		440			
No. 4	Brazil Block Coal Co., Brazil	Oct. 22,'92	159	8	5	26	18,900		8,140		1,660			
No. 6	Brazil Block Coal Co, Brazil	Oct. 22,'92	34	4	4	25	8,500		1,918		320			
No. 7	Brazil Block Coal Co., Brazil	Oct. 22,'92	64	5	5	24	11,000		3,454		340			
No. 8	Brazil Block Coal Co., Brazil	Oct. 22,'92	174	11	14	25	34,732		8,009		1,300		1	Slate not fatal.
No. 9	Brazil Block Coal Co., Brazil	Oct. 22,'92	164	6	9	23	23,000		7,143		1,340			
No. 10.	Brazil Block Coal Co., Brazil	Oct. 22,'92	85	7	8	26	22,326		4,039		340			
Crawford—														
No. 2	Crawford Coal Co., Brazil	Oct. 28,'92	139	6	8	24	28,250		2,534.07	1,871.07	506.16			
No 3	Crawford Coal Co., Brazil	Oct. 28,'28	75	6	3	25	17,020		4,363.14		872			
No. 4	Crawford Coal Co., Brazil	Oct. 28,'92	31	5	3	23	12,675		419.11	775.14	84			
Chicago.	Nickel Plate Coal Co., Brazil	Oct. 22,'92	60	5	4	26	25,000		2,350		700			
N. Nickel Plate	Jackson Coal Co., Brazil	Oct. 22,'92	62	7	2	26	10,000	$2000 00	1,295		300			
Newburg	P. Ehrlich & Co., Turner P. O	Jan. 24,'93	73	9	3	23	22,550		3,120		2,000			
Gartside	Watson, Little & Co., Brazil	Oct. 11,'92	156	10	14	23	21,155		6,918		1,500		1	Slate not fatal.
Nellie.	Otter Creek Coal Co., Brazil	Oct. 5,'92	73	5	4	23	13,800		3,141.03		560			
Columbia.	Zeller & Sigler, Knightsville	Oct. 2,'92	150	6	6	25	23,000		7,000		2,000			
Amer'n Be'uty	Zeller & Sigler, Knightsville	Oct. 2,'92	21	5	2	22	23,000		600		200			
Banner	Eureka Block Coal Co., Carbon	Oct. 13,'92	143	8	6	19	32,600	1375 00	4,657.19		1,150			
World's Fair	D. H. Davis Coal Co., Knight'v	Dec. 16,'92	175	9	5	25	21,000		6,249.10		1,700			
Church Hill.	Weaver, Getz & Co., Center Pt.	Nov. 12,'92	22	3	2	15	8,500		1,001.08		250			
Louise	Weaver, Getz & Co., Center Pt.	Nov. 12,'92	80	4	3	25	13,500		4,846.04		1,100		1	Slate not fatal.
Vandalia	Robert Givens, Center Point.	Oct. 1,'92	28	2	3	23	22,000		1,000		300			
Briar Hill.	Morrier Coal Co., Clay City	Oct. 25,'92	[illegible]	8	4	25	6,500		2,163		625			
Newb'g No. 2	Gartsherre Coal Co., Brazil	Oct. 14,'92	70	12	4	21	22,750		3,231.14		1,200			
Pratt	Coal Bluff Co., Terre Haute	Dec. 22,'92	100	6	6	21½	30,000		3,891	325	60			
Anchor	Coal Bluff Co., Terre Haute	Dec. 22,'92	55	5	5	20½	11,000		2,617	20	400			
Diamond	Diamond Bl'k C. Co., Clay City	Nov. 3,'92	64	8	6	25	15,000	10 98	2,647		965			
Hoosier.	Hoosier Coal Co., Brazil.	Oct. 31,'92	50	5	2	24	15,210		1,729,05					
Sheperman	Sheperman Coal Co., Brazil	Feb. 26,'93	16	3	1	20	3,400		687.16					
Harrison	Chicago & Ind. C'l Co, T. Haute	Jan. 10,'93	42	6	7	22	24,200		1,817		829			
Somers	J. Somers, Staunton	Jan. 24,'93	28	10		20		300 00	1,192		485			
Crawford No. 5	Crawford Coal Co., Brazil	Jan. 13,'93	14	6			8,000							
Crawford No. 6	Crawford Coal Co., Brazil	Jan. 13,'93	46	9	3		5,974		1,711.11					
Total			2,658	221	163	762		$3685 98	112,112.22	2,991.21	23966.16		3	

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF JANUARY, 1892—Continued.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Vandalia	Williams & Givens, Center Pt.	Feb. 18, '92	35	4	2	20	....	....	1,000	....	....	..	..	
Briar Hill	Morrier Coal Co., Clay City	Feb. 24, '92	64	7	5	26	12,800	....	1,300	....	400	..	..	
Newburg	Gartsherre Coal Co., Brazil	Feb. 22, '92	92	11	3	20	....	....	3,824.10	....	2,240	..	..	
Pratt Mine	Coal Bluff Co., Terre Haute	Feb. 24, '92	99	8	9	...	....	....	....	2,060	....	..	..	
Anchor	Coal Bluff Co., Terre Haute	Feb. 24, '92	72	5	6	...	....	....	2,876	....	700	..	..	
Harrison	Ind. Block Coal Co., Terre Haute	Sept. 1, '92	78	8	8	22	23,000	....	1,956.11	27.16	1,000	..	..	
Total	....	......	2,393	202	153	691	....	$2,725	99,973	9,080	22,508	..	8	

FEBRUARY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	Mar. 28, '92	91	5	5	10½	10,800	....	2,033.3	....	260	..	..	
No. 2	Brazil Block Coal Co., Brazil	Mar. 28, '92	54	5	3	21	80,700	....	1,998.6	....	240	..	..	
No. 3	Brazil Block Coal Co., Brazil	Mar. 28, '92	61	5	4	14	7,260	....	....	2,545.6	420	..	1	Killed by falling slate.
No. 4	Brazil Block Coal Co., Brazil	Mar. 28, '92	26	4	..	13	9,000	$800	1,889.6	....	320	..	..	
No. 6	Brazil Block Coal Co., Brazil	Mar. 28, '92	56	5	4	20	8,740	....	2,138.13	....	240	..	..	
No. 7	Brazil Block Coal Co., Brazil	Mar. 28, '92	56	5	4	20	7,240	....	2,309.3	....	260	..	..	
No. 8	Brazil Block Coal Co., Brazil	Mar. 28, '92	135	9	11	18	2,100	100	5,547.11	....	240	..	..	
No. 9	Brazil Block Coal Co., Brazil	Mar. 28, '92	135	8	10	14	25,140	....	4,260.12	....	720	..	..	
No. 10	Brazil Block Coal Co., Brazil	Mar. 28, '92	63	6	7	20	16,720	....	3,312.5	....	400	..	..	
Chicago	Brazil Block Coal Co., Brazil	Mar. 28, '92	61	7	7	15	14,150	....	2,016.18	....	140	..	..	
Crawford No. 2	Crawford Coal Co., Brazil	Mar. 31, '92	146	6	9	24	27,530	....	4,469.7	1,539.17	810	..	..	
Crawford No. 3	Crawford Coal Co., Brazil	Mar. 31, '92	59	6	2	14	16,000	....	2,571.5	....	504	..	..	
Crawford No. 4	Crawford Coal Co., Brazil	Mar. 31, '92	89	6	4	19	9,410	....	2,548.3	106	360	..	..	
Nickle-Plate	Jackson Coal Co., Brazil	Mar. 11, '92	51	5	4	17	7,500	....	2,369.13	....	420	..	..	
Chicago	Nickle-Plate Coal Co., Brazil	Mar. 11, '92	97	7	8	15	15,000	....	3,184.4	....	580	..	..	
Newburg	P. Ehrlich & Co., Turner	Mar. 12, '92	115	9	4	16	38,000	....	4,097.13	....	2,160	..	..	

Slope	P. Ehrlich & Co., Turner	Mar. 12, '92	31	8	2	5	4,100	....	588.7	....	140	..	..	
Nellie	Otter Creek Coal Co., Brazil	Mar. 7, '92	108	7	4	23	13,920	....	5,154.15	....	960	..	..	
Gartside	Watson, Little & Co., Brazil	Mar. 16, '92	164	12	14	15	...	....	4,505	....	900	..	..	
Columbia	Zeller & Sigler, Knightsville	Mar. 14, '92	125	6	6	16	...	150	4,286	....	1,100	..	..	
Diamond	Zeller & Sigler, Knightsville	Mar 14, '92	40	4	4	18	....	200	1,215	....	200	..	..	
Eureka	Eureka Block Coal Co., Carbon	Mar. 18, '92	98	7	4	22	13,000	450	4,587	....	900	..	..	
Morris	Sherburne Bl'k Coal Co., Brazil	Mar. 12, '92	45	6	4	16	....	....	1,795	....	460	..	..	
Hoosier	Hoosier Block Coal Co., Brazil	Mar. 14, '92	71	5	2	25	....	....	3,011.6	....	....	..	..	
World's Fair	D. H. Davis Coal Co., Knightsv.	Mar. 23, '92	100	7		17	10,000	....	3,931	....	800	..	..	
Church Hill	Weaver, Getz & Co., Center Pt.	Mar. 11, '92	40	5	4	13	....	....	1,198.10	....	260	..	..	
Louise	Weaver, Getz & Co., Center Pt.	Mar. 11, '92	40	4	1	18	....	300	1,731.18	....	500	..	..	
Vandalia	Williams & Givens, Center Pt.	Mar. 28, '92	35	4	2	18	22,000	....	1,100	....	125	..	..	
Briar Hill	Morrier Coal Co., Clay City	April 9, '92	62	7	5	22	80,000	....	1,894	....	575	..	..	
Newburg No. 2	Gartsherre Coal Co., Brazil	Mar. 14, '92	83	12	3	8	22,750	....	1,617.9	133.11	600	..	..	
Pratt	Coal Bluff Co., Terre Haute	Mar. 11, '92	70	7	8	14	18,200	...	1,892.2	22.13	320	..	..	
Anchor	Coal Bluff Co., Terre Haute	Mar. 11, '92	70	5	5	13	10,260	....	2,239	....	340	..	..	
Harrison	Ind. Block Coal Co., Terre Haute	Sep. 1, '92	84	8	8	19	25,000	....	2,143.15	30.8	1,800	..	..	
Total	....	....	2,561	212	152	552	....	$2,000	86,627.96	4,375.55	18,054	..	1	

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF MARCH, 1892.

Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	Apr. 20, '92	88	5	5	10	10,000	....	2,004	...	200	..	..	
No. 2	Brazil Block Coal Co., Brazil	Apr. 20, '92	75	5	5	18	7,715	....	3,046	....	720	..	..	
No. 3	Brazil Block Coal Co., Brazil	Apr. 20, '92	77	5	5	11	9,840	....	2,225	....	300	..	..	
No. 4	Brazil Block Coal Co., Brazil	May 20, '92	18	7	1	1	10,000	$800	27.15	....	....	..	..	
No. 6	Brazil Block Coal Co., Brazil	Apr. 20, '92	56	5	5	22	6,900	....	2,578	....	500	..	..	
No. 7	Brazil Block Coal Co., Brazil	Apr. 20, '92	89	5	5	21	12,400	....	4,206	....	500	..	..	
No. 8	Brazil Block Coal Co., Brazil	Apr. 20, '92	109	8	12	18	23,000	....	6,675	....	880	..	..	
No. 9	Brazil Block Coal Co., Brazil	Apr. 20, '92	79	4	4	9	16,140	....	2,508	....	320	..	..	
No. 10	Brazil Block Coal Co., Brazil	Apr. 20, '92	68	5	8	18	25,622	....	4,049	....	780	..	..	
Chicago	Brazil Block Coal Co., Brazil	Apr. 20, '92	52	7	7	17	9,510	....	2,271	....	180	..	..	
Crawford—														
No. 2	Crawford Coal Co., Brazil	Apr. 19, '92	157	6	9	..	29,680	....	6,180.17	1,033.15	1,256	..	1	Falling coal.
No. 3	Crawford Coal Co., Brazil	Apr. 19, '92	76	6	2	...	17,300	....	3,120.6	..	624	..	..	
No. 4	Crawford Coal Co., Brazil	Apr. 19, '92	92	6	5		9,410	....	2,114.14	825	422	..	..	
Nickle-Plate	Jackson Coal Co., Brazil	Apr. 11, '92	48	5	4	15	10,000	....	2,829.5	....	400	..	..	
Chicago	Nickel-Plate Coal Co., Brazil	Apr. 11, '92	93	7	8	16	16,000	....	3,495.14	....	560	..	..	
Newburg	Pete Ehrlich Coal Co., Turner.	Apr. 9, '92	101	9	4	13	35,000	....	3,278.4	....	2,000	..	..	
Slope	Pete Ehrlich Coal Co., Turner.	Apr. 9, '92	36	5	2	14	5,250	....	1,308	....	320	..	..	
Nellie Mine	Otter Creek Coal Co., Brazil	Apr. 15, '92	125	5	5	25	13,680	....	6,780.11	....	1,200	..	..	
Gartside	Watson, Little & Co., Brazil	May 20, '92	183	11	14	17	14,250	....	5,669	....	1,200	..	..	
Columbia	Zeller & Sigler Coal Co., Knightsville	Apr. 9, '92	125	6	6	17	15,000	....	6,700	....	2,000	..	..	

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF MARCH, 1892—Continued.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Diamond	Zeller & Sigler Coal Co., Knightsville	Apr. 9, '92	36	5	4	17	8,000	....	1,600	...	150	..	..	
Eureka	Eureka Block Coal Co., Carbon	May 9, '92	89	6	4	18	14,500	278	4,200	....	1,000	..	..	
Morris Mine	Sherburn Block Coal Co., Brazil	Apr. 6, '92	35	5	3	14	8,400	....	1,540	....	380	..	..	
Hoosier Mine	Hoosier Coal Co., Brazil	Apr. 9, '92	75	6	3	22	12,570	30	3,500	....	....		..	
World's Fair	D. H. Davis Coal Co., Knightsville	Apr. 22, '92	100	7	3	8	11,000	....	2,200	....	550	..	..	
Churchill	Weaver, Getz & Co., Center Point	Apr. 22, '92	90	6	6	23½	....	25	4,121.14	...	1,000	..	..	
Louise	Weaver, Getz & Co., Center Point	Apr. 22, '92	40	5	1	5	....	200	653.17	....	175	..	..	
Vandalia	Williams & Givens, Center P't	Apr. 11, '92	40	4	2	22	2,200	....	1,300	....	....	..	..	
Briar Hill	Morrier Coal Co., Clay City	Apr. 9, '92	57	7	4	19	60,000	65	1,665	....	480	..	..	
Newburg No. 2	Gartsherre Coal Co., Brazil	May 12, '92	80	12	3	9	22,750	....	1,332.16	458.11	675	..	..	
Pratt	Coal Bluff Coal Co., Terre Haute	Apr. 12, '92	20	5	5	12	17,800	....	1,145	...	180	..	..	
Anchor	Coal Bluff Coal Co., Terre Haute	Apr. 12, '92	45	5	5	..	10,800	....	1,376	....	180	..	..	
Diamond	Diamond Block Coal Co., Clay City	.....	..	...	...	.	....	....	....	....	....	..	..	
Harrison	Indiana Block Coal Co., Terre Haute	Sept. 1, '92	89	8	8	17	22,000	....	2,051.7	....	1,700	..		
Total	....	......	2,543	213	167	448½	....	$1,398	99,726.40	2,313.26	20,832	..	1	

Reports for May sent out May 6, 1892.

APRIL, 1892.

Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	May 20, '92	76	6	4	17	11,770	....	3,206.17	....	.....	..	..	
No. 2	Brazil Block Coal Co., Brazil	May 20, '92	44	5	4	18	10,600	....	2,903.15	....	500	..	..	
No. 3	Brazil Block Coal Co., Brazil	May 20, '92	50	5	5	15	8,140	....	2,320	....	360	..	..	
No. 4	Brazil Block Coal Co., Brazil	May 20, '92	21	2	1	10	10,000	....	770.4	....	180	..	..	
No. 6	Brazil Block Coal Co., Brazil	May 20, '92	62	5	6	22	8,970	....	2,736.8	....	600	..	1	Killed by falling slate.
No. 7	Brazil Block Coal Co. Brazil	May 20, '92	79	5	6	20	9,525	....	3,808.17	....	660	..	1	Sprain by falling down shaft from top to bottom vein.
No. 8	Brazil Block Coal Co., Brazil	May 20, '92	126	9	9	24	22,000	....	6,209.12	....	440	..	..	
No. 9	Brazil Block Coal Co., Brazil	May 20, '92	76	4	5	16	14,720	....	2,909.18	....	400	..	..	
No. 10	Brazil Block Coal Co., Brazil	May 20, '92	66	5	7	22	15,300	....	4,217.9	....	520	..	..	
Chicago	Brazil Block Coal Co., Brazil	May 20, '92	44	7	7	21	10,000	....	1,983.5	....	100	..	..	
Crawford—														
No. 2	Crawford Coal Co., Brazil	June 24, '92	165	6	9	21	29,400	....	4,744	1,352.13	948.4	..	..	
No. 3	Crawford Coal Co., Brazil	June 24, '92	63	5	2	17	13,610	....	2,961.9	....	592.17	..	..	
No. 4	Crawford Coal Co., Brazil	June 24, '92	67	6	4	21	13,048	....	2,077.19	1,178.10	415.2	..	..	
Nickel-Plate	Jackson Coal Co., Brazil	June 13, '92	43	6	3	29	15,000	....	2,997	....	600	..	..	
Chicago	Nickle-Plate Coal Co., Brazil	June 13, '92	110	8	7	23	20,000	....	4,604	....	800	..	1	Leg broke by fall of slate.
Newburg	P. Ehrlich & Co., Turner P. O.	May 7, '92	96	9	4	13	38,600	....	3,501	....	2,114	..	1	Sprain by falling coal.
Slope	P. Ehrlich & Co., Turner P. O.	May 7, '92	36	5	2	2	5,250	....	190	....	36	..	..	
Nellie	Otter Creek Coal Co., Brazil	May 10, '92	100	6	4	25	12,400	....	5,044	....	920	..	..	
Gartside	Watson, Little & Co., Brazil	May 20, '92	149	12	14	17½	15,920	....	6,270	....	1,400	..	..	
Columbia	Zeller & Sigler, Knightsville	May 13, '92	130	6	7	19	....	$150	7,000	....	2,000	..	..	
Diamond	Zeller & Sigler, Knightsville	May 13, '92	30	5	2	17	....	50	1,350	....	200	..	..	
Banner	Eureka Block Coal Co., Carbon	May 9, '92	95	7	4	16	16,000	309	4,032	....	900	..	..	
Morris	Sherburn Block Co., Brazil	May 6, '92	30	4	2	20	8,400	....	1,550	....	400	..	..	
Hoosier	Hoosier Coal Co., Brazil	May 21, '92	70	6	3	26	16,493	135	2,959	....	.....	..	..	
World's Fair	D. H. Davis Coal Co., Knightsville	May 26, '92	80	6	2	11	10,000	....	2,414	....	650	..	..	
Churchill	Weaver, Getz & Co., Center Point	Sept. 1, '92	99	5	4	22	14,500	....	3,936 3	....	927	..	..	
Louise	Weaver, Getz & Co., Center Point	Sept. 1, '92	...	..			.....	....	.....	....	.....	..	..	Not in operation.
Vandalia	Williams & Givens, Center P't	May 23, '92	40	4	3	18	22,000	....	1,300	....	.....	..	..	
Briar Hill	Merrier Coal Co., Clay City	May 18, '92	44	6	4	24	60,000	128	1,440	....	460	..	..	
Newburg No. 2	Gartsherre Coal Co., Brazil	May 12, '92	72	12	3	6	22,700	....	947.11	384.2	525	..	..	
Pratt	Coal Bluff Coal Co., Terre Haute	June 7, '92	55	6	6	21	11,250	....	2,142.11	....	480	..	..	
Anchor	Coal Bluff Coal Co., Terre Haute	June 7, '92	80	5	5	13	11,690	....	1,095.5	....	160	..	..	

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF APRIL, 1892—Continued.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Diamond . . .	Diamond Block Coal Co., Clay City . . .	. . . . . .	. . .	. .	. .	. . .	. . . .	. . . .	. . . . .	. . . .	. . . .	. .	. .	
Harrison . . .	Indiana Block Coal Co., Terre Haute	Sept. 1, '92	72	8	8	11	23,000	. . . .	1,060.5	. . . .	100	. .	. .	
Total . . .	. . . .	. . . . .	2,370	196	156	587½	. . . .	$772	94,669.57	2,914.82	19,087½	. .	8	

Reports for June sent out June 7, 1892.

MAY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Gartsherre—														
No. 1 . . .	Brazil Block Coal Co., Brazil .	June 20, '92	71	5	5	18	12,500	. . . .	2,611	. . . .	360	. .	. .	
No. 2 . . .	Brazil Block Coal Co., Brazil .	June 20, '92	30	4	3	24	12,246	. . . .	1,736.5	. . . .	120	. .	. .	
No. 3 . . .	Brazil Block Coal Co., Brazil .	June 20, '92	56	5	4	18	9,200	. . . .	2,476.10	. . . .	420	. .	. .	
No. 4 . . .	Brazil Block Coal Co., Brazil .	June 20, '92	21	4	1	18	10,000	$350	984	. . . .	200	. .	. .	
No. 6 . . .	Brazil Block Coal Co., Brazil .	June 20, '92	51	5	6	20	10,235	. . . .	2,483.3	. . . .	560	. .	. .	
No. 7 . . .	Brazil Block Coal Co., Brazil .	June 20, '92	75	5	6	20	11,300	. . . .	3,362.9	. . . .	360	. .	. .	
No. 8 . . .	Brazil Block Coal Co., Brazil .	June 20, '92	126	9	10	21	22,000	. . . .	6,075.6	. . . .	740	. .	. .	
No. 9 . . .	Brazil Block Coal Co., Brazil .	June 20, '92	96	4	5	19	22,300	. . . .	3,523.11	. . . .	580	. .	. .	
No. 10. . .	Brazil Block Coal Co., Brazil .	June 20, '92	59	6	7	21	16,000	. . . .	3,640.17	. . . .	500	. .	. .	
Chicago. . . .	Brazil Block Coal Co., Brazil .	June 20, '92	45	7	4	20	9,800	. . . .	1,598.6	. . . .	60	. .	. .	
Crawford—														
No. 2 . . .	Crawford Coal Co., Brazil	June 24, '92	154	6	9	20	25,610	. . . .	4,617.18	2,464.8	923.18	. .	. .	
No. 3 . . .	Crawford Coal Co., Brazil . . .	June 24, '92	65	5	2	15	19,230	. . . .	2,156.3	. . . .	431.13	. .	. .	
No 4 . . .	Crawford Coal Co., Brazil . .	June 24, '92	70	6	5	18	12,127	. . . .	1,811.1	478.11	563.11	. .	. .	
Nickel-Plate .	Jackson Coal Co., Brazil. . . .	June 13, '92	40	4	3	12	15,100	. . . .	891	. . . .	175	. .	. .	Abandoned May 15, '92.
Chicago. . . .	Nickel-Plate Co., Brazil .	June 13, '92	100	8	7	24	20,000	. . . .	4,137	. . . .	150	. .	. .	
Newburg . .	P. Ehrlich & Co., Turner, P. O.	June 9, '92	97	8	5	13⅛	46,000	. . . .	8,224.14	. . . .	1,260	. .	. .	
Slope	P. Ehrlich & Co., Turner, P. O.	June 9, '92	. . .	. . .	. . .	. . .	. . . .	. . . .	. . . . .	. . . .	. . . .	. .	. .	Not in operation.

Nellie	Otter Creek Coal Co., Brazil	June 8,'92	80	5	3	22	11,600	....	3,700.9	....	580	..	..	
Gartside	Watson, Little & Co., Brazil	June 8,'92	161	9	14		15,607	....	6,088	....	1,500	..	..	
Columbia	Zeller & Sigler, Knightsville	June 21,'92	140	6	7	16	15,000	....	7,000	....	2,000	..	..	
Diamond	Zeller & Sigler, Knightsville	June 21,'92	28	4	2	21	15,000	....	1,338	....	300	..	1	Killed by fall of slate.
Banner	Eureka Block Coal Co., Carbon	June 15,'92	128	8	4	18	34,445	250	4,050	....	1,100	..	..	
Morris	Sherburn Coal Co., Brazil	July 29,'92	23	3	1	12	2,800	....	1,200	....	300	..	..	
World's Fair	D. H. Davis Coal Co., Knghts'v	July 23,'92	100	8	2	9	12,000	....	2,200	....	600	..	..	
Church Hill	Weaver, Getz & Co., Center Pt	Sept. 1,'92	85	3	3	16	12,500	....	2,198.18	....	500	..	..	
Louise	Weaver, Getz & Co., Center Pt	Sept. 1,'92	22	3	1	3	6,000	....	227.15	....	50	..	..	
Vandalia	Williams & Givens, Center Pt.	Sept. 2,'92		.	.	9		....	450	....	....	..	..	
Briar Hill	Monier Coal Co., Clay City	July 28,'92	42	7	4	25	5,600	90	1,815	....	600	..	..	
Newburg No. 2	Gartsherre Coal Co., Brazil	Aug. 7,'92	72	12	3	4	22,750	....	907.17	....	400	..	..	
Pratt	Coal Bluff Co., Terre Haute	Sept. 17,'92	50	5	5	21½	19,700	....	2,755.15	....	660	..	..	
Anchor	Coal Bluff Co., Terre Haute	Sept. 17,'92	65	4	5	20	12,000	....	2,630.18	....	480	..	..	
Diamond	Diamond Bl'k C. Co., Clay City	....						....	....	....	....	..	..	
Hoosier	Hoosier Coal Co., Brazil	Aug. 1,'92	65	5	3	14	15,290	135	1,697.14	....	....	..	..	
Harrison	Ind. Bl'k Coal Co., Terre Haute	Sept. 1,'92	74	8	8	23	24,000	....	1,521.2	27.12	1,200	..	..	
Total	....	....	2,291	181	149	535	....	823	85,102.04	2,969.31	18282.42	..	1	

Reports for July sent out July 18, 1892.

JUNE, 1892.

Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	July 15,'92	75	5	5	14½	10,000	....	2,783	....	380	..	..	
No. 2	Brazil Block Coal Co., Brazil	July 15,'92	38	4	4	23	7,740	....	2,060	....	240	..	..	
No. 3	Brazil Block Coal Co., Brazil	July 15,'92	59	5	4	17	11,015	....	2,413	....	480	..	..	
No. 4	Brazil Block Coal Co., Brazil	July 15,'92	33	4	1	20	6,780	$500 00	1,161	....	320	..	..	
No. 6	Brazil Block Coal Co., Brazil	July 15,'92	69	5	6	23	8,500	....	2,555	....	640	..	..	
No. 7	Brazil Block Coal Co., Brazil	July 15,'92	74	6	5	23	12,750	....	3,520	....	440	..	..	
No. 8	Brazil Block Coal Co., Brazil	July 15,'92	156	10	11	21	35,712	....	5,152	....	320	..	..	
No. 9	Brazil Block Coal Co., Brazil	July 15,'92	130	6	7	23	18,000	....	5,622	....	960	..	..	
No. 10	Brazil Block Coal Co., Brazil	July 15,'92	69	6	6	20	14,835	....	3,480	....	500	..	..	
Chicago	Brazil Block Coal Co., Brazil	July 15,'92	42	6	4	23	10,500	....	1,967	....	60	..	..	
Crawford No. 2	Crawford Coal Co., Brazil	July 22,'92	159	6	9	17	26,750	....	3,386.17	1,656.17	677	..	..	
Crawford No. 3	Crawford Coal Co., Brazil	July 22,'92	60	5	3	13	9,680	....	2,623.15		525	..	..	
Crawford No. 4	Crawford Coal Co., Brazil	July 22,'92	70	7	5	10	11,906	....	354.3	1,657	71	..	..	
Chicago	Nickel-Plate Coal Co., Brazil	Sept. 21,'92	80	6	6	19	15,000	....	2,987.15	....	620	..	..	
Newburg	P. Ehrlich & Co., Turner, P. O.	July 28,'92	94	9	4	14	22,320	....	3,174.11	....	2,600	..	..	
Slope	P. Ehrlich & Co., Turner, P. O.	July 28,'92	..	.	.	.	....	....	....	....	....	..	..	**Not in operation.**
Nellie	Otter Creek Coal Co., Brazil	July 20,'92	82	6	3	25	11,350	....	3,274.17	....	....	..	..	
Gartside	Watson, Little & Co., Brazil	July 22,'92	140	10	11	18½	21,960	....	5,681	....	1,300	..	..	
Columbia	Zeller & Sigler, Knightsville	July 27,'92	150	6	7	11	16,000	300 00	5,481	....	1,200	..	..	
Diamond	Zeller & Sigler, Knightsville	July 27,'92	25	4	2	19	16,000	....	1,166	....	200	..	..	**Worked out June 30, ['92.**
Banner	Eureka Block Coal Co., Carbon	Aug. 30,'92	129	7	4	15	36,485	295 00	3,241.8	....	960.5	..	..	
Morris	Sherburn Bl'k Coal Co., Brazil	July 29,'92	20	2	1	15	3,100	....	1,100	....	220	..	..	**Worked out June 30, ['92.**

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF JUNE, 1892—Continued.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
World's Fair	D. H. Davis Coal Co., Knights'v	July 23,'92	100	8	2	13	12,000	....	3,240	....	800	.	..	
Church Hill	Weaver, Getz & Co., Center Pt	Sept. 1,'92	55	3	3	13	12,500	....	1,217.10	....	350	.	..	
Louise	Weaver, Getz & Co., Center Pt	Sept. 1,'92	60	3	2	21	9,837	200 00	2,752.15	....	600	.	..	
Vandalia	Williams & Givens, Center Pt	Sept. 2,'92	...			12		....	720	....	....	.	..	
Briar Hill	Morrier Coal Co., Clay City	July 28,'92	49	7	4	22	6,800	140 00	2,360	....	720	.	..	
Newburg No. 2	Gartsherre Coal Co., Brazil	Aug. 7,'92	72	12	3	2	22,750	.	354.1	....	162	.	..	
Pratt	Coal Bluff Co., Terre Haute	Sept. 17,'92	45	5	4	17	21,600	....	2,347.10	....	680	.	..	
Anchor	Coal Bluff Co., Terre Haute	Sept. 17,'92	60	4	5	12	11,025	....	1,696.18	....	220	.	..	
Diamond	Diamond Bl'k Co., Clay City	Aug. 17,'92	81	10	6	18	12,500	131 83	2,989	....	900	.	..	
Hoosier	Hoosier Coal Co., Brazil	July 23,'92	60	5	2	13	15,290	17 90	1,701.7	....	....		1	Falling slate.
Shiperman	....		.	.				....		....			..	
Harrison	Ind. Bl'k Coal Co., Terre Haute	Sept. 1,'92	76	8	8	12	23,000	....	1,478.7	....	1,200		..	
Total	....	......	2,411	190	147	538	....	$7583 53	84,134.54	3,313.12	1,804.5	..	1	

Reports for August sent out August 15, 1892.

JULY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	Sept. 5,'92	95	5	6	21	12,000	....	3,947	...	400	..	..	
No. 2	Brazil Block Coal Co., Brazil	Sept. 5,'92	39	5	3	23	7,840	....	1,393	....	220	..	..	
No. 3	Brazil Block Coal Co., Brazil	Sept. 5,'92	67	5	4	23	8,525	....	3,192	....	580	..	..	
No. 4	Brazil Block Coal Co., Brazil	Sept. 5,'92	39	4	2	24	19,004	...	1,113	...	150	..	..	
No. 6	Brazil Block Coal Co., Brazil	Sept. 5,'92	54	5	5	23	9,950	....	2,221	....	420	..	..	
No. 7	Brazil Block Coal Co., Brazil	Sept. 5,'92	56	6	5	22	8,740	...	2,615	....	280	..	..	
No. 8	Brazil Block Coal Co., Brazil	Sept. 5,'92	160	10	11	15	35,020	...	6,132	...	920	..	..	
No. 9	Brazil Block Coal Co., Brazil	Sept. 5,'92	155	7	8	24	19,000	..	7,387	...	1,460	..	..	
No. 10	Brazil Block Coal Co., Brazil	Sept. 5,'92	68	7	6	21	25,401	$400 00	2,889	...	320		..	
Chicago	Brazil Block Coal Co., Brazil	Sept. 21,'92	48	6	6	1	10,000	...	155				..	
Crawford No. 2	Crawford Coal Co., Brazil	Aug. 30,'92	149	6	9	...	25,000	...	4,249.12	1,727.14	845	..	1	Falling coal.
Crawford No. 3	Crawford Coal Co., Brazil	Aug. 30,'92	51	6	2	.	16,500	...	2,507	....	501	..	..	

Crawford No. 4	Crawford Coal Co., Brazil	Aug. 30,'92	55	5	4	...	11,744	...	1,423	388.4	284	...	...	
Chicago	Nickel-Plate Coal Co., Brazil	Sept. 21,'92	82	6	5	22	15,000	...	3,245.7	...	600	...	...	
Newburg	P. Ehrlich & Co., Turner	Sept. 1,'92	97	7	4	16	22,400	...	3,492.12	...	2,328	...		
Slope	P. Ehrlich & Co., Turner	...	...	...		...				...				Not in operation.
Nellie	Otter Creek Coal Co., Brazil	Aug. 5,'92	75	6	3	25	12,480	...	3,297	...	600	...	...	
Gartside	Watson, Little & Co., Brazil	Aug. 11,'92	179	10	12	21½	21,630		5,880	...	1,500	...	1	Killed by falling slate.
Columbia	Zeller & Sigler, Knightsville	Aug. 2,'92	150	8	7	17	23,000	300 00	6,200	...	2,000	...		
Banner	Eureka Block Coal Co., Carbon	Aug. 30,'92	124	8	5	23	31,200	375 00	4,926.11	...	1,231.10	...		
World's Fair	D. H. Davis Coal Co., Knightsv	Sept. 19,'92	140	7	3	16	22,000		3,697	...	1,100	...	...	
Church Hill	Weaver, Getz & Co., Center Pt	Oct 18,'92	26	3	2	19	11,500	...	1,465.14	...	275	...	...	
Louise	Weaver, Getz & Co., Center Pt	Oct. 18,'92	50	4	1	10	13,500	150 00	1,570	...	400	...	...	
Vandalia	Williams & Givens, Center Pt.	Aug. 7,'92	40	3	3	18	22,000	...	800	...	...	...	...	
Briar Hill	Morrier Coal Co., Clay City	Aug. 30,'92	53	8	4	24	7,200	50 00	2,081	...	700	...	...	
Newburg No. 2	Gartsherre Coal Co., Brazil	Aug. 18,'92	72	12	3	4	22,750	...	575.14	...	204	...	...	
Pratt	Coal Bluff Co., Terre Haute	Sept. 17,'92	55	5	5	20	23,400	...	2,411.3	223.10	100	...	...	
Anchor	Coal Bluff Co., Terre Haute	Sept. 17,'92	65	5	5	17	12,500	...	2,259.17	22.6	380	...	...	
Diamond	Diamond Block Co., Clay City	Sept. 1,'92	76	6	6	17	12,500	65 65	2,778	...	892	...	...	
Hoosier	Hoosier Coal Co., Brazil	Aug. 20,'92	45	5	2	23	13,837	...	2,322.18	...	...	...	...	
Sheperman	Sheperman Coal Co., Brazil	Oct. 20,'92	8	3	1	22	2,300	300 00	428.13	...	80	...	...	
Harrison	Indiana Bl'k Coal Co., Terre H	Sept. 1,'92	76	8	8	14	22,000	...	1,180.6	...	900	...	...	
Total	...	...	2,449	181	150	525½	...	$1640 65	88,030.27	2,360.34	19670.10	...	2	

Blanks for September sent out September 14, 1892.

AUGUST, 1892.

Gartsherre—													
No. 1	Brazil Block Coal Co., Brazil	Sept. 30,'92	80	5	6	26	14,000	...	5,014	...	720	...	...
No. 2	Brazil Block Coal Co., Brazil	Sept. 30,'92	42	3	3	21	10,410	...	1,832	...	220	...	...
No. 3	Brazil Block Coal Co., Brazil	Sept. 30,'92	51	4	3	23	8,200	...	3,572	...	560	...	...
No. 4	Brazil Block Coal Co., Brazil	Sept. 30,'92	118	8	4	24	23,160	...	5,522	...	1,100	...	...
No. 6	Brazil Block Coal Co., Brazil	Sept. 30,'92	43	4	5	25	9,360	...	2,012	...	460	...	...
No. 7	Brazil Block Coal Co., Brazil	Sept. 30,'92	69	5	5	26	10,600	...	3,442	...	340	...	...
No. 8	Brazil Block Coal Co., Brazil	Sept. 30,'92	149	10	14	26	31,337	...	7,557	...	1,100	...	...
No. 9	Brazil Block Coal Co., Brazil	Sept. 30,'92	169	7	9	24½	17,000	...	8,206	...	1,600	...	...
No. 10	Brazil Block Coal Co., Brazil	Sept. 30,'92	66	7	8	24	14,377	...	2,882	...	240	...	...
Crawford's—													
No. 2	Crawford Coal Co., Brazil	Sept. 21,'92	135	6	8	26	25,700	...	4,317.3	1,072.15	860.16	...	...
No. 3	Crawford Coal Co., Brazil	Sept. 21,'92	76	6	2	26	17,400	...	3,583.5	...	716	...	...
No. 4	Crawford Coal Co., Brazil	Sept. 21,'92	55	5	4	26	11,730	...	644.3	1,461.3	129	...	...
Chicago	Nickel-Plate Coal Co., Brazil	Sept. 6,'92	73	6	4	24	15,000	...	3,391.2	...	625	...	...
Newburg	P. Ehrlich & Co., Turner	Sept. 27,'92	82	8	4	23½	22,500	...	4,318.4	...	2,880	...	...
Nellie	Otter Creek Coal Co., Brazil	Sept. 18,'92	75	6	4	23	11,500	...	3,537.8	...	680	...	...
Gartside	Watson, Little & Co., Brazil	Sept. 12,'92	169	11	15	25	18,830	...	7,525	...	1,780	...	...
Columbia	Zeller & Sigler, Knightsville	Sept. 26,'92	142	7	6	25	23,000	...	7,800	...	2,500	...	...

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF AUGUST, 1892—Continued.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Am'an Beauty	Zeller & Sigler, Knightsville	Sept. 26,'92	20	5	.	26	23,000	$1000 00	40.13	....	25	..	..	New mine, just opened.
Banner	Eureka Block Coal Co., Carbon	Sept. 17,'92	129	8	5	24	27,850	431 31	5,982	....	1,495.10	..	..	
World's Fair	D. H. Davis Coal Co., Knights'v	Sept. 19,'92	180	7	4	20	22,000	....	5,109.5	....	1,410	..	..	
Church Hill	Weaver, Getz & Co., Center Pt	Nov. 12,'92	26	3	2	17	8,000	....	1,332.17	....	325	..	..	
Louise	Weaver, Getz & Co., Center Pt	Nov. 12,'92	72	4	3	19	12,500	....	3,050.9	....	700	..	..	
Vandalia	Robert Givens, Center Point	Sept. 2,'92	35	3	2	18	22,000	...	750	....	....	..	..	
Briar Hill	Morrier Coal Co., Clay City	Sept. 21,'93	50	7	4	21	7,000	65 00	1,803	...	700	..	..	
Newburg No. 2	Gartsherre Coal Co., Brazil	Sept. 2,'92	65	12	3	15	22,750	....	2,396		975	..	..	
Pratt	Coal Bluff Co., Terre Haute	Sept. 17,'92	60	5	5	25½	19,800	...	3,883.6	447.18	120	..	..	
Anchor	Coal Bluff Co., Terre Haute	Sept. 17,'92	75	5	5	19	12,900	....	2,456.13	....	420	..	..	
Diamond	Diamond Block Co., Clay City	Oct. 22,'92	66	9	6	26	15,000	126 75	2,621	....	880	..	..	
Hoosier	Hoosier Coal Co., Brazil	Sept. 24,'92	35	5	2	25	13,426	.	2,295.11	66.11	....	..	1	Slate.
Sheperman	Sheperman Coal Co., Brazil	Oct. 20,'92	8	3	1	23	2,300	100 00	338.16	....	48	..	..	
Harrison	Chicago & Ind. Bl'k Coal Co., Terre Haute	Sept. 21,'92	50	7	7	18	22,000	....	1,839.8	103.12	750	..	..	
Crawford No. 5	Crawford Coal Co., Brazil	Jan. 13,'93	17	9		..	8,000	....	.....	....	....	..	..	
Crawford No. 6	Crawford Coal Co., Brazil	Jan. 13,'93	28	10	3	..	5,000	....	.....	250.15	....	..	..	
Total	....	......	2,510	210	156	714½	....	$1723 06	108,299.23	3,399.64	24358.26	..	1	

Blanks for October sent out October 19, 1892.

SEPTEMBER, 1892.

Gartsherre—													
No. 1	Brazil Block Coal Co., Brazil	Oct. 22,'92	65	5	5	20	10,000	. . . .	2,954	. . . .	260	. .	. .	
No 2	Brazil Block Coal Co., Brazil	Oct. 22,'92	42	4	4	25	10,600	. . . .	2,173	. . . .	180	. .	. .	
No. 3	Brazil Block Coal Co., Brazil	Oct. 22,'92	50	4	3	23	8,310	. . . .	2,604	. . . .	440	. .	. .	
No. 4	Brazil Block Coal Co., Brazil	Oct. 22,'92	159	8	5	26	18,900	. . . .	8,140	. . . .	1,660	. .	. .	
No. 6	Brazil Block Coal Co, Brazil	Oct. 22,'92	34	4	4	25	8,500	. . . .	1,918	. . . .	320	. .	. .	
No. 7	Brazil Block Coal Co., Brazil	Oct. 22,'92	64	5	5	24	11,000	. . . .	3,454	. . . .	340	. .	. .	
No. 8	Brazil Block Coal Co., Brazil	Oct. 22,'92	174	11	14	25	34,732	. . . .	8,009	. . . .	1,300	. .	1	Slate not fatal.
No. 9	Brazil Block Coal Co., Brazil	Oct. 22,'92	164	6	9	23	23,000	. . . .	7,143	. . . .	1,340	. .	. .	
No. 10.	Brazil Block Coal Co., Brazil	Oct. 22,'92	85	7	8	26	22,326	. . . .	4,039	. . . .	340	. .	. .	
Crawford—														
No. 2	Crawford Coal Co., Brazil	Oct. 28,'92	139	6	8	24	28,250	. . . .	2,534.07	1,871.07	506.16	. .	. .	
No 3	Crawford Coal Co., Brazil	Oct. 28,'28	75	6	3	25	17,020	. . . .	4,363.14	. . . .	872	. .	. .	
No. 4	Crawford Coal Co., Brazil	Oct. 28,'92	31	5	3	23	12,675	. . . .	419.11	775.14	84	. .	. .	
Chicago.	Nickel Plate Coal Co., Brazil	Oct. 22,'92	60	5	4	26	25,000	. . . .	2,350	. . . .	700	. .	. .	
N. Nickel Plate	Jackson Coal Co., Brazil	Oct. 22,'92	62	7	2	26	10,000	$2000 00	1,295	. . . .	300	. .	. .	
Newburg	P. Ehrlich & Co., Turner P. O.	Jan. 24,'93	73	9	3	23	22,550	. . . .	3,120	. . . .	2,000	. .	. .	
Gartside	Watson, Little & Co., Brazil	Oct. 11,'92	156	10	14	23	21,155	. . . .	6,918	. . . .	1,500	. .	1	Slate not fatal.
Nellie.	Otter Creek Coal Co., Brazil	Oct. 5,'92	73	5	4	23	13,860	. . . .	3,141.03	. . . .	560	. .	. .	
Columbia.	Zeller & Sigler, Knightsville	Oct. 2,'92	150	6	6	25	23,000	. . . .	7,000	. . . .	2,000	. .	. .	
Amer'n Be'uty	Zeller & Sigler, Knightsville	Oct. 2,'92	21	5	2	22	23,000	. . . .	600	. . . .	200	. .	. .	
Banner.	Eureka Block Coal Co., Carbon	Oct. 13,'92	143	5	8	6	19	32,600	1375 00	4,657.19	. . . .	1,150	. .	. .
World's Fair.	D. H. Davis Coal Co., Knight'v	Dec. 16,'92	175	9	5	25	21,000	. . . .	6,249.10	. . . .	1,700	. .	. .	
Church Hill.	Weaver, Getz & Co., Center Pt.	Nov. 12,'92	22	3	2	15	8,500	. . . .	1,001.08	. . . .	250	. .	. .	
Louise	Weaver, Getz & Co., Center Pt.	Nov. 12,'92	80	4	3	25	13,500	. . . .	4,846.04	. . . .	1,100	. .	1	Slate not fatal.
Vandalia.	Robert Givens, Center Point.	Oct. 1,'92	28	2	3	23	22,000	. . . .	1,000	. . . .	300	. .	. .	
Briar Hill.	Morrier Coal Co., Clay City	Oct. 25,'92	[illegible]	8	4	25	6,500	. . . .	2,163	. . . .	625	. .	. .	
Newb'g No. 2.	Gartsherre Coal Co., Brazil	Oct. 14,'92	70	12	4	21	22,750	. . . .	3,231.14	. . . .	1,200	. .	. .	
Pratt	Coal Bluff Co., Terre Haute	Dec. 22,'92	100	6	6	21½	30,000	. . . .	3,891	325	60	. .	. .	
Anchor	Coal Bluff Co., Terre Haute	Dec. 22,'92	55	5	5	20½	11,000	. . . .	2,617	20	400	. .	. .	
Diamond	Diamond Bl'k C. Co., Clay City	Nov. 3,'92	64	8	6	25	15,000	10 98	2,647	. . . .	965	. .	. .	
Hoosier.	Hoosier Coal Co., Brazil.	Oct. 31,'92	50	5	2	24	15,210	. . . .	1,729,05	. . . .	. . . .	. .	. .	
Sheperman.	Sheperman Coal Co., Brazil	Feb. 26,'93	16	3	1	20	3,400	. . . .	687.16	. . . .	. . . .	. .	. .	
Harrison	Chicago & Ind. C'l Co, T. Haute	Jan. 10,'93	42	6	7	22	24,200	. . . .	1,817	. . . .	829	. .	. .	
Somers	J. Somers, Staunton	Jan. 24,'93	28	10	.	20	. . . .	300 00	1,192	. . . .	485	. .	. .	
Crawford No. 5	Crawford Coal Co., Brazil	Jan. 13,'93	14	6	. .	. . .	8,000	. . . .	. . . .	. . . .	. . . .	. .	. .	
Crawford No. 6	Crawford Coal Co., Brazil	Jan. 13,'93	46	9	3	. . .	5,974	. . . .	1,711.11	. . . .	. . . .	. .	. .	
Total	. . . .	. . . .	2,658	221	163	762	. . . .	$3685 98	112,112.22	2,991.21	23966.16	. .	3	

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF OCTOBER, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Am't Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	Nov. 16,'92	60	5	5	21	11,000	...	3,153	...	420	...	...	
No. 2	Brazil Block Coal Co., Brazil	Nov. 16,'92	46	5	3	23	11,960	...	2,569	...	250	...	...	
No. 3	Brazil Block Coal Co., Brazil	Nov. 16,'92	50	5	3	24	8,720	...	2,324	...	360	...	...	
No. 4	Brazil Block Coal Co., Brazil	Nov. 16,'92	155	6	5	24	21,030	...	9,488	...	1,840	...	...	
No. 6	Brazil Block Coal Co., Brazil	Nov. 16,'92	33	4	4	22	6,550	...	1,584	...	260	...	...	
No. 7	Brazil Block Coal Co., Brazil	Nov. 16,'92	62	5	5	25	9,600	...	3,390	...	320	...	...	
No. 8	Brazil Block Coal Co., Brazil	Nov. 16,'92	171	12	14	25	40,079	...	9,215	...	1,320	...	...	
No. 9	Brazil Block Coal Co., Brazil	Nov. 16,'92	129	7	8	22	21,000	...	7,344	...	1,380	...	1	Net fatal. [shaft.
No. 10	Brazil Block Coal Co., Brazil	Nov. 16,'92	69	8	8	22	19,300	...	4,537	...	580	...	1	Fatal, falling down
Crawford—														
No. 2	Crawford Coal Co., Brazil	Jan. 13,'93	94	5	6	...	25,200	...	4,214	...	846	...	...	
No. 3	Crawford Coal Co., Brazil	Jan. 13,'93	84	6	4	...	16,680	...	4,858.12	...	971	...	...	
No. 4	Crawford Coal Co., Brazil	Jan. 13,'93	32	5	3	...	12,200	...	176.5	956.6	35	...	...	
No. 5	Crawford Coal Co., Brazil	Jan. 13,'93	22	7	...	...	9,000	...	227	46	...	...	...	
No. 6	Crawford Coal Co., Brazil	Jan. 13,'93	41	7	3	...	3,000	...	1,413.12	...	...	...	...	
Chicago	Nickel-Plate Coal Co., Brazil	Jan. 18,'93	62	5	4	22	15,000	...	2,349	...	440	...	...	
N. Nickel Plate	Jackson Coal Co., Brazil	Jan. 18,'93	73	7	4	22	15,000	$200 00	3,270	...	600	...	...	
Newburg	P. Ehrlich & Co., Turner	Nov. 8,'92	76	7	4	24½	23,400	...	3,350	...	2,400	...	...	
Gartside	Watson, Little & Co., Brazil	Nov. 12,'92	155	10	14	20	18,300	...	6,599	...	1,440	...	...	
Nellie	Otter Creek Coal Co., Brazil	Nov. 22,'92	82	5	5	25	14,800	...	3,462.6	...	640	...	...	
Amer'n Be'uty	Zeller & Sigler, Knightsville	Dec. 10,'92	40	4	1	25	23,000	...	1,964.10	...	625	...	...	
Columbia	Zeller & Sigler, Knightsville	Dec. 10,'92	125	7	5	25	23,000	...	5,894	...	1,900	...	...	
Banner	Eureka Block Coal Co., Carbon	Dec. 25,'92	119	9	6	25	26,000	475 00	6,630.6	...	1,600	...	...	
World's Fair	D. H. Davis Coal Co., Knight'v	Dec. 16,'92	180	8	5	24	21,500	...	6,543.6	...	1,860	...	...	
Church Hill	Weaver, Getz & Co., Center Pt	Jan. 9,'93	99	2	1	16	9,000	...	9,362	...	205	...	...	
Louise	Weaver, Getz & Co., Center Pt	Jan. 9,'93	99	5	4	21½	14,500	125 00	4,638.10	...	1,100	...	...	
Vandalia	R. Givens, Center Point	Dec. 1,'92	28	2	3	25	22,000	...	1,000	...	...	...	...	
Briar Hill	Morrier Coal Co., Clay City	Dec. 12,'92	51	7	4	24	7,500	35 00	2,183	...	550	...	...	
Newb'g No. 2	Gartsherre Coal Co., Brazil	Nov. 12,'92	72	12	4	25½	22,750	...	3,384.1	...	1,450	...	...	
Pratt	Coal Bluff Co., Terre Haute	Dec. 22,'92	97	6	...	21	27,500	...	4,283	333	240	...	...	

Anchor	Coal Bluff Co., Terre Haute	Dec. 22,'92	60	5	5	22	11,000		2,844		400			
Diamond	Diamond Block Co., Clay City	Jan. 5,'93	60	9	7	23	13,500	166 99	2,305		782			
Hoosier	Hoosier Coal Co., Brazil	Dec. 15,'92	60	5	2	24	13,100		2,112.7					
Somers	J. Somers, Staunton	Jan. 24,'93	42	11	1	18		265 00	2,054		800			
Harrison	Chicago & Ind. C'l Co., T. Haute	Jan. 10,'93	45	7	8	20	22,000		1,979.18		1,058.10			
Sheperman	Sheperman Coal Co., Brazil	Feb. 1,'93	11	3	1	21	3,700		647					
Total			2,684	223	159	681½		$1266 99	114,938.93	1,335.6	26672.10		2	

Reports for November and December sent out December 2, 1892.

NOVEMBER, 1892

Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	Jan. 17,'93	62	5	4	18	10,600		2,788		320			
No. 2	Brazil Block Coal Co., Brazil	Jan. 17,'93	48	5	3	24	11,400		2,339		340			
No. 3	Brazil Block Coal Co., Brazil	Jan. 17,'93	55	4	4	24	9,280	$100 00	1,807		240			
No. 4	Brazil Block Coal Co., Brazil	Jan. 17,'93	174	9	5	26	23,000	100 00	7,774		1,500			
No. 6	Brazil Block Coal Co., Brazil	Jan. 17,'93	34	4	4	24	8,700		1,481		240			
No. 7	Brazil Block Coal Co., Brazil	Jan. 17,'93	63	5	5	24	8,600		2,837		200			
No. 8	Brazil Block Coal Co., Brazil	Jan. 17,'93	136	12	16	22	32,226		7,953		1,200			
No. 9	Brazil Block Coal Co., Brazil	Jan. 17,'93	135	7	9	20	25,000		6,652		1,200			
No. 10	Brazil Block Coal Co., Brazil	Jan. 17,'93	74	7	9	22	17,800	300 00	4,243		520			
Crawford—														
No. 2	Crawford Coal Co., Brazil	Jan. 13,'93	120	4	6		22,680		3,485.18		697			
No. 3	Crawford Coal Co., Brazil	Jan. 13,'93	81	6	3		15,500		4,874.10					
No. 4	Crawford Coal Co., Brazil	Jan. 13,'93	30	4	3		11,000		156	1,010	31			
No. 5	Crawford Coal Co., Brazil	Jan. 13,'93	24	5	1		10,990		129.09	983.09	25			
No. 6	Crawford Coal Co., Brazil	Jan. 13,'93	42	7	3		9,000		1,266.16					
Chicago	Nickel Plate Coal Co., Brazil	Jan. 18,'93	62	5	4	22	15,000		2,018		380			
N. Nickel Plate	Jackson Coal Co., Brazil	Jan. 18,'93	109	7	4	23	15,000	350 00	4,895		950			
Newburg	P. Ehrlich & Co., Turner	Dec. 8,'92	71	8	3	23½	23,200		3,261.12		2,300			
Gartside	Watson, Little & Co., Brazil	Dec. 8,'92	154	12	15	22	35,310		6,349		1,400			
Nellie	Otter Creek Coal Co., Brazil	Dec. 15,'92	85	5	5	21	14,200		3,488.09		500			
Columbia	Zeller & Sigler, Knightsville	Dec. 10,'92	100	7	5	23	23,000		4,836		1,750			
Am. Beauty	Zeller & Sigler, Knightsville	Dec. 10,'92	80	5	2	22	23,000		3,701		1,000			
Banner	Eureka Block Coal Co., Carbon	Dec. 25,'92	117	9	7	23	24,000	340 00	5,656.07		1,411			
World's Fair	D. H. Davis Coal Co., Knightsv.	Dec. 16,'92	190	8	5	24	22,000		6,624.16		1,875			
Church Hill	Weaver, Getz & Co., Center Pt.	Jan. 9,'93	18	3	1	13	9,000		600.04		75			
Louise	Weaver, Getz & Co., Center Pt.	Jan. 9,'93	105	5	4	21	14,500		5,407.06		1,300			{ Not enough men reported to bring the mine under the law.
Vandalia	R. Givens, Center Point	Dec. 6,'92												
Briar Hill	Morrier Coal Co., Clay City	Dec. 12,'92	54	7	4	21	7,800		2,305		510			
Newburg No. 2	Gartsherre Coal Co., Brazil	Dec. 3,'92	70	12	4	22½	22,750		3,685.17		1,484			
Pratt	Coal Bluff Co., Terre Haute	Dec. 22,'92	105	7	7	23	31,400		4,437	505	420			

REPORT OF MINES IN CLAY COUNTY FOR THE MONTH OF NOVEMBER, 1892—Continued.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Anchor	Coal Bluff Co., Terre Haute	Dec. 22,'92	65	5	5	21½	12,000	....	2,753	....	420	..	..	
Diamond	Diamond Bl'k C. Co., Clay City	Jan. 5,'93	84	9	8	22	13,500	78 63	2,633	....	919	..	..	
Hoosier	Hoosier Coal Co., Brazil	Jan. 13,'93	50	5	2	23	12,800	....	2,114.07	....	919	..	..	
Sheperman	Sheperman Coal Co., Brazil	Feb. 1,'93	15	3	1	23	4,900	....	695.11	....	....	..	..	
Harrison	Chicago & Ind. C'l Co., T. Haute	Jan. 10,'93	43	7	8	21	22,000	....	1,748.10	636.14	802	..	..	
Somers	J. Somers, Staunton	Jan. 24,'93	64	11	2	20	....	675 85	2,544	59	1,000	..	..	
Total			2,725	225	171	641½	....	$1914 48	117,636.60	3,183.23	24,759	..	..	

DECEMBER, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Gartsherre—														
No. 1	Brazil Block Coal Co., Brazil	Jan. 17,'93	63	4	5	17	8,928	....	2,576	..	280	..	..	
No. 2	Brazil Block Coal Co., Brazil	Jan. 17,'93	35	5	3	24	8,750	....	2,346	..	260	..	..	
No. 3	Brazil Block Coal Co., Brazil	Jan. 17,'93	51	4	3	24	6,048	....	1,971	....	240	..	..	
No. 4	Brazil Block Coal Co., Brazil	Jan. 17,'93	176	10	6	22	22,400	$200 00	765	....	350	..	..	
No. 6	Brazil Block Coal Co., Brazil	Jan. 17,'93	36	4	3	24	8,746	....	1,510	....	180	..	..	
No. 7	Brazil Block Coal Co., Brazil	Jan. 17,'93	47	5	4	23	9,875	....	3,325	....	260	..	..	
No. 8	Brazil Block Coal Co., Brazil	Jan. 17,'93	189	11	17	25	38,763	....	8,711	....	1,360	..	..	
No. 9	Brazil Block Coal Co., Brazil	Jan. 17,'93	147	8	10	25	19,000	....	6,946	....	1,360	..	..	
No. 10	Brazil Block Coal Co., Brazil	Jan. 17,'93	101	7	8	21	21,060	....	4,980	....	700	..	..	
Crawford—														
No. 2	Crawford Coal Co., Brazil	Mar. 3,'93	114	5	7	26	26,000	....	4,516.08	....	903	..	..	
No. 3	Crawford Coal Co., Brazil	Mar. 3,'93	64	7	3	24	16,600	....	4,439.13	....	885	..	..	
No. 4	Crawford Coal Co., Brazil	Mar. 3,'93	38	5	3	19	10,000	....	262.11	985.02	52	..	..	
No. 5	Crawford Coal Co., Brazil	Mar. 3,'93	55	5	2	25	11,800	....	1,186	846	169	..	..	

No. 6	Crawford Coal Co., Brazil	Mar. 3,'93	45	6	3	24	9,000		2,337				
Chicago	Nickel Plate Coal Co., Brazil	Jan. 18,'93	62	5	4	22	15,000		1,991		375		
N.Nickel Plate	Jackson Coal Co., Brazil	Jan. 18,'93	122	8	4	24	15,000		5,488		1,050		
Newburg	P. Ehrlich & Co., Turner P. O.	Feb. 26,'93	86	9	3	23	23,160		3,264		2,000		
Gartside	Watson, Little & Co., Brazil	Jan. 16,'93	148	11	14	24	20,000		7,992		1,800		
Nellie	Otter Creek Coal Co., Brazil	Jan. 17,'93	91	5	6	26	15,000		4,191.16		680		
Columbia	Zeller & Sigler, Knightsville	Jan. 23,'93	100	7	5	25	23,000		5,090.06		1,500		
Am. Beauty	Zeller & Sigler, Knightsville	Jan. 23,'93	110	8	3	25	23,000	1000 00	5,242.19		1,225		
Banner	Eureka Block Coal Co., Carbon	Jan. 7,'93	144	9	3	25	27,500	425 00	6,685.05		1,672		
World's Fair	D. H. Davis Coal Co., Knightsv.	Jan. 25,'93	200	8	5	23	22,000		7,021.05		2,000		
Church Hill	Weaver, Getz & Co., Center Pt.	Feb. 16,'93	17	2	1	17	5,500		599.08		800		
Louise	Weaver, Getz & Co., Center Pt.	Feb. 16,'93	136	5	5	24	16,500		6,974 10		1,600		
Vandalia	R. Givens, Center Point												
Briar Hill	Morrier Coal Co., Clay City	Jan. 25,'93	48	6	5	24	7,500	250 00	2,243		465		
Newburg No. 2	Gartsherre Coal Co., Brazil	Jan. 24,'93	90	12	5	22	22,750		4,166.09		1,806		
Pratt	Coal Bluff Co., Terre Haute	Jan. 31,'93	70	9	7	21	29,000		4,074	399.10	7		
Anchor	Coal Bluff Co., Terre Haute	Jan. 31,'93	50	4	5	20	13,000		2,248		15		
Diamond	Diamond Bl'k C'l Co., Clay City	Feb. 26,'93	86	11	7	25	14,600	423 56	3,568		1,067		
Hoosier	Hoosier Coal Co., Brazil	Jan. 23,'93	50	5	2	24	14,300	265 00	1,918.07	128.13			
Sheperman	Sheperman Coal Co., Brazil	Feb. 1,'93	20	3	1	13	5,800		498.16				
Harrison	Chicago & Ind. C'l Co., Terre H.	Jan. 10,'93	45	7	8	18	23,000		1,832.01	485.01	682		
Somers	J. Somers, Staunton	Jan. 24,'93	75	14	2	21		285 00	3,698	67	1,900		
Fairview	Otter Creek Coal Co., Brazil	Feb. 11,'93	15	5		20		2859 73	286.06				
Total			2,926	239	169	789		$5708 00	124,920	2,900	27,843		

REPORT OF ASSISTANT INSPECTOR.

DUGGER, INDIANA, February 24, 1892.

Report of Welmon Lackey, Assistant Inspector of Mines of the Second District, from November 1, 1891, to January 1, 1893:

To Hon. Thomas McQuade, Brazil, Indiana:

DEAR SIR—I herewith respectfully submit my second annual report of the mines visited by me in the Second Mining District of Indiana, beginning November 1, 1891, and ending December 31, 1892. During the year embraced in this report, many improvements have been made. Nine manways, or second outlets, have been completed. Three sets of cages have been equipped with safety catches, three air shafts have been sunk, three fans have been erected and three furnaces.

I have had to labor to a very great disadvantage in some parts of the district on account of the indifference on the part of some of the operators in complying with the requirements of the mining laws, and the indifference of the State's attorneys.

I have had suits filed for over a year which have not, as yet, reached the courts. The coal trade has been very active in the entire district for the last twelve months, there being an increase in the output of 465,990 tons of coal over 1891.

This report contains production of coal, capital invested, list of fatal and non-fatal accidents, scales tested, number of employes in all coal mines and the names and address of owners and operators of all mines employing more than ten men, with a description of their condition. The increased output of coal is not due to more mines in operation, but to there being a great many more days worked; also to there being a greater number of persons employed. The total number of men employed inside of the mines is 2,223; total number of men employed outside of the mines, 345; total number employed in mines employing less than ten men, 181.

Total number of mules in mines employing more than ten men, 238.

Four new mines have been opened that employ more than ten men. Four have been worked out and abandoned that worked more than ten men.

The delay in getting my report ready is due to the change being made making the year end December 31 instead of October 31, and the delay of getting my statistical report from the coal companies.

Respectfully,

WELMON LACKEY.

SCALES TESTED.

February 29, 1892. Scales tested at Dugger Mine and found correct. Mine owned by Dugger & Neal Coal Company.

June 20, 1892. Scales tested at Superior Mine and found incorrect. Mine owned by Island Coal Company. The mine is situated in Sullivan County.

July 9, 1892. Scales tested at Blackburn Mine, operated by the Posey Coöperative Coal Company. Scales were found correct. The mine is located in Pike County.

FATAL ACCIDENTS.

Special visit to old Pittsburg Mine on account of a fatal accident. Charles Simpson killed while riding an electric motor, the motor colliding with an empty bank car. Mine owned by Old Pittsburg Coal Company, February 26, 1892.

Special visit to Maple Valley Mine, owned by Cable & Co., Daviess County. Leonard Redmaster killed by falling slate, December 21, 1892.

Special visit to Prospect Hill Mine, owned by Frank Clark, in Knox County. Abe Clymer killed by falling slate, December 14, 1892.

Special visit to Little's Mine, owned by S. W. Little. Josiah Hercomb killed by falling coal while working off a standing shot, October 22, 1892.

Special visit to Dugger Mine, owned by the Dugger & Neal Coal Company. A. E. Ringer killed by falling slate, July 9, 1892.

Special visit to Jumbo Mine, owned by the Jackson Hill Coal Company, in Sullivan County. John Beecher killed by a flying timber in tipple, or dump room, August 8, 1892.

Special visit to New Pittsburg Mine, owned by New Pittsburg Coal and Coke Company. James Sexton killed by falling slate July 21, 1892.

NON-FATAL ACCIDENTS.

February 9, 1892, John Reynolds' leg was broken by bank cars in Old Pittsburg Mine, owned by the Old Pittsburg Coal Company in Sullivan County.

February 10, 1892, Robert Crook's leg was broken while working in the Freeman Mine, owned by Vincennes Coal Company, in Knox County.

August 31, 1892, Joseph Pierce's leg was broken by falling slate in Frisco Mine, owned by E. A. Powell, in Gibson County.

December 3, 1892, James Richards had both legs and one arm broken in No. 2 Mine, operated by the Island Coal Company, in Green County.

Octobor 22, 1892, George Fulk's leg and back were injured by falling slate in Dugger Mine, owned by Dugger & Neal Coal Company, in Sullivan County.

September 17, 1892, Fritz Brink's back and leg were injured by falling slate in Ingleside Mine, owned by John Ingle & Company, in Vanderburgh County.

October 22, 1892, Thomas Tweedy had two fingers taken off by mining machine in Sunnyside Mine No. 2, owned by Sunnyside Coal & Coke Company, in Vanderburgh County.

NEW MINES IN GREENE COUNTY.

Lackie & Templeton Mine, located one-half mile southwest of Linton, was opened in 1892. As yet there are not sufficient men employed to bring them under the requirements of the mining laws.

Island Valley, operated by the Valley Coal Company, located two miles south of Linton, on the I. & V. R. R. Completed in 1892, but does not employ sufficient men to demand inspection.

Island City No. 1, owned by Island Coal Company. It is located south of Linton, on the I. & V. R. R. It has been laying idle for the past year.

SUMMIT MINE.

Operated by the Summit Coal Company. Located one and one-half miles west of Linton, on the I. & L. S. R. R., also a branch of the I. & V. R. R. It is worked by shaft. Coal was found at a depth of ninety-five feet. This mine is in good working condition. This company was very indifferent as to stopping room break throughs. I was compelled to enforce the law, after which they complied with all the laws in regard to this matter. It is ventilated by a fan giving a volume of 24,000 cubic feet of air per minute.

THE BUCKEYE MINE.

Owned and operated by the Linton Coal and Mining Company. Located one and one-half miles west of Linton, on a branch of the I. & V. R. R., and is worked by a shaft; coal being found at a depth of seventy-two feet. It was inspected twice, March 26 and August 23. Found some entries in need of doors, which were fixed at once by the company, who preferred to stop the places rather than to comply with the law. At the time of each visit, there was a good volume of air; ventilated by a fan.

GREENE COUNTY.

ISLAND MINE No. 2.

Owned and operated by the Island Coal Company. Located one-half mile north of Linton. This mine was inspected three times, March 30, October 10 and December 15, 1892. The excavation of this mine is so large that the fan used does not furnish sufficient air to properly ventilate the mine. Blasting is practiced twice per day, making the air very bad. This company has been very indifferent about complying with the mining laws. I have been compelled to bring proceedings in court against them to properly enforce the laws. Mine worked by shaft. Coal found at a depth of ninety-five feet. Twenty Harrison mining machines are used at this mine, employing more than two hundred men. This mine has the largest outpot of any mine in Southern Indiana.

PIKE COUNTY.

POSEY MINE.

Operated by the Posey Coöperative Coal Company. Located at Blackburn, three miles north of Petersburg on the E. & S. R. R. Worked by slope; coal being found at a depth of sixty-five feet. The condition of this mine is not as good as it should be. As all who are working in the mine are share-holders, I found it impossible to compel them to do anything. It is ventilated by a furnace. A slope is being opened just west of the one now being worked, and will be worked in connection therewith.

RAGGIAS MINE.

Owned by Samuel Raggias. Located at Raggias Station on the E. & L. R. R. It has not been in operation since November, 1891.

LITTLE'S MINE.

Owned by S. W. Little. Located at Little's Station, six miles south of Petersburg on the E. & I. R. R. It is worked by shaft, coal being found at a depth of eighty-seven feet. It was inspected twice and found to be in good condition. On my first visit this shaft was worked by electric machines, but on my second visit they had abandoned the use of the electric plant and gone back to the picks.

AYERSHIRE MINE.

Owned by David Ingle. Located at Ayershire, six miles east of Oakland City on the Air Line R. R. It is worked by shaft and slope. Mr. Ingle has put in a good plant of machinery at the shaft, using self-dumping cages. The mine is ventilated by a fan, having a volume of 35,000 cubic feet per minute. Coal is found at a depth of forty-five feet below the surface. The mine is in good shape.

KNOX COUNTY.

BICKNELL MINE.

Owned and operated by the Bicknell Coal Company. Located at Bicknell, on the I. & V. R. R. The mine is worked by shaft, the coal being found at a depth of ninety-two feet. It is ventilated by a fan, the ventilation being very good. A man-way has been completed, and it has a good stairway, The mine was inspected twice and found in good condition at the time of each visit.

FREEMAN'S MINE.

Owned and operated by the Vincennes Coal Company. Located a half mile east of Vincennes. It is worked by shaft. Two veins of coal have been found at a depth of 358 feet; coal M. and L. Coal L. has been abandoned, there being so many slips in the coal and roof that it was impossible to make it a paying investment. The two veins come so close together that they cut the sand rock entirely out that is found between the two veins of coal. Fire clay is found under coal M. five feet thick, and is expected to be a paying vein of clay. The mine is ventilated by a fan. The air was found to be good on both visits.

PROSPECT HILL MINE.

Operated by Frank Clark. Located south of Vincennes. It is worked by shaft. Coal was found at a depth of 344 feet. Coal M. is worked, and they are bothered some with creeping. Only a small force of men are employed. The mine was inspected twice, and less than ten men were employed at each visit. However, the air was found to be very good at my last visit.

STAR MINE.

Operated by John Archibold. Located at Newburg on the Ohio River. This mine was inspected twice, and on both visits was found to be in good working condition. The air is good, they having put in a fan with a capacity of 20,000 cubic feet per minute. The roof is very good at this mine, there being very few props used. I found rooms thirty feet wide without a prop in them.

CHANDLER MINE.

Operated by the Clement Coal Company. Located at Chandler, on the Air Line R. R. This mine was only inspected once. On my second visit the mine was lying idle on account of making repairs. A new head frame has been erected; catches have been put on cages. This is an old mine, formerly worked by single entries, making it very hard to ventilate. The air is not as good as it should be, but air courses are being made, and I believe they will very soon have a good ventilation.

DEFOREST MINE.

Operated by Deforest Coal Company. Located at Deforest Station, three miles west of Boonville, on the Air Line R. R. This is a shaft sunk in connection with the old mine, the old shaft being abandoned on account of fire. When this mine was inspected they were just beginning work. They had no safety catches on the cages, and the only ventilation was the natural current of the air. However, the air was reasonably good; only twelve men were employed. Coal being found at a depth of sixty-five feet.

LOWDER MINE.

Owned by the Lowder, Woolley Coal Company. Located one mile northeast of Boonville, on a branch of the Air Line R. R. This mine was not inspected. The men were on a strike at the time of both visits. I have since learned that the company has put in machines, and is working a small force of men. The mine is worked by slope. Coal is found at a depth of thirty-five feet.

WARRICK COUNTY.

GOUGH MINE.

Located one-half mile north of Boonville, on the Boonville branch of the Air Line R. R. Owned and operated by Robert Gough. On my first visit the men were on a strike at this mine. On my second visit they were just getting to work after being on a strike for three months. However, I found the mine in very good condition. Thirteen men were employed. The mine is worked by shaft. Coal found at a depth of forty-two feet. Ventilated by furnace. Slope is used as second outlet.

SULLIVAN COUNTY.

DUGGER MINE.

Operated by the Dugger & Neal Coal Company. Coal is loaded on the I. & I. S. R. R. and on the I. & V. R. R. The mine is worked by shaft; coal being found at a depth of 105 feet. This company has been very indifferent in complying with the mining law. I found it necessary to have them fined. However, they are now complying with the law. The mine is ventilated by a fan, giving a volume of 32,000 cubic feet per minute.

SUPERIOR MINE.

Operated by the Island Coal Company. Located one mile west of Dugger, on Green Coal branch of the I. & V. R. R. It is worked by shaft, coal being found at a depth of sixty-three feet. This mine is in good working condition. The machines have been removed, and it is now a pick mine. They have a second outlet which is in good condition. This mine was idle at least six months of last year. It is ventilated by a fan, giving a good volume of air.

LYONTON MINE.

Operated by the Lyonton Coal Company. Located at Lyonton, on the I. & I. S. R. R. The mine is worked by a shaft, coal being found at a depth of forty-seven feet. The mine was inspected twice. The air was good. Safety catches have been put on cages. This mine will be abandoned about May 1, 1893. It is ventilated by a furnace.

HANCOCK MINE.

Owned and operated by Hancock & Conkle. Located at Farnsworth, on the I. & I. S. R. R. Worked by shaft, coal being found at a depth of seventy-two feet. The mine was inspected twice and found to be in a good condition. The mine has a second outlet. It is ventilated by a fan, giving a volume of 12,000 cubic feet per minute.

SHELBURN MINE.

Owned by the Shelburn Coal Company. Located at Shelburn, on the E. & T. H. R. R. Worked by shaft, coal L. being found at a depth of 240 feet. The mine was inspected twice. On my second visit the air was not so good as formerly, they having moved the fan at the bottom, making an upcast, and it was not doing the work properly. Machines are used in this mine.

CURRYSVILLE MINE.

Owned and operated by the Currysville Coal and Coke Company. Located one mile north of Shelburn, on the E. & T. H. R. R. It is worked by shaft, coal being found at a depth of 242 feet. It was inspected once. On my second visit I found that the tipple had been burned on July 6, 1892. Ventilation good.

FARMERSBURG MINE.

Operated by the Farmersburg Coal and Coke Company. It is located at Farmersburg, on the E. & T. H. R. R. It is worked by shaft, coal being found at a depth of 242 feet. This mine was not inspected, as it was lying idle on both visits.

NEW PITTSBURG MINE.

Owned and operated by the New Pittsburg Coal and Coke Company. Located at Alum Cave, on a branch of the E. & T. H. R. R. It is worked by shaft, coal being found at a depth of thirty feet. It was inspected twice and found to be in good working condition. It is ventilated by fan and is a machine mine, the Harrison mining machines being used. This company had their tipple and engine room burned on July 14, 1892. Before the fire this mine was worked by slope, but they have since sunk the shaft in connection with the old works.

LITTLE PITTSBURG MINE.

Owned and operated by the Star Mining Company. Located at Hymeria, and is worked by shaft, coal L. being found at a depth of forty feet. The mine was inspected once. On my second visit it was lying idle for repairs. They have a second outlet for a manway. They also have an air shaft. This mine is operated on a small scale, all the coal being hauled to the railroad by wagons.

OLD PITTSBURG MINE.

Owned by the Old Pittsburg Coal Company. Located at Hymeria, on branch of the E. & T. H. R. R., and is worked by shaft. Coal L. is found at a depth of fifty feet. It is a small machine mine, using the electric machines, and hauling coal with electric motors. It was inspected twice. On my first visit it was in good working order. A manway has been completed, which is a slope. On my second visit I found the air not good and not properly divided on the two sides of the mine. It is ventilated by a fan. However, it is in ordinary condition.

JUMBO MINES.

Owned and operated by the Jackson Hill Coal and Coke Company. Located at Hardersville, three miles south of Hymeria, on branch of the E. & T. H. R. R. It is worked by shaft; coal (L) being found at a depth of thirty feet. It is a machine mine, using the Harrison machines. The air in this mine is not as good as it should be on account of firing at all times of the day, otherwise the mine is in good condition. A slope is used as a manway. No person is allowed to ride the cages. It is ventilated by fan.

NEW MINE IN SULLIVAN COUNTY.

A new mine is being sunk one-half mile north of Dugger, owned by the Dugger Coöperative Coal Company.

PERRY COUNTY.

CANNELTON MINE.

Owned by the American Cannel Coal Company. Located three miles northeast of Cannelton. It is worked by drift. These works are on a decline, they having worked the coal out of two of the hills and have almost completed the third in which they are working. The mine is ventilated by furnace. The air in the mine is good. The coal is hauled through the tunnels by mules and dumped in larger cars and hauled by an engine to the river, all of the coal being shipped by water.

TROY MINE.

Owned by Burgenroth Brothers. Located one-half mile from Troy. It is worked by shaft; coal being found at a depth of sixty feet. A manway, or second outlet, has been made, and the mine is in good condition. The ventilation is good, being ventilated by a furnace. All coal is shipped by water. Only thirteen men were employed at my last visit.

VANDERBURGH COUNTY.

INGLESIDE MINE.

Operated by Mr. Ingle. Located west of Evansville, on the Ohio River. This mine was inspected twice. On my first visit the air was bad, there being so much carbonic acid gas and black damp escaping from abandoned works, making the air very impure. On my second visit the old works had been bratticed off, and I found the ventilation much better. A new tipple has been erected, and other improvements to the amount of $10,000.

INGLESIDE MINE.

This is a leased shaft, coal being found at a depth of 265 feet. I have since learned that this mine is not a paying one. It is worked by shaft, and ventilated by fan.

SUNNYSIDE MINE No. 1.

Operated by the Sunnyside Coal and Coke Company. Located north of Evansville. This is a machine mine, compressed air being used as power. The rooms are worked very wide, being sixty, and some as wide as ninety feet. There is no system of entry driving at this place. However, the air is kept well up to the face of the works by means of doors and brattices. The air is reasonably good. The mine is worked by shaft. Coal is found at a depth of 260 feet. It is ventilated by fan.

SUNNYSIDE MINE No. 2.

Operated by the Sunnyside Coal and Coke Company. Located north of Evansville, on the P., D. & E. R. R. This mine is connected with Sunnyside Mine No. 1, by means of an entry. It is ventilated by the same fan as Mine No. 1. Very little has been done at this mine in the last two years. It is worked by shaft; coal being found at a depth of 255 feet. This mine is also worked by machinery, getting power from Mine No. 1.

FIRST AVENUE MINE.

Operated by the First Avenue Coal Company. Located northeast of Evansville. It is worked by shaft, coal being found at a depth of two hundred and sixty-five feet and is ventilated by fan. This mine was inspected twice—April 23 and September 15. It has no second outlet and I was compelled to enforce the law on this company to compel them to make a second outlet, but for some cause unknown to me, I have utterly failed to get the matter before the Court up to this writing. The ventilation of this mine has been very much improved in the last two years, they having cut off the works known as the old north works. They have a very good air way into the present workings.

DIAMOND MINE.

Operated by the Diamond Coal and Mining Company. Located northeast of Evansville. It is worked by shaft, coal being found at a depth of two hundred and fifty-seven feet. It is ventilated by a fan, and the ventilation is good. The west works having been abandoned, only one side of the mine was being worked the double entry system.

CO-OPERATIVE MINE.

Operated by the Co-operative Coal Company. Located northeast of Evansville. It is worked by shaft, the coal being found at a depth of two hundred and thirty feet. This shaft was begun in 1891 and completed in 1892. Very few of the mining laws were complied with at this place. As the mine was a new one and most of the men employed were members of the company, it made it almost impossible to enforce any law.

DAVIESS COUNTY.

MAPLE VALLEY MINE.

Owned by Cable & Co. Located two miles southwest of Washington. The air in this mine is very warm owing to there being a continued fire burning in the old works. At one time this fire was so great that it was impossible to work in this mine for several days. However, the company has used every precaution, and spent much time and money to extinguish the fire, but to no avail. This fire was caused by the dumping of slack into the rooms. Carbonic acid gas and black damp are found in this mine in quantities so great that when mixed with the air it makes it so heavy that it is very hard to ventilate the mine as it should be. All of the old works are being closed up and bratticed off from the workings of this mine. A new shaft has been completed at the north end of the present works which will be known as mine No. 9. This mine will have a good fan which will be used in connection with the one now used. It will ventilate the mine to such an extent that the entire mine will be free from danger of gases. The mine will be worked by shaft, the coal being found at a depth of sixty-one feet.

MINE No. 4.

Owned by Cable & Company. Located two miles south of Washington. This mine was inspected twice and found in good condition, with the exception of a few rooms which had broken through for the want of being bratticed. This mine is being worked by shaft. Second outlet or manway is a slope. No one is lowered or hoisted on the cages. The north side of this shaft is worked out, excepting entry pillars, which will soon be finished. Coal is found at a depth of forty-three feet. It is ventilated by fan.

MINE No. 6.

Owned by Cable & Company. Located three miles west of Washington. It was worked out and abandoned August 25, 1892.

MINE No. 7.

Owned and operated by Cable & Company. Located two miles west of Washington. This mine was inspected twice—on June 10 and September 27, 1892. It is very wet, having a great many drippers in the roof. Sand slips are also found in the roof, making it very dangerous in many rooms. The ventilation of this mine is good. A slope is used as an escape or manway. No men or mules are lowered or hoisted on the cages. It is worked by shaft, coal being found at sixty-two feet below the surface. It is ventilated by a fan.

WILSON MINE No. 1.

Owned and operated by John Wilson & Sons. Located one and one-half miles northwest of Washington. This mine was inspected twice—June 10 and September 27, 1892. The entire mine is very wet. A shaft is used as an escape. No person is lowered or hoisted on the cages. The ventilation is very good, but the room breaks needed stopping up. The mine is worked by shaft, coal being found seventy-four feet below the surface.

THE WILSON MINE.

Owned by the Wilson Coal Company. Located at Montgomery, on the O. & M. R. R. I paid this mine two visits, and, upon inspecting it, found less than ten persons employed. The O. & M. R. R. having ceased coaling engines at this place, the company was compelled to cut the force of hands to less than ten men.

MUTUAL MINE.

Operated by the Mutual Mining Company. Located one mile south of Cannelburg, the coal being hauled by mules on tram-road to the main line of the O. & N. R. R. The coal in this mine is a gray cannel and bituminous coal. The condition of the mine is good, and it is ventilated by a fan which has a volume of 16,000 cubic feet of air per minute, and an average of thirty-five men are employed inside of the mine. This is the only cannel coal mine in the State. The mine is worked by shaft, and coal is found at a depth of 100 feet below the surface.

WHITE WATER VALLEY MINE.

Owned and operated by Samuel Rogers. Located six miles south of Washington on the E. & I. R. R. On both visits this mine was idle and was not inspected. It is worked by a shaft and ventilated by a fan. Coal is found at a depth of fifty feet below the surface.

SPENCER COUNTY.

LINCOLN CITY MINE.

Owned and operated by Henry Shaffer. Located one mile east of Lincoln City on the Cannelton branch of the Air Line R. R. It is worked by a shaft, and coal was found at a depth of twenty-one feet. It was inspected twice. On my first visit less than ten men were employed. This mine is worked for the fine quality of clay. The coal is very shallow and hard to mine. A manway is being completed. The mine is ventilated by a furnace, and the ventilation is good. This mine was overflowed with water last June.

GIBSON COUNTY.

FRISCO MINE.

Operated by A. E. Powell. Located at Francisco on the Air Line R. R. It was inspected twice, June 15 and September 13, 1892. On my first visit, the ventilation was good. They had not completed the manway which was under way, and which was sunk to the depth of seventy feet. On my second visit I found very bad air in some parts of the mine on account of brattices being open. I advised that they be fixed at once, and have learned since that the company complied with my demands, and that the ventilation is good. The mine is worked by shaft, coal being found at a depth of one hundred and thirty-five feet. This is the only shaft working more than ten men in the county. A leased shaft has been sunk at Oakland City. Coal was found at a depth of one hundred and twenty-eight feet.

DUBOIS COUNTY.

BARONIAN MINE.

Owned by Alexander Baronian. Located at Huntingburg. This mine is operated on a small scale. On my visit to this place, I found that they employed less than ten men, and the mine was in a bad condition.

RASE BANK MINE.

Located three miles north of Huntingburg. They employ less than ten men.

REPORT OF MINES IN DISTRICT No. 2, BY COUNTIES, FOR THE YEAR 1892.

COUNTIES.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.
Perry	78	7	$600	5,516	32,448	2,232
Vanderburgh	221	46	14,000	65,508	62,232	23,330
Warrick	71	20	2,500	10,000	5,600	3,320
Pike	205	35	1,476	27,168	108,132	....
Greene	387	49	....	.....	325,408	....
Gibson	75	3	....	.....	36,000	....
Daviess	410	44	....	159,640	95,720	36,000
Knox	81	17	400	12,288	21,960	8,232
Sullivan	675	122	17,200	287,604	250,200	46,272
Spencer	20	2	600	2,640	4,200	1,200
Total	2,223	345	46,176	571,164	921,900	120,586
Mines employing less than 10 men	181	...	....	.....	49,200	....

Total capital invested	$1,330,000 00
Average since paid for mining coal, per ton	40
Average day wages, top hands, per day	1 42
Average day wages, inside hands, per day	1 60

No increased facilities for shipping.

Ten mines in operation by machinery. Coal being mined by machines propelled by compressed air.

Five mines in operation by electricity. Coal being mined and hauled to bottom of shaft by electricity.

Daviess County Cannel Co. Mine, 50 persons employed on the inside. Produce this year, 30,000 tons screened coal, which is enumerated in above.

REPORT OF MINES IN GREENE COUNTY FOR THE MONTH OF JANUARY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Summit . . .	Summit Coal Co	Mar. 22, '92	132	12	10	19		. . . .	4,414	7,829	3,415	. .	1	
Island No. 2 .	Island Coal Co., Linton . . .	Mar. 31, '92	175	20	16	21½	41,000	. . . .	9,914	1,676	. .	. .	. .	
Buckeye . . .	L. M. and Coal Co., Linton	Mar. 23, '92	50	7	3	10	7,000	. . . .	1,800	1,000	4,000	. .	. .	
							FEBRUARY, 1892.							
Fleehart . . .	Linton Coal Mining Co., Linton	Mar. —, '92	50	14	3	10	20,000	. . .	1,800	3,000	. . . .	. .	.	
Summit . . .	Summit Coal Co., Dugger . . .	Mar. 22, '92	127	12	10	8	. .	. . . .	3,438	6,378	2,940	. .	1	
Island No. 2 .	Island Coal Co., Linton	Mar. 31, '92	210	23	18	19	41,000	. . . .	10,500	16,900	. . . .	. .	. .	
							MARCH, 1892.							
Summit . .	Summit Coal Co., Dugger . .	May 31, '92	128	12	10	11	24,000	. . . .	3,636	5,744	2,108	. .	.	
Linton No. 2 .	Island Coal Co., Linton	May 3, '92	250	22	20	24	56,000	. . . .	15,600	25,800	.	. .	.	
Buckeye . . .	L. C. M. Co., Linton	May 4, '92	55	7	3	11	7,000	. . . .	1,900	2,000	1,040	. .	.	
							APRIL, 1892.							
Buckeye . . .	Linton C'l & Min'g Co., Linton	May 27, '92	60	7	3	8	10,000	. . . .	1,600	2,650	1,050	. .	.	
Summit. . . .	Summit Coal Co., Dugger	May 31, '92	107	13	10	11	24,000	. . . .	2,940	4,646	1,706	. .	. .	
Linton No. 2 .	Island Coal Co., Linton	May 24, '92	250	22	20	15	56,000	. . .	9,000	14,900	. . .	. .	. .	

MAY, 1892.

Buckeye . . .	Linton C'l & Min'g Co., Linton	Jan. 12,'93	30	6	3	. . .	10,000	$50	771	1,229	. .	. .	. .
Summit. . . .	Summit Coal Co., Dugger . . .	June 12,'92	109	12	10	9½	24,000	. . . .	3,149	4,870	1,720	. .	. .
Linton No. 2 .	Island Coal Co., Linton . . .	June 22,'92	240	22	20	15	56,000	. . . .	8,388	14,000	. . . .	. .	. .

JUNE, 1892.

Linton No. 2 .	Island Coal Co., Linton	July 14,'92	240	20	20	16	50,000	. . . .	9,025	14,776	. . . .	. .	. .
Buckeye . . .	Linton C'l & Min'g Co., Linton	July 12,'92	30	7	3	6	10,000	. . . .	868	1,387	. . . .	. .	. .
Summit. . . .	Summit Coal Co., Dugger . . .	July 14,'92	109	12	10	10½	24,000	. . . .	3,814	6,170	2,356	. .	. .

JULY, 1892.

Buckeye . . .	Linton C'l & Min'g Co., Linton	Aug. 12,'92	42	7	3	9	10,000	. . . .	1,323	2,142	819	. .	. .
Island No. 2 .	Island Coal Co., Linton	Aug. 12,'92	240	20	20	19	41,792	. . . .	7,850	11,694	. .	. .	. .
Summit. . . .	Summit Coal Co., Dugger . . .	Aug. 12,'92	185	13	10	12	24,000	. . . .	3,794	7,002	2,249	. .	. .

AUGUST, 1892.

Summit. . . .	Summit C'l Co., Lint'n & Dug'r	Nov. 12,'92	114	12	10	11¾	24,000	. . . .	3,788	6,002	2,264	. .	. .
Buckeye . . .	Linton C'l & Min'g Co., Linton	Nov. 12,'92	48	8	13	12⅘	10,000	$600	1,624	2,692	1,000	. .	. .

SEPTEMBER, 1892.

Buckeye . . .	Linton C'l & Min'g Co., Linton	Nov. 12,'92	50	8	3	12¼	10,000	. . . .	1,722	2,723	1,001	. .	. .
Summit. . .	Summit Coal Co., Dugger . . .	Nov. 12,'92	130	15	11	18	25,000	. . . .	5,623	9,038	3,415	. .	. .

OCTOBER, 1892.

Summit. . . .	Summit Coal Co., Dugger . . .	Dec. 9,'92	150	15	11	20	24,000	. . . .	6,431	10,715	4,244	. .	. .
Buckeye . . .	Linton C'l & Min'g Co., Linton	Nov. 12,'92	65	10	4	18⅝	10,000	. . . .	3,403	5,539	2,136	. .	. .

REPORT OF MINES IN GREENE COUNTY FOR MONTH OF NOVEMBER, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Summit.	Summit Coal Co., Dugger	Jan. 19,'93	150	15	11	19¾	24,000	....	6,190	10,316	4,226	..	..	
Buckeye	Linton C'l & Min'g Co., Linton	Dec. 7,'92	60	15	4	..	10,000	....	3,181	5,275	2,094	..	..	

DECEMBER, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Buckeye	Linton C'l & Min'g Co, Linton	Jan. 19,'93	85	20	4	15½	10,000	....	3,128	5,151	2,028	..	..	
Summit.	Summit Coal Co., Dugger	Feb. 13,'93	118	16	11	19	24,000	....	6,080	11,040	4,025	..	..	

REPORT OF MINES IN WARRICK COUNTY FOR THE MONTH OF DECEMBER, 1891.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Chandler	Hall & Brais, Chandler	.....	18	4	4	20		$300 00	114,584	125	400	..	..	
Star	John Archibald, Evansville	.....	28	2	2	21	25,000	....	30,000 b	....	3,000 b	..	..	
Louder	Louder & Wooley, Boonville	.....	47	8	3	24	10,000	...	3,217	....	....	..	..	

JANUARY, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
DeForest	DeForest, B. & Dodds, DeForest	......	22	3	1	...	10,000	$100 00	2,452	300	100	..	..	
Louder	Louder & W. Coal Co., Boonville	......	35	6	2	22	11,000	...		3,320	....	..	..	
Chandler	Hall & Brais, Chandler	......	18	4	4	20	....	300 00	1,985	40	100	..	..	

FEBRUARY, 1892.														
DeForest	DeForest, B. & Dodds, DeForest		22	3	1	16	10,000	$50 00	5,286	5,311				
Louder	Louder & W. Coal Co., Boonville		35	7	2	4½	11,000			874				
Star	John Archibald, Evansville	Mar. 30, '92	34	6	2	21	24,000	500 00	804	471	33			
MARCH, 1892.														
Star	John Archibald, Evansville		27	10	2	22	2,000		30,000 b		15,000 b			
Louder	Louder & W. Coal Co., Boonville		34	3	2	16	14,000			874				
APRIL, 1892.														
Louder	Louder & W. Coal Co., Boonville	Nov. 22, '92	15	6	1	22	12,000	$2000 00	280	130	180			
Star	John Archibald, Evansville	Nov. 12, '92	24	5	3	10	20,000			500	200			
Chandler	Hall & Brais, Chandler	Nov. 4, '92	10	3	3	16	40,000	75 00	400	21				
Gough	Robert Gough, Boonville		10	3	3	12			500	20	300			
MAY, 1892.														
Chandler	Hall & Brais, Chandler	June 14, '92	18	4	4	11			1,028		26			
Star	Newburg Coal Co., Evansville	June 14, '92	28	6	2	20	20,000		28,000 b	10,000 b	5,000 b			
Louder	Louder, W. & Co., Boonville													On strike.
JUNE, 1892.														
Louder	Louder, W. & Co., Boonville													Not working.
Gough	Robert Gough, Boonville													Not working.
Star	John Archibald, Evansville		25	10	3	15	20,000			14,000				

REPORT OF MINES IN WARRICK COUNTY FOR THE MONTH OF JULY, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total tons screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured Into Coke.	No. Accidents.	Remarks.
Star	John Archibald, Evansville	.....	25	5	3	16	20,000	....	.....	1,650	....	..	..	
Gough	Robert Gough, Boonville	.....	...	..	..	...	....	....	.....	...	....	..	..	Not working.
Louder	Louder & W. Coal Co., Boonville	.....	...	..	..	...	....	....	.....	....	....	..	..	Not working.
						AUGUST, 1892.								
Star	....	......	24	6	3	12	20,000	....	.....	1,306	....	..	..	
						SEPTEMBER, 1892.								
Star	John Archibald, Evansville	Jan. 11, '93	24	6	3	15	12,000	....	.....	1,486	....	..	..	
Chandler	Clemmit & Co., Chandler	Jan. 11, '93	9	3	2	17	30,000	$400 00	500	52	....	..	..	
						OCTOBER, 1892.								
Louder	L. W. C. Co., Boonville	Nov. 22, '92	15	6	1	22	12,000	$200	280	130	150	..	..	
Chandler	Clemmit & Co., Chandler	Nov. 22, '92	10	3	3	16	40,000	75	500	21	150	..	..	
Star	John Archibald, Evansville	Nov. 22, '92	24	5	3	10	20,000	....	.....	5,000	....	..	..	

NOVEMBER, 1892.

Chandler	Clemmit & Co., Chandler	Jan. 12, '93	15	4	3	20	40,000	$50	3,000	500	....	..
Louder	L. W. C. Co., Boonville	Dec 21, '92	24	7	2	16	13,000	600	880	1,098	324	..
Star	John Archibald, Evansville	Jan, 11, '93	28	6	3	16	14,000	....	.....	1,700	....	..

DECEMBER, 1892.

Star	John Archibald, Evansville	Jan. 11, '93	34	6	3	20	18,000	....	....	2,300	....	..
Louder	L. W. C. Co., Boonville	Jan. 28, '93	31	9	3	18	13,000	$900	....	2,949	....	..
Chandler	Clemmit & Co., Chandler	Jan. 28, '93	10	4	3	19	40,000	40	525	226	236	..

REPORT OF MINES IN VANDERBURGH COUNTY FOR THE MONTH OF DECEMBER, 1891.

First Avenue	F. A. C. M. Co., Evansville	.....	57	11	7	22	....	....	1,351.40	72	948	..
Ingleside	John Ingle & Co., Evansville	.....	100	12	14	22	....	....	4,000	6,000	500	..
Sun'yside No. 1	Sunnyside Coal Co., Evansville	.....	61	18	9	24	....	....	2,469	1,886	48	..

JANUARY, 1892.

First Avenue	F. A. C. M. Co., Evansville	....	55	10	6	20	..	..	1,375	175	895	.	
Ingleside	John Ingle & Co., Evansville	.....	91	12	14	21	12,600	$200	3,600	4,800	300	..	
Sun'yside No. 2	Sunnyside Coal Co., Evansville	.....	29	6	3	21	....	....	945	.	244	..	
Sun'yside No. 1	Sunnyside Coal Co., Evansville	....	67	18	9	25	19,500	....	2,749	1,032	230	..	
Diamond	D. C. M. Co., Evansville	Dec. 16, '92	33	18	3	26	9,000	....	1,889	358	799	..	

FEBRUARY, 1892.

Sun'yside No. 1	Sunnyside Coal Co., Evansville	......	64	15	9	23½	16,800	$700	1,721	1,738	86	.	1
Sun'yside No. 2	Sunnyside Coal Co., Evansville	......	30	6	4	20	8,400	....	764	170	164	..	..
Ingleside	John Ingle & Co., Evansville	......	91	12	14	20	...	200	3,600	4,800	300	..	..
First Avenue	First Ave. Coal Co., Evansville	Apr. 25, '92	51	12	7	22	...	87.50	1,159	185	741	..	..
Diamond	D. C. M. Co., Evansville	Dec. 16, '92	33	17	3	26	9,000	....	1,259	506	480	..	

REPORT OF MINES IN VANDERBURGH COUNTY FOR THE MONTH OF MARCH, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Am't Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
First Avenue	F. A. C. M. Co., Evansville	Apr. 15, '92	49	12	6	23	....	$524	1,182	202	752	..	..	
Ingleside	John Ingle & Co., Evansville	Apr. 12, '92	82	9	14	22	16,000	....	4,000	6,600	600	.	..	
Sun'yside No. 1	S. S. C. & C. Co., Evansville	Apr. 13, '92	42	18	8	25	14,600	....	1,736	3,276	508	..	..	
Sun'yside No. 2	S. S. C. & C. Co., Evansville	Apr. 13, '92	20	7	4	19	7,500	...	941	177	204		..	
Diamond	D. C. M. Co., Evansville	Dec. 16, '92	26	11	3	26	7,500	...	1,341	578	597	.	..	

APRIL, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Am't Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Sun'yside No. 1	S. S. C. & C. Co., Evansville	May 11, '92	42	15	8	21	16,000	....	909	1,819	92	..	..	
Sun'yside No. 2	S. S. C. & C. Co., Evansville	May 11, '92	10	5	4	14	3,200	...	269	558	117	..	..	
Coöperative	E. C. C. Co., Evansville	May 3, '92	5	6	27	27		$800	200	...	...	.	..	
First Avenue	F. A. C. M. Co., Evansville	June 1, '92	43	15	14	19	....	500	780	189	547	..	..	
Ingleside	John Ingle & Co., Evansville	June 28, '92	85	20	14	20	15,320	....	3,000	4,500	300	..	..	
Diamond	D. C. M. Co., Evansville	Dec. 16, '92	25	11	3	26	9,000	....	605	430	587	..	..	

MAY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Am't Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Ingleside	John Ingle & Co., Evansville	June 28, '92	84	14	14	20	15,000	...	3,200	4,800	350	..	..	
Sun'yside No. 1	S. S. C. & C. Co., Evansville	......	43	10	8	24	16,300	...	401	2,119	134	..	..	
Sun'yside No. 2	S. S. C. & C. Co., Evansville	...	.		..	.	....	....	....	...	....	..	..	Not working.
Diamond	D. C. M. Co., Evansville	Dec. 16, '92	16	14	3	26	9,000	....	436	743	389	..	..	
First Avenue	F. A. C. M. Co., Evansville	......	48	12	6	22	9,000	....	1,150	200	745	..	.	

JUNE, 1892.

Sun'yside No.1	S. S. C. & C. Co., Evansville	.....	48	9	8	22	16,100	....	536	1,980	184	.	..	
Sun'yside No.2	S. S. C. & C. Co., Evansville													Not working.
Ingleside	John Ingle & Co	Feb. 13,'93	80	15	14	15	17,000	....	60,000	90,000	50,000	.	..	
First Avenue	F. A. C. M. Co., Evansville	...	43	6	7	21	9,000	....	1,000	305	792	.	..	
Diamond ...	D. C. M. Co., Evansville	Dec. 16,'93	13	12	3	26	7,000	....	258	423	591	.	..	

JULY, 1892.

Sun'yside No.1	S. S. C. & Coke Co., Evansville	......	55	9	7	25	46,040	....	1,421	2,254	293	.	..	
Sun'yside No.2	Sunnyside Coal & Coke Co													Not working.
Diamond ...	D. C. M. Co., Evansville	Dec. 16,'92	16	12	3	20	7,000	....	154	419	302	.	..	
Ingleside ...	John Ingle & Co., Evansville	Feb. 10,'93												No work in July.
First Avenue	First Ave. C. M. Co., Evansville	... ..	43	8	7	22	9,000	....	11,000	242	125	.	..	

AUGUST, 1892.

Ingleside ...	John Ingle, Evansville	......	60	15	10	12	17,000	$10,000				.	..	
Sun'yside No.1	S. S. C. & Coke Co., Evansville	......	56	7	9	24	40,000	....	1,422	2,350	300	.	..	
Sun'yside No.2	S. S. C. & Coke Co., Evansville													Not working.
First Avenue	First Ave. C. M. Co., Evansv'l	Feb. 8,'93	42	15	4	19	10,000	....	3,050	4,200	200	.	..	
Diamond ...	D. C. M. Co., Evansville	Dec. 16,'92	18	14	3	26	8,000	....	629	571	363	.	..	

SEPTEMBER, 1892.

Sun'yside No.1	S. S. C. C. & Co., Evansville	Nov. 16,'92	48	12	7	22	10,000	$550	1,274	173	744	.	..
			67	8	6	25	25,260	....	1,959	1,371	653	.	..
Sun'yside No.2	S. S. C. C. & Co., Evansville	Nov. 16,'92	11	3	3	24			187	492	160	.	..
Ingleside ..	John Ingle & Co., Evansville	Nov. 16,'92	60	15	10	12	17,000	10,000	1,440	2,160	60	.	..
Coöperative	Evansville Co. M., Evansville		10	2	1	20			400	150	100		
Diamond	Diamond Co. Co., Evansville	Dec. 16,'92	25	6	4	16	....	...	2,000	1,000	.....		..
First Avenue	F. A. Coal Mining Co., Evansv.	Nov. 16,'92	44	9	6	23	10,000	....	1,182	204	750	.	..

REPORT OF MINES IN VANDERBURGH COUNTY FOR THE MONTH OF OCTOBER, 1892.

Name of Mine.	Address of Company.	Date Report Received	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Diamond . . .	D. C. M. Co., Evansville . . .	Dec. 16,'92	23	15	3	26	7,000	. . . .	1,103	485	621	. .	.	
Ingleside . . .	John Ingle & Co., Evansville .	Jan. 26,'93	95	20	16	22	16,000	. . . .	3,600	5,400	250	. .	1	
Sun'yside No.1	S. S. C. & Coke Co. Evansville	Nov. 19,'92	77	8	6	26	35,000	. . . .	2,258	1,155	587	. .	1	
Sun'yside No.2	S. S. C. & Coke Co., Evansville	Nov. 19,'92	13	5	3	26	. . . .	.	299	143	28	. .	. .	
First Avenue	T. A. C. M. Co., Evansville . .	Nov. 16,'92	51	14	7	24	. . . .	$525	1,661	545	819	. .	. .	

NOVEMBER, 1892.

Name of Mine.	Address of Company.	Date Report Received	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Diamond . . .	D. C. M. Co , Evansville . . .	Jan. 16,'93	23	13	3	26	. . . .	. .	1,103	283	622	. .	. .	
First Avenue	F. A. Co. M. Co., Evansville .	Jan. 18,'93	55	14	8	26	. . . .	$100	1,838	439	243	. .	. .	
Ingleside . .	John Ingle & Co., Evansville .	Dec. 18,'92	95	20	16	24	16,000	. . . .	4,000	6,000	300	. .	. .	
Sun'yside No.1	S. S. C. & Coke Co., Evansville	Dec. 15,'92	21	4	4	23	7,380	. . . .	368	778	46	. .	. .	
Sun'yside No.2	S. S. C. & Coke Co., Evansville	Dec. 15,'92	78	8	6	25	34,410	100	2,476	1,145	546	. .	. .	

DECEMBER, 1892.

Name of Mine.	Address of Company.	Date Report Received	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Ingleside . . .	John Ingle & Co., Evansville .	Jan. 26,'93	95	20	19	24	16,000	$4,000	4,000	6,000	300	. .	. .	
Sun'yside No.1	S. S. C. & C. Co., Evansville .	Jan. 21,'93	79	8	6	25	36,700	100	275	1,374	628	. .	. .	
Sun'yside No.2	S. S. C. & C. Co , Evansville . .	Jan. 21,'93	23	4	4	26	10,750	. . .	485	962	55	. .	. .	
First Avenue	T. A. C. M. Co., Evansville . .	Jan. 30,'93	63	13	7	25	. . . .	150	1,988	104	843	. .	. .	
Diamond . . .	D. C. M. Co., Evansville . . .	Jan. 26,'93	26	15	4	29	. . . .	. . . .	1,512	286	700	. .	. .	

REPORT OF MINES IN PIKE COUNTY FOR THE MONTH OF JANUARY, 1892.

Little's	S. W. Little, Evansville	Feb. 6,'93	80	22	6	24			1,596	5,239	852			Nut coal, 1092.
Blackburn	Posey Coal Co., Blackburn	Feb. 10,'93	25	4	6	18	10,000	$250	750	1,000	200			
Ayrshire	David Ingle, Ayrshire	Feb. 13,'93	148	30	30	11				4,110		794		
FEBRUARY, 1892.														
Blackburn	Posey Coal Co., Blackburn	Mar. 24,'92	26	4	6	17	10,000	$150	500	1,200	150			
Ayrshire	David Ingle, Ayrshire	Mar. 24,'92	112	23	30	3			1,210			331		
Little's	S. W. Little, Evansville	Mar. 24,'92	80	22	6	24	14,000		1,595	6,000	859			
MARCH, 1892.														
Ayrshire	David Ingle, Ayrshire													Strike the whole month.
Little's	S. W. Little, Evansville	Feb. 7,'93	79	21	6	24	14,000		1,285	5,000	900			
APRIL, 1892.														
Ayrshire	David Ingle, Ayrshire													Strike.
Little's	S. W. Little, Evansville	May 14,'92	84	20	6	10			427	3,476	358			
Blackbrun	Posey Coal Co., Blackburn	May 27,'92	40	5	9	15	10,000		1,000	1,000	200			
MAY, 1892.														
Ayrshire	David Ingle, Ayrshire	June 10,'92	85	25	16	8				1,851				
Little's	S. W. Little, Evansville	June 10,'92	84	20	6	10	14,000		427	3,476	350			
Blackburn	Posey Coal Co., Blackburn	June 10,'92	35	4	8	15			950	975	100			

REPORT OF MINES IN PIKE COUNTY FOR THE MONTH OF JUNE, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Ayrshire . . .	David Ingle, Ayrshire	Aug. 21,'92	80	12	8	6		. . . .	. .	2,368	. . .	. .	. .	
Little's	S. W. Little, Evansville	Aug. 21,'92	79	20	6	14	14,000	. .	528	5,900	400	. .	. .	

JULY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Ayrshire . . .	David Ingle, Ayrshire	Aug. 21,'92	52	9	8	19	. . . .	. . . .	676	1,114	381	. .	1	
Little's	S. W. Little, Evansville	Aug. 21,'92	85	21	6	13	14,000	. . . .	692	4,921	400	.	. .	

AUGUST, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Blackburn . .	Posey Coal Co., Blackburn . .	. . . . . .	25	10	6	20	. . . .	$500	1,000	. .	250	. .	.	
Little's	S. W. Little, Evansville	. . . . . .	90	15	6	17	14,000	. . .	700	5,000	300	. .	. .	

SEPTEMBER, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Little's	S. W. Little, Evansville	Jan. —,'92	90	18	6	21	. . . .		1,399	4,818	640	. .	. .	Nut, 601.
Blackburn . .	Posey Coal Co., Blackburn .	Oct. 18,'92	35	10	6	19	. .	$200	1,050	. . .	. . . .	.	.	

OCTOBER, 1892.

S. W. Little	S. W. Little, Evansville	Nov. 18,'92	1,000	15	7	23		$400		8,624			1
Posey	Posey Coal Co., Blackburn	Nov. 16,'92	35	10	6	19		200	1,050				
Ayrshire	David Ingle, Ayrshire	Nov. 11,'92	70	10	12	19		876	1.214	387			

NOVEMBER, 1892.

Little's	S. W. Little, Evansville	Dec. 16,'92	97	10	7	22	14,000		1,787	5,487	744		
Ayrshire	David Ingle, Ayrshire	Dec. 16,'92	79	12	12	21			1,600	6,909	400		
Blackburn	Posey Coal Co., Blackburn	Dec. 12,'92	36	19	6	20			1,500				

DECEMBER, 1892.

Little's	S. W. Little, Evansville	Jan. 19,'93	98	14	7	24	14,000			8,624			
Ayrshire	David Ingle, Ayrshire	Jan. 17,'93	75	11	12	20			900	1,623	385		
Posey	Posey Coal Co., Blackburn	Jan. 12,'93	34	9	6	19			1,090				

REPORT OF MINES IN KNOX COUNTY FOR THE MONTH OF JANUARY, 1892.

Freeman	Vincennes Coal Co., Vincennes		28	6	2	24		$117 89		1,700			
Prospect Hill	Frank Clark, Vincennes		18	3	2	25			20,472		7,730		
Bicknell	Bicknell Coal Co., Bicknell	Apr. 2,'92	44	10	2	15	6,360.25		883	475	785		

FEBRUARY, 1892.

Bicknell	Bicknell Coal Co., Bicknell		39	5	2	7	6,360.25		503	176	503		
Vincennes	Vincennes Coal Co., Vincennes	Mar. 26,'92	25	6	2	24		$250 00		960			1
Prospect Hill	Frank Clark, Vincennes	Mar. 26,'92	17	6	2	23		150 00	516	694	183		1

REPORT OF MINES IN PIKE COUNTY FOR THE MONTH OF MARCH, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Prospect Hill	Frank Clark, Vincennes	May 10, '92	13	5	2	26	7,000	$100 00	....	904	169	..	..	
Bicknell	Bicknell Coal Co., Bicknell	May 2, '92	28	4	2	10	....	....	880	...	716	..	..	
APRIL, 1892.														
Prospect Hill	Frank Clark, Vincennes	May 14, '92	8	5	2	17	....	$100 00	173	41	43	..	..	
Bicknell	Bicknell Coal Co., Bicknell	June 17, '92	19	4	1	10	8,600	....	261	412	215	..	..	
MAY, 1892.														
Prospect Hill	Frank Clark, Vincennes	......	9	3	1	21	....	....	136	60	11	..	..	
Bicknell	Bicknell Coal Co., Bicknell	......	13	3	1	2	8,608	....	75	....	60	..	..	
JUNE, 1892.														
Prospect Hill	Frank Clark, Vincennes	July 14, '92	7	2	1	26	6,500	....	50	139	....	..	..	
Bicknell	Bicknell Coal Co., Bicknell	July 12, '92	7	3	1	3	....	....	52	....	41	..	..	

JULY, 1892.

Prospect Hill .	Frank Clark, Vincennes . .	Aug. 12,'92	7	3	2	27	. . .	. . . .	76	190	. . . .	. .	. .
Bicknell . . .	Bicknell Coal Co., Bicknell . .	Aug. 12,'92	9	3	1	8	10,000	. . . .	249	. . .	203	. .	. .
Freeman . . .	Vincennes Coal Co., Vincennes	Aug. 12,'92	14	4	1	24	14,000	. . . .	. . . . . .	392	. . . .	. .	. .

AUGUST, 1892.

Prospect Hill .	Frank Clark, Vincennes . . .	Sept. 15,'92	9	3	1	24	. . . .	. . . .	184	92	58	.	. .
Bicknell . . .	Bicknell Coal Co., Bicknell . .	Oct. 28,'92	13	3	1	4	6,550	. . . .	146	. . . .	119	. .	. .

SEPTEMBER, 1892.

Prospect Hill .	Frank Clark, Vincennes . .	Oct. 28,'92	11	2	1	24	. . . .	.	367	6	119	. .	
Bicknell . . .	Bicknell Coal Co., Bicknell . .	Nov. 21,'92	21	4	1	17	6,500	$100 00	861	. . . .	609	. .	. .

OCTOBER, 1892.

Bicknell .	Bicknell Coal Co., Bicknell . .	Nov. 25,'92	24	4	1	19	6,500	$75 00	1,113	. . . .	790	. .	. .
Prospect Hill .	Frank Clark, Vincennes . . .	Nov. 17,'92	13	4	1	24	. . . .	150 00	510	42	178	. .	. .

NOVEMBER, 1892.

Prospect Hill .	Frank Clark, Vincennes . . .	Dec. 16,'92	14	4	1	23	. . . .	$100 00	585	19	211	. .	. .
Bicknell . . .	Bicknell Coal Co., Bicknell . .	Jan. 13,'93	32	4	2	24	6,500	. . . .	1,170	. . . .	830	. .	. .

DECEMBER, 1892.

Prospect Hill .	Frank Clark, Vincennes . . .	Jan. 21,'93	15	4	2	23	. . . .	$100 00	611	73	192	. .	. .
Bicknell . . .	Bicknell Coal Co., Bicknell . .	Jan. 13,'93	45	5	2	24	6,500	$100 00	1,509	. . . .	1,358	. .	. .

REPORT OF MINES IN PERRY COUNTY FOR THE MONTH OF JANUARY, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Troy	Bergemath Bros., Troy . . .	Feb. 5,'93	20	2	2	25	. . . .	. .	600	. . . .	300	. .	. .	
Cannelton . .	American Coal Co., Cannelton	Feb. 5,'93	74	6	11	24	12,000	. . . .	1,040	2,048	350	. .	. .	

FEBRUARY, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Troy	Bergemath Bros., Troy	Mar. 28,'92	20	2	1	22	. . . .	. . . .	. . . .	920	. .	. .	. .	
Cannelton . .	American Coal Co., Cannelton	Mar. 28,'92	73	6	11	25	11,056	. . . .	1,089	2,557	348	. .	. .	

MARCH, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Troy	Bergemath Bros., Troy . .	May 4,'92	19	2	1	23	. . . .	. . . .	640	. . . .	320	. .	. .	
Cannelton . .	American Coal Co., Cannelton	May 4,'92	73	6	11	26	9,820	. . . .	1,146	1,889	420	. .	1	

APRIL, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Cannelton . .	American Coal Co., Cannelton	May 11,'92	74	6	12	24	11,100	$8 00	860	1,692	256	. .	1	
Troy	Bergemath Bros., Troy .	May 13,'92	18	2	2	22	2,000	. . .	. . . . .	892	. . . .	. .	. .	

MAY, 1892.														
Cannelton . .	American Coal Co., Cannelton	June 12,'92	79	5	9	24	10,070	. . . .	709	3,020	267	.	. .	
Troy	Bergemath Bros., Troy	June 12,'92	18	2	2	22	. . . .	. . .	. . . .	893	. . . .	. .	.	
JUNE, 1892.														
Cannelton . .	American Coal Co., Cannelton	June 14,'92	64	5	14	24	11,110	. . . .	719	1,953	273	.	. .	
Troy	Bergemath Bros., Troy . . .	June 14,'92	17	2	2	23	2,000	. . .	870	. . . .	. . . .	. .	. .	
JULY, 1892.														
Troy	Bergemath Bros. Troy. .	Aug. 12,'92	18	2	2	20	. .	. . . .	. . . .	800	. . . .	. .	.	
Cannelton . .	American Coal Co, Cannelton	Aug. 24,'92	60	5	13	26	10,910	. . . .	468	1,904	186	. .	. .	
AUGUST, 1892.														
Troy	Bergemath Bros, Troy	Oct. 25,'92	9	2	1	16	2,200	. . . .	. . . . .	648	. . . .	.	. .	
Cannelton . .	American Coal Co., Cannelton	Oct. 8,'92	52	8	14	11	950	. . . .	589	621	219			
SEPTEMBER, 1892.														
Troy	Bergemath Bros., Troy . . .	Oct. 25,'92	9	2	1	10	2,100	. . . .	. . . . .	435	. .	.	. .	
Cannelton . .	American Coal Co., Cannelton	Oct. 8,'92	45	7	14	10	9,500	. . . .	252	509	96	.	. .	
OCTOBER, 1892.														
Troy . . .	Bergemath Bros, Troy . . .	Dec. 5,'92	12	2	2	10	2,000	. . . .	. . . .	400	. . . .	. .	.	
Cannelton . .	American Coal Co., Cannelton	Dec. 3,'92	48	5	6	13	9,650	. . . .	718	331	249	.	. .	

REPORT OF MINES IN PERRY COUNTY FOR THE MONTH OF NOVEMBER, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Troy	Bergemath Bros., Troy	Dec. 5,'92	12	2	2	10	2,000	. . . .	. . . . . .	400	. . .	. .	. .	
Cannelton . .	American Coal Co., Cannelton	Dec. 3,'92	38	8	10	10	6,665	. . .	735	470	124	. .	. .	
DECEMBER, 1892.														
Troy	Bergemath Bros., Troy . . .	Jan. 10,'93	12	2	2	11	2,200	. . . .	. .	440	. . .	. .	. .	
Cannelton . .	American Coal Co., Cannelton	Jan. 11,'93	37	7	10	18	9,000	. . . .	750	450	125	. .	. .	

REPORT OF MINES IN GIBSON COUNTY FOR THE MONTH OF JANUARY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Francisco. .	E. A. Powell, Francisco . . .	June 15,'92	75	15	4	31	14,000	. . . .	. . . . . .	3,400	. . . .	. .	. .	
FEBRUARY, 1892.														
Francisco. . .	E. A. Powell, Francisco	June 15,'92	75	15	4	29	14,000	. . . .	. . . . . .	33,000	. . . .	. .	. .	
MARCH, 1892.														
Francisco. . .	E. A. Powell, Francisco	June 15,'92	75	13	4	31	14,000	. . . .	. . . . . .	3,400	. . .	. .	. .	

APRIL, 1892.

Francisco. . .	E. A. Powell, Francisco	June 15, '92	48	10	4	30	14,000	. . . .	. .	4,000	. . . .	. .	. .

MAY, 1892.

Francisco. . .	E. A. Powell, Francisco	June 15, '92	48	10	4	31	14,000	$400 00	161	3,775	226	. .	. .

JUNE, 1892.

Francisco. . .	E. A. Powell, Francisco . . .	July 8, '92	50	10	4	30	14,000	. . . .	170	3,875	226	. .	. .

JULY, 1892.

Francisco. . .	E. A. Powell, Francisco	Aug. 11, '92	45	9	4	25	14,000	. . . .	190	2,876	192	. .	. .

AUGUST, 1892.

Francisco. . .	E. A. Powell, Francisco	Sept. 9, '92	50	8	4	24	10,000	. . . .	195	3,795	62	. .	. .

SEPTEMBER, 1892.

Francisco. . .	E. A. Powell, Francisco	Oct. 4, '92	45	8	4	26	10,000	. . . .	295	2,800	95	. .	. .

OCTOBER, 1892.

Francisco. .	E. A. Powell, Francisco	Nov. 10, '92	42	7	4	22	12,000	. . . .	195	2,800	. . .	. .	. .

REPORT OF MINES IN GIBSON COUNTY FOR THE MONTH OF NOVEMBER, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured Into Coke.	No. Accidents.	REMARKS.
Francisco. . .	E. A. Powell, Francisco	Dec. 6, '92	51	9	4	25	14,000	. . .	170	3,675	229	. .	.	
DECEMBER, 1892.														
Francisco. . .	E. A. Powell, Francisco . . .	Jan. 11, '93	51	10	5	26	14,000	. .	175	3,675	226	.	. .	

REPORT OF MINES IN SPENCER COUNTY FOR THE MONTH OF JANUARY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured Into Coke.	No. Accidents.	REMARKS.
Schafer	Henry Schafer, Lincoln City .	. . . . . .	30	4	3	26	. . . .	. . . .	206	434	90	. .		
FEBRUARY, 1892.														
Schafer . . .	Henry Schafer, Lincoln City .	. . . . . .	27	2	3	24	. . .	. . . .	254	425	94	. .	. .	
MARCH, 1892.														
Lincoln City .	Henry Schafer, Lincoln City .	April 8, '92	20	2	3	27	. . . .	. . .	320	350	100	. .	. .	This mine did not run in the month of April.

MAY, 1892.													
Lincoln City .	Henry Schafer, Lincoln City .	June 10, '92	11	2	2	27	. . . .	. . . .	133	223	44	.	In the month of June less than ten men were employed.
JULY, 1892.													
Lincoln City .	Henry Schafer, Lincoln City .	Aug. 12, '92	8	2	1	26	. . . .	$100 00	10	334	15	. .	. .
AUGUST, 1892.													
Lincoln City .	Henry Schafer, Lincoln City .	. . . . . .	12	2	3	26	. . . .	$100 00	. . . .	360	30	.	. .
SEPTEMBER, 1892.													
Lincoln City .	Henry Schafer, Lincoln City .	Oct. 19, '92	15	2	3	26	. . .	. . . .	214	458	60	. .	. .
OCTOBER, 1892.													
Lincoln City .	Henry Schafer, Lincoln City .	Dec. 12, '92	15	2	2	23	. . . .	. . . .	165	345	50	. .	. .
NOVEMBER, 1892.													
Lincoln City .	Henry Schafer, Lincoln City .	Dec. 12, '92	15	2	2	23	. . . .	. . .	155	362	51	. .	. .
DECEMBER, 1892.													
Lincoln City .	Henry Schafer, Lincoln City .	Jan. 24, '93	15	2	2	26	. . . .	. . . .	195	423	60	. .	. .

REPORT OF MINES IN DAVIESS COUNTY FOR THE MONTH OF JANUARY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured Into Coke.	No. Accidents.	REMARKS.
Wilson	J. Wilson & Sons, Washington	Jan. 25,'93	30	5	2	23	10,700	....	2,655	....	....	..	.	
Mutual	M. M. Coal Co., Cannelburgh	Jan. 19,'93	55	8	3	22	55,000	$15 00	2,250	35	150	..	.	
Montgomery	Wilson Coal Co., Washington	Jan. 25,'93	9	2	2	4	....	....	80	100	10	..	..	
No. 7	Cable & Co., Washington	Jan. 27,'93	46	5	3	22½	1,900	....	.....	3,788	....	..	..	
No. 6	Cable & Co., Washington	Jan. 27,'93	31	4	2	24	1,400	....	.....	3,143	....	..	..	
Maple Valley	Cable & Co., Washington	Jan. 27,'93	116	10	21	22½	21,000	...	3,719	919	1,780	..	..	
No. 4	Cable & Co., Washington	Jan. 27,'93	123	10	18	23½	20,000	....	4,617	....	1,560	..	..	

FEBRUARY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured Into Coke.	No. Accidents.	REMARKS.
No. 4	Cable & Co., Washington	Mar. 24,'92	125	10	18	23	19,000	...	4,258	60	1,593	.	..	
No. 6	Cable & Co., Washington	Mar. 24,'92	28	5	2	23	13,000	....	.....	1,847	....	..	..	
No. 7	Cable & Co., Washington	Mar. 24,'92	50	5	4	19	1,500	....	.....	2,506	....	..	..	
Maple Valley	Cable & Co., Washington	Mar. 24,'92	124	10	18	16	19,000	....	3,374	....	1,848	..	..	
Mutual	M. M. Coal Co., Cannelburgh	Mar. 24,'92	77	8	3	22	5,800	$75 00	2,500	80	120		.	

MARCH, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured Into Coke.	No. Accidents.	REMARKS.
Mutual	M. M. Coal Co., Cannelburgh	May 17,'92	50	9	3	13	55,000	$75 00	1,300	60	80	..	.	
Maple Valley	Cable & Co., Washington	June 2,'92	106	9	19	12	18,000	....	2,814	689	1,459	..	..	
No. 4	Cable & Co., Washington	June 2,'92	133	12	18	21	21,000	....	3,764	....	1,390	..	..	
No. 6	Cable & Co., Washington	June 2,'92	26	4	2	24	13,000	....	.....	....	....	..	..	
No. 7	Cable & Co., Washington	June 2,'92	50	4	4	22	15,000	....	.....	3,264	....	..	..	

APRIL, 1892.

Mutual	M. M. Coal Co., Cannelburgh	May 17, '92	48	9	3	9	57,000	....	1,000	6	75	..	..	
Maple Valley.	Cable & Co., Washington	May 6, '92	115	10	19	15	19,000	....	2,814	689	1,459	..	..	
No. 4	Cable & Co., Washington	May 6, '92	128	11	18	16	24,000	....	3,764	....	1,280	..	..	
No. 7	Cable & Co., Washington	May 6, '92	50	4	4	15	14,000	....	....	3,264	....	..	..	
No. 6	Cable & Co., Washington	May 6, '92	22	3	2	16	10,000	....	....	1,884	....	..	..	

MAY, 1892.

Mutual	M. M. Coal Co., Cannelburgh	June 14, '92	50	9	3	9	6,000	$40 00	1,150	50	100	..	..	
Maple Valley.	Cable & Co., Washington	July 4, '92	108	10	18	12	16,000	....	2,597	444	1,379	..	..	
No. 4	Cable & Co., Washington	July 4, '92	118	10	18	10	24,000	....	2,434	....	872	..	..	
No. 6	Cable & Co., Washington	July 4, '92	20	3	1	15	10,000	....	....	1,670	....	..	..	
No. 7	Cable & Co., Washington	July 4, '92	47	5	4	14	1,500	....	....	3,260	....	..	..	

JUNE, 1892.

Wilson	J. Wilson & Sons, Washington	Aug. 11, '92	25	6	2	10	8,700	....	....	867	....	..	..	
Mutual	M. M. Coal Co., Cannelburgh	Aug. 11, '92	50	9	3	4	8,500	$120 00	550	65	40	..	..	
No. 6	Cable & Co., Washington	Aug. 12, '92	20	4	1	21	10,000	....	....	2,240	....	..	..	
No. 7	Cable & Co., Washington	Aug. 12, '92	50	6	4	17	14,000	....	....	2,106	....	..	..	
No. 4	Cable & Co., Washington	Aug. 12, '92	109	9	18	10	24,000	....	2,161	....	749	..	..	
Maple Valley.	Cable & Co., Washington	Aug. 12, '92	109	9	18	10	16,000	....	1,987	49	1,054	..	..	

JULY, 1892.

Mutual	M. M. Coal Co., Cannelburgh	Aug. 21, '92	52	9	3	11	8,500	$50	1,550	60	65	..	..	
No. 7	Cable & Co., Washington	Aug 30, '92	50	6	4	14	15,000	....	....	3,400	....	..	..	
No. 4	Cable & Co., Washington	Aug. 30, '92	109	10	20	14	23,100	....	2,807	....	1,036	..	..	
Maple Valley	Cable & Co., Washington	Aug. 30, '92	102	9	18	12	17,000	....	2,368	168	1,285	..	..	

REPORT OF MINES IN DAVIESS COUNTY FOR THE MONTH OF AUGUST, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Am't Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
No. 7	Cable & Co., Washington	Sept. 28,'92	50	7	4	23	13,000	....	.....	4,226	....	..	..	
Maple Valley	Cable & Co., Washington	Sept. 28,'92	112	9	18	17	16,500	....	2,605	1,318	1,453	..	..	
No. 4	Cable & Co., Washington	Sept. 28,'92	114	10	20	16	18,000	....	3,605	...	1,336	..	..	
Wilson	John Wilson, Washington	Sept. 15,'92	25	7	5	12	...	...	1,265	....	...	..	.	
Mutual	Mutual Mining Co., Cannelb'gh	Dec. 8,'92	55	9	3	23	8,000	$150	2,700	120	250	..	.	

SEPTEMBER, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Am't Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Mutual	Mut. Mining Co., Cannelburgh	Dec. 8,'92	55	9	3	23	8,000	...	2,700	120	250	..	..	
Maple Valley	Cable & Co., Washington	Oct. 31,'92	113	10	18	19	32,000	....	1,745	2,587	991	..	..	
No. 4	Cable & Co., Washington	Oct. 31,'92	112	8	18	19	18,000	....	4,118	..	1,596	..	.	
No. 7	Cable & Co., Washington	Oct. 31,'92	45	6	4	20	12,000	....	.....	3,823	....		..	

OCTOBER, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Am't Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	Remarks.
Wilson's	Thos. Wilson & Sons, Wash'gton	Nov. 30,'93	30	5	3	22	11,000	....	...	....	....	..	..	No coal was hauled.
Mutual	Mut. Mining Co., Cannelburgh	...	...	..		...		...	...	....	....	..	..	No report received.
No. 4	Cable & Co., Washington	Nov. 22,'92	117	10	18	22	20,000	...	4,703	..	1,529	..	1	
No. 7	Cable & Co., Washington	Nov. 22,'92	50	6	4	21	14,000	...	....	4,791	...	..		
Maple Valley	Cable & Co., Washington	Nov. 22,'92	116	10	18	17	31,000	....	2,511	838	1,399	..	..	

NOVEMBER, 1892.

Mutual	Mut. Mining Co., Cannelburgh	Dec. 9,'92	57	9	3	22	9,000	$175	2,800	200	900			
No. 9	Cable & Co., Washington	Jan. 21,'93	51	5	5	17½	6,000			3,308				
No. 7	Cable & Co., Washington	Jan. 21,'93	48	6	4	22	12,000			4,616				
No. 4	Cable & Co., Washington	Jan. 21,'93	127	11	19	22	15,000		4,176		1,634			
Maple Valley	Cable & Co., Washington	Jan. 21,'93	81	7	11	19½	20,000		1,116	2,069	642			
Wilson	Thos. Wilson & Sons, Wash'gton													Has no report.

DECEMBER, 1892.

Mutual	Mut. Mining Co., Cannelburgh	Jan. 12,'93	58	10	4	18½	8,500	$200	2,950	80	120			
Maple Valley	Cable & Co., Washington	Jan. 21,'93	71	7	11	29½	20,000		1,947	796	732			
No. 4	Cable & Co., Washington	Jan. 21,'93	130	10	18	11½	18,000		3,954		1,529			
No. 9	Cable & Co., Washington	Jan. 21,'93	50	5	5	21½	10,000			4,783				
No. 7	Cable & Co., Washington	Jan. 21,'93	53	6	5	20	11,000		152	4,991	52			
Wilson's	Thos. Wilson & Sons, Wash'gton													Has no report.

REPORT OF MINES IN SULLIVAN COUNTY FOR THE MONTH OF JANUARY, 1892.

Farmersburg	F. C. M. Co., Farmersburg	Mar. 23,'92	9	2	1	25	2,500		390		175			
Dugger	D. & N. Coal Co., Dugger	Mar. 23,'92	147	18	12	23	35,950	$240	7,270		3,794			
Little Pittsburgh	Stark & Co., Hymera	Mar. 31,'92	39	1		20	2,800		800	200	120			
Hancock	Hancock & Conkel, Farnsworth	Mar. 25,'92	75	9	5	8	8,000		1,253	308	415			
Jumbo	J. H. C. and Coke Co., Angel	Mar. 25,'92	130	12	10	15	18,000		6,000		1,400			
New Pittsb'gh	N. P. C. and C. Co., Alum Cave	Mar. 25,'92	109	25	10					11,000				
Superior	Island Coal Co., Linton	Mar. 23,'92	16	5	2	16	2,400		1,240	2,000				
Shelburn	Shelburn Coal Co., Shelburn	Mar. 23,'92	36	7	6	22	9,000		1,000	100	500			
Curryville	C. C. and Coke Co., Shelburn	Mar. 31,'92	31	7	5	15	7,000		1,000	1,000				
Old Pittsb'gh	O. P. Coal Co., Hymera	Mar. 25,'92	52	10	4	25	20,000		3,110	950				

REPORT OF MINES IN SULLIVAN COUNTY FOR THE MONTH OF FEBRUARY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Little Pittsburgh . . .	Stark & Co., Hymera	Mar. 23,'92	39	1	. .	20	2,000	. .	800	200	120	. .	. .	
Farmersburgh	F. C. M. Co., Farmersburg	Mar. 25,'92	9	2	. .	. .	. . . .	. . .	. . . .	. . .	. . .	. .	. .	
Hancock . . .	Hancock & Conkel, Farnsworth	Mar. 25,'92	75	9	5	8	8,600	$975	1,253	368	415	. .	. .	
Jumbo . .	J. H. C. and Coke Co., Angel .	Mar. 31,'92	130	12	10	15	18,000	. .	6,000	.	1,500	. .	. .	
New Pittsb'gh	N. P. C. and C. Co., Alum Cave	Mar. 31,'92	107	29	10		. . . .	.	. . . .	10,678	. . .	. .	. .	
Superior . .	Island Coal Co., Linton . .	Mar. 31,'92	15	5	6	16	3,400	300	1,312	2,000	. . .	. .	1	
Dugger . .	D. & N. Coal Co., Dugger . . .	May 10,'92	163	19	12	16	35,950	. . . .	4,964	7,555	. . . .	. .	1	
Curryville . .	C. C. and Coke Co., Shelburn .	Mar. 23,'92	32	7	5	16	7,000	. . . .	1,030	1,114	. .	. .	. .	
Shelburn . . .	Shelburn Coal Co., Shelburn .	Mar. 31,'92	38	7	6	23	12,000	. . .	1,113	179	630	. .	. .	

MARCH, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Farmersburg .	F. C. M. Co., Farmersburg .	Apr. 8,'92	8	2	1	25	. . . .	$25	100	125	50	. .	. .	
Jumbo . . .	J. H. C. and Coke Co., Angel .	Apr. 8,'92	60	10	10	24	16,000	. . . .	9,500	.	2,400	. .	. .	
Dugger	D. & N. Coal Co., Dugger .	May 10,'92	163	19	12	17	35,000	. . .	4,326	6,583	. . .	. .	. .	
Curryville . .	C. C. and Coke Co., Shelburn .	Apr. 12,'92	32	7	5	20	800	. .	1,030	1,141	473	. .	. .	
Old Pittsb'gh .	O. P. Coal Co., Hymera	Apr. 12,'92	51	10	4	30	1,900	. . . .	3,210	958	. . . .	. .	. .	
Lyonton . . .	L. C. and Coke Co., Lyonton .	Apr. 12,'92	21	10	3	4	8,400	. . . .	400	160	45	. .	. .	
Shelburn	Shelburn Coal Co., Shelburn .	Apr. 12,'92	50	8	3	14	9,500	. . . .	945	101	. . . .	. .	. .	
New Pittsb'gh	N. P. C. & Co., Alum Cave .	Apr. 12,'92	100	10	14	20	20,000	. . . .	. . . . .	11,300	. . . .	. .	. .	
Hancock . . .	Hancock & Conkel, Farnsworth	Jan. 30,'93	49	8	6	24	12,000	500	896	319	400	. .	. .	

APRIL, 1892.

New Pittsb'gh	N. P. C. and C. Co., Alum Cave	May 13,'92	100	10	14	20	24,000	$299	....	10,260	...	..	..
Shelburn	Shelburn Coal Co., Shelburn .	May 13,'92	50	8	3	15	9,500	....	945	101	45	..	..
Old Pittsb'gh .	O. P. Coal Co., Hymera	May 13,'92	78	16	..	30	20,000	....	2,030	685	45	..	..
Curryville . .	C. C. and Coke Co., Shelburn .	May 10,'92	35	7	5	26	7,000	....	761	1,158	102	..	..
Farmersburg .	F. Coal Co., Farmersburg . .	May 10,'92	8	1	1	26	....	....	....	....	....	..	..
Dugger	D. & N. Coal Co., Dugger . . .	July 4,'92	132	18	10	12	28,700	....	3,917	5,960	2,443	..	..
Jumbo	J. H. C. and Coke Co., Angel .	July 4,'92	85	20	12	25	16,000	....	9,000	..	2,000	..	..
Hancock . . .	Hancock & Conkel, Farnsworth	Jan. 30,'92	29	8	4	13	12,000	....	334	210	147	..	..

MAY, 1892.

Lyonton .	L. C. and Coke Co., Lyonton .	June 12,'92	1	1	1	1	8,000	$25	75	25	25	..	..
New Pittsb'gh	N. P. C. and C. Co., Alum Cave	June 12,'92	110	18	12	17	28,000	....	6,450	11,200	....	..	..
Jumbo . .	J. H. C. and Coke Co	June 11,'92	70	20	12	25	16,000	...	8,000	..	2,000	..	..
Old Pittsb'gh .	O. P. Coal, Hymera	June 11,'92	86	17	4	25	20,000	...	3,327	668	45	..	..
Dugger	D. & N. Coal Co., Dugger . . .	July 5,'92	152	18	10	10	30,000	...	3,121	4,749	1,628	..	..
Hancock . . .	Hancock & Conkel, Farnsworth	Jan. 30,'93	59	7	6	23	12,000	...	1,113	179	630	..	..
Shelburn . . .	Shelburn Coal Co., Shelburn .	July 5,'92	38	7	5	22	10,000	....	1,300	1,400	586	..	..
Little Pittsburgh	M. Stark & Co., Hymera	July 5,'92	14	2	..	10	2,000	. .	300	250	473	..	..
Curryvil'e . .	C. C. and Coke Co., Shelburn .	July 5,'92	32	7	5	20	7,000	.	1,030	1,141	....	..	..

JUNE, 1892.

Alum Cave . .	N. P. Coal and Coke Co., Alum Cave	Aug. 12,'92	100	10	11	13	27,000	....	6,000	7,500	....	430	..
Hymera . . .	Old Pittsb'gh Coal Co., Hymera	Aug. 12,'92	89	18	4	23	20,000	....	2,891	313	40	..	..
Dugger	Dugger & Neal Coal Co., Dugger	Aug. 12,'92	127	17	9	9	32,000	....	2,861	4,353	1,492	..	..
Shelburn . . .	Shelburn Coal Co., Shelburn .	Aug. 10,'92	40	8	5	19	10,000	....	1,100	1,500	400	..	..
Jumbo	J. H. C. and Coke Co., Angel .	Aug. 10,'92	120	12	9	22	21,000	....	7,000	..	2,000	..	..
Hancock . .	Hancock & Conkel, Farnsworth	Jan. 30,'93	47	7	6	11	16,000	$250 00	1,052	246	378	..	..
Lyonton . .	L. Coal and Coke Co., Lyonton	Aug. 12,'92	11	2	2	12	8,000	....	150	100	90	..	..

REPORT OF MINES IN SULLIVAN COUNTY FOR THE MONTH OF JULY, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Lyonton	Lyonton C. and C. Co., Lyonton	Aug. 4,'92	4	1	1	5	8,000		75	50	25			
Little Pittsburgh	M. Stark & Co., Hymera	Aug. 5,'92	10	1		14	2,000		250	250				
Dugger	D. & N. Coal Co., Dugger	Aug. 10,'92	129	18	9	10	32,000		3,106	4,726	1,620		1	
New Pittsb'gh	N. P. C. and C. Co., Alum Cave	Aug. 12,'92	110	15	9	17	40,000		5,000	7,700	175	715		
Hancock	Hancock & Conkel, Farnsworth	Jan. 30,'93	53	6	6	20	12,000		1,654	356	750			
Jumbo	J. H. C. and Coke Co., Angel	Aug. 12,'92	130	12	10	17	20,000		6,000		1,500			
Superior	Island Coal Co., Lyonton	Aug. 12,'92												
Curryville	C. C. and Coke Co., Shelburn													Tipple burned.
Shelburn	Shelburn Coal Co., Shelburn	Aug. 10,'92	39	8	4	18	10,000		1,000	1,300	3,000			
Old Pittsb'rgh	Old Pittsb'gh Coal Co., Hymera	Aug. 12,'92	99	24	5	24	18,000		6,162	68	75			

AUGUST, 1892.

NAME OF MINE.	ADDRESS OF COMPANY.	DATE REPORT RECEIVED.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured into Coke.	No. Accidents.	REMARKS.
Lyonton	Lyonton C. and C. Co., Lyonton	Sept. 3,'92	11	3	1	8	8,000		150	50	50			
Stark	M. Stark & Co., Hymera	Sept. 13,'92	14	8		18	4,000		700	500	100			
Shelburn	Shelburn Coal Co., Shelburn	Sept. 14,'92	37	8	4	19	8,000	$32 00	901	1,477	205			
Old Pittsb'rgh	Old Pittsburgh, Hymera	Sept. 16,'92	97	23	5	26	14,000		6,263	68	72			
New Pittsb'gh	N. P. C. and C. Co., Alum Cave	Sept. 22,'92	110	15	7	21	40,000		6,170	9,255	480			
Dugger	D. & N. Coal Co., Dugger	Sept. 19,'92	145	25	9	18	29,000		4,654	7,097	2,433			
Curryville	Curryville C. & C. Co., Shelburn													
Superior	Island Coal Co., Linton	Sept. 24,'92	15	5	2	16	10 000		1,312	2,000				
Jumbo	Jackson Hill Coal Co., Angel	Sept. 27,'92	130	12	10	15	12,000		6,000		1,500			
Hancock	Hancock & Conkel, Farnsworth	Oct. 1,'92	75	9	5	12	12,000	975 00	1,553	508	615			

SEPTEMBER, 1892.

Dugger . . .	D. & N. Coal Co., Dugger . . .	Nov. 1,'92	150	25	9	22	29,000	. . .	5,384	8,993	2,809	. .		
Hancock	Hancock & Conkel, Farnsworth	Jan. 30,'93	53	8	6	23	11,000	$150 00	1,773	422	856		.	
New Pittsb'gh	N. P. C. and C. Co., Alum Cave	Nov. 1,'92	116	14	9	23	40,000	. . .	. .	12,500	. . . .	795	.	
Old Pittsb'rgh	O. P. Coal Co., Hymera . . .	Nov. 1,'92	97	23	5	26	20,000	. . .	6,986	23½	.		. .	
Curryville . .	C. C. and Coke Co., Shelburn .	Nov. 7,'92	32	12	5	19¾	30,000	. . .	828		424		. .	
Shelburn	Shelburn Coal Co., Shelburn .	Nov. 7,'92	37	8	4	19	8,000	. . .	901	1,470	480		. .	
Jumbo	Jackson Hill Coal Co., Angel .	Nov. 7,'92	130	12	10	15	19,000	. . .	6,000	. . .	1,500	. .	. .	
Little Pittsburgh . . .	M. Stark & Co., Hymera . . .	Nov. 7,'92	18	2	. .	21	2,000	. . . .	1,000	210	. . . .	.	.	

OCTOBER, 1892.

Little Pittsburgh. . . .	M. Stark & Co., Hymera . . .	Feb. 4,'93	19	2	. .	22	2,000	. . .	10,100	225	. . . .	. .	. .	
Curryville . .	C. C. and Coke Co., Shelburn .	Feb. 4,'93	32	12	5	19	30,000	. . .	828	. . . .	424	. .	. .	
Hancock . .	Hancock & Conkel, Farnsworth	Jan. 30,'93	50	8	6	19	. .		1,618	421	880	. .		
New Pittsb'gh	N. P. C. and C. Co., Alum Cave	Dec. 27,'92	120	15	11	19	40,000	$287 58		11,185	595	595	. .	
Old Pittsb'gh	O. P. Coal Co., Hymera . .	Nov. 9,'92	131	23		23		. . . .	6,804	277	. .		. .	
Dugger	D. & N. Coal Co., Dugger . . .	Feb. 4,'93	160	13	14	18	30,000	. . . .	6,427	10,660	4,233		. .	
Shelburn . . .	Shelburn Coal Co., Shelburn .	Feb. 4,'93	35	7	5	19	8,000	. . . .	900	1,400	400	. .	.	

NOVEMBER, 1892.

Dugger	D. & N. Coal Co., Dugger . . .	Feb. 4,'93	160	13	14	18	30,000	. . . .	6,427	10,660	4,233		. .	
Old Pittsb'gh	O. P. Coal Co., Hymera	Feb. 4,'93	131	23	. .	23	20,000	. . . .	6,804	277	. . . .	.	. .	
Little Pittsburgh . . .	M. Stark & Co., Hymera . . .	Feb. 4,'93	18	2	2	21	2,000	. . .	1,000	210	. .		. .	
Hancock . . .	Hancock & Conkel, Farnsworth	Jan. 30,'93	57	8	6	23	12,000	. . . .	1,766	405	1,025		. .	
Curryville . .	C. C. and Coke Co., Shelburn .	Jan. 13,'93	34	11	4	24	7,000		1,313	125	676		.	
New Pitts'bgh	N. P. C. and C. Co., Alum Cave	Jan. 12,'93	125	14	10	22	40,000	$129 99	13,310	. . . .	675	675	. .	

REPORT OF MINES IN SULLIVAN COUNTY FOR THE MONTH OF DECEMBER, 1892.

Name of Mine.	Address of Company.	Date Report Received.	No. Persons Employed on the Inside.	No. Persons Employed on the Outside.	No. Mules or Horses Used.	No. Days Worked.	Cubic Feet of Air per Minute.	Amount Money Invested in Improvements.	Total Tons Screened Coal Produced.	Total Tons Mine Run Coal Produced.	Total Tons Slack Produced.	How Much Manufactured Into Coke.	No. Accidents.	Remarks.
New Pittsb'gh	N. P. C. and C. Co., Alum Cave	Jan. 12,'93	125	14	10	22	40,000	....	1,313	12,410	672	672	..	
Curryville . .	C. C. and Coke Co., Shelburn .	Jan. 12,'93	34	11	4	24	700	....	1,313	125	676	..	..	
Little Pittsburgh . . .	M. Stark & Co., Hymera . .	Jan. 11,'93	18	2	..	21	....	....	1,000	210	....	..	..	
Old Pittsb'gh	O. P. Coal Co., Hymera . .	Jan. 11,'93	119	21	6	23	23,000	....	6,516	249	....	..	..	
Hancock . . .	Hancock & Conkel, Farnsworth	Jan. 30,'93	60	9	6	22	12,000	....	1,983	486	1,096	..	..	
Dugger	D. & N. Coal Co., Dugger . . .	Jan. 30,'93	150	20	12	22	30,000	....	6,111	8,148	2,037	..	..	

TABLE GIVING NAMES OF MINES, ALSO NAMES AND ADDRESSES OF OWNERS OF ALL MINES IN PERRY COUNTY THAT EMPLOY TEN OR MORE MEN.

NAMES OF MINES.	OPERATORS.	ADDRESSES.	KIND OF MINE.	POWER USED.	KIND OF COAL.	Seam Worked.	THICKNESS. Feet.	THICKNESS. Inches.	Depth from Surface.	Average Number Men Inside.	Average Number Men Outside.	HOW VENTILATED.
Cannelton	A. C. Coal Co	Cannelton	Drift	Horse	Bituminous	F	3	1	140	59	10	Furnace.
Frog	Bergemath Bros	Frog	Shaft	Steam	Bituminous	G	3	...	160	14	2	Furnace.

TABLE GIVING NAMES OF MINES, ALSO NAMES AND ADDRESSES OF OWNERS OF ALL MINES IN WARRICK COUNTY THAT EMPLOY TEN OR MORE MEN.

NAMES OF MINES.	OPERATORS.	ADDRESSES.	KIND OF MINE.	POWER USED.	KIND OF COAL.	Seam Worked.	THICKNESS. Feet.	THICKNESS. Inches.	Depth from Surface.	Average Number Men Inside.	Average Number Men Outside.	HOW VENTILATED.
Chandler	Clemment Coal Co	Chandler	Shaft	Steam	Bituminous	K	4	..	106	15	3	Furnace.
De Forrest	De Forrest Coal Co	Evansville	Shaft	Steam	Bituminous	K	6		65	15	3	
Gough	Robert Gough	Boonville	Shaft	Steam	Bituminous	K	6	6	42	16	4	Furnace.
Louder	L. W. Coal Co	Boonville	Slope	Steam	Bituminous	K	6	6	28	35	5	Fan.
Star	John Archibald	Evansville	Shaft	Steam	Bituminous	K	4	...	100	25	6	Fan.

TABLE GIVING NAMES OF MINES, ALSO NAMES AND ADDRESSES OF OWNERS OF ALL MINES IN KNOX COUNTY THAT EMPLOY TEN OR MORE MEN.

NAMES OF MINES.	OPERATORS.	ADDRESSES.	KIND OF MINE.	POWER USED.	KIND OF COAL.	Seam Worked.	THICKNESS. Feet.	THICKNESS. Inches.	Depth from Surface.	Average Number Men Inside.	Average Number Men Outside.	HOW VENTILATED.
Bicknell	Bicknell Coal Co	Bicknell	Shaft	Steam	Bituminous	L	4	..	92	20	5	Fan.
Freeman	V. Coal Co	Vincennes	Shaft	Steam	Bituminous	M	3		340	20	5	Fan.
Prospect Hill	Frank Clark	Vincennes	Shaft	Steam	Bituminous	M	3	...	342	13	4	Fan.

TABLE GIVING NAMES OF MINES, ALSO NAMES AND ADDRESSES OF OWNERS OF ALL MINES IN SULLIVAN COUNTY THAT EMPLOY TEN OR MORE MEN.

NAMES OF MINES.	OPERATORS.	ADDRESSES.	KIND OF MINE.	POWER USED.	KIND OF COAL.	Seam Worked.	THICKNESS. Feet.	THICKNESS. Inches.	Depth from Surface.	Average Number Men Inside.	Average Number Men Outside.	HOW VENTILATED.
Curryville	C. Coal and Coke Co.	Shelburn	Shaft.	Steam	Bituminous	L	5	.	240	30	5	Fan.
Little Pittsb'gh	Stark & Co.	Hymera	Shaft.	H. Pow.	Bituminous	L	4	6	40	19	2	Furnace.
Shelburn	S. Coal and Coke Co.	Shelburn	Shaft.	Steam	Bituminous	L	5	...	240	45	8	Fan.
Old Pittsburgh	O. P. Coal Co.	Hymera	Shaft.	Steam	Bituminous	L	4	6	50	100	23	Fan.
New Pittsburgh	N. P. Coal and C. Co.	Alum Cave	Shaft.	Steam	Bituminous	L	6	..	30	120	18	Fan.
Hancock	Hancock & Conkel.	Farnsworth	Shaft.	Steam	Bituminous	L	5	..	72	75	9	Fan.
Lyonton	L. Coal and Coke Co.	Lyonton	Shaft.	Steam	Bituminous	L	5	.	47	28	5	Furnace.
Superior	Island Coal Co.	Linton	Shaft.	Steam	Bituminous	L	5	...	63	40	6	Fan.
Dugger	D. and N. Coal Co.	Dugger	Shaft.	Steam	Bituminous	L	5	..	105	150	20	Fan.
Jumbo	J. H. Coal and C. Co.	Angel	Shaft.	Steam	Bituminous	L	5	..	30	140	14	Fan.
Farmersburg	F. Coal Co.	Farmersburg	Shaft.	Steam	Bituminous	L	5	...	230	16	3	Fan.

TABLE GIVING NAMES OF MINES, ALSO NAMES AND ADDRESSES OF OWNERS OF ALL MINES IN PIKE COUNTY THAT EMPLOY TEN OR MORE MEN.

Ayrshire	David Ingle	Ayrshire	Shaft.	Steam	Bituminous	K	5	.	28	80	14	Fan.
Little's	S. W. Little	Evansville	Shaft.	Steam	Bituminous	K	6	6	80	100	14	Fan.
Blackburn	P. C. Coal Co.	Blackburn	Slope.	Steam	Bituminous	K	6	6	100	30	5	Furnace.

TABLE GIVING NAMES OF MINES, ALSO NAMES AND ADDRESSES OF OWNERS OF ALL MINES IN GREENE COUNTY THAT EMPLOY TEN OR MORE MEN.

Island No. 2	Island Coal Co.	Linton	Shaft.	Steam	Bituminous	L	5		70	210	23	Fan.
Summit	Summit Coal Co.	Dugger	Shaft.	Steam	Bituminous	L	5	6	95	127	12	Fan.
Buckeye	Linton Coal M. Co.	Linton	Shaft.	Steam	Bituminous	L	5	...	72	50	8	Fan.

TABLE GIVING NAME OF MINE, ALSO NAME AND ADDRESS OF OWNER OF ALL MINES IN GIBSON COUNTY THAT EMPLOYS TEN OR MORE MEN.

Frisco	E. A. Powell	Francisco	Shaft.	Steam.	Bituminous	K	4	...	130	55	9	

TABLE GIVING NAMES OF MINES, ALSO NAMES AND ADDRESSES OF OWNERS OF ALL MINES IN DAVIESS COUNTY THAT EMPLOY TEN OR MORE MEN.

Maple Valley	Cabel & Co.	Washington	Shaft.	Steam.	Bituminous	K	5	...	61	110	12	Fan.
No. 9	Cabel & Co.	Washington	Shaft.	Steam.	Bituminous	K	5	...	86	. .	...	Fan.
No. 7	Cabel & Co.	Washington	Shaft.	Steam.	Bituminous	K	6	...	62	48	5	Fan.
No. 4	Cabel & Co.	Washington	Shaft.	Steam.	Bituminous	K	3	...	43	120	12	Fan.
Muny	Sam. Rogers	Washington	Shaft.	Steam.	Bituminous	K	6	...	50	20	4	Fan.
Wilson	John Wilson & Sons	Washington	Shaft.	Steam.	Bituminous	K	6	...	94	25	9	Fan.
Wilson	The Wilson C. Co.	Washington	Shaft.	Steam.	Bituminous	K	3	...	96	. .	.	Fan.
Mutual	Mutual Mining Co.	Cannelburg	Shaft.	Steam.	Can., Bit'us	I	5	...	95	45	10	Fan.

TABLE GIVING NAMES OF MINES, ALSO NAMES AND ADDRESSES OF OWNERS OF ALL MINES IN VANDERBURGH COUNTY THAT EMPLOY TEN OR MORE MEN.

Ingleside	John Ingle & Co.	Evansville	Shaft.	Steam.	Bituminous	K	4	...	262	90	10	Fan.
Sunnyside	Sunnyside Coal Co	Evansville	Shaft.	Steam.	Bituminous	K	4	...	260	60	9	Fan.
Sunnyside No. 2	Sunnyside Coal Co	Evansville	Shaft.	Steam.	Bituminous	K	4	...	250	14	3	Fan.
First Avenue.	First Ave. Coal Co	Evansville	Shaft.	Steam.	Bituminous	K	4	. .	256	35	8	Fan.
Diamond	Diamond C. M. Co	Evansville	Shaft.	Steam.	Bituminous	K	4	.	250	20	5	Fan.
Co-operative	The C. C. Co.	Evansville	Shaft.	Steam.	Bituminous	K	4	...	250	15	4	....

TABLE GIVING NAME OF MINE, ALSO NAME AND ADDRESS OF OWNER OF ALL MINES IN SPENCER COUNTY THAT EMPLOYS TEN OR MORE MEN.

Lincoln City	Henry Schafer.	Lincoln City.	Shaft.	Steam.	Bituminous	M	3	3	20	20	4	Furnace.

REPORT OF STATE SUPERVISOR OF OILS.

INDIANAPOLIS, IND., Dec. 1, 1892.

To Hon. S. S. Gorby, State Geologist of Indiana:

SIR—In accordance with the statutes providing for the appointment of a State Supervisor of Oil Inspection and Deputy Supervisors of Mineral Oils and other substances, and to regulate the sale of the same for illuminating purposes, I herewith submit my Second Annual Report for the inspection of illuminating oils for the period commencing November 1, 1891, and including October 31, 1892.

N. J. HYDE,
State Supervisor of Oil Inspection.

REPORT OF STATE SUPERVISOR OF OILS.

N. J. HYDE, STATE SUPERVISOR.

Concerning the inspection of mineral oils I have seen no reason to change or modify the instructions issued from this office March 2, 1891. They have been and are now very generally complied with.

The total number of barrels of oil inspected from November 1, 1891, to and including October 31, 1892, amounted to two hundred and thirty-four thousand nine hundred and seventy-seven (234,977). Of this number two hundred and thirty-four thousand eight hundred and seventy-four (232,874) barrels were approved, and two thousand one hundred and three (2,103) were rejected. After deducting the number of barrels rejected there remained two hundred and thirty-two thousand eight hundred and seventy-four (232,874) barrels for consumption in Indiana, which shows an increase of about twenty thousand (20,000) barrels over the preceding year. While throughout the eastern and central portions of the State is shown a decrease on account of the use of natural gas, the other portions of the State show a large increase in the consumption of oil, they not being blessed with the benefits derived from the use of gas. The following tables will show the number of barrels inspected by stations, number inspected each month and place of manufacture:

Total number of barrels inspected	234,977
Barrels rejected	2,103
Total number of barrels for consumption in Indiana	232,874

THE FOLLOWING TABLE SHOWS THE NUMBER OF BARRELS INSPECTED BY STATIONS.

District.	Station.	Approved.	Rejected.	Total.
1	Evansville	16,134	840	16,974
2	Vincennes	8,269		8,269
3	New Albany	12,444		12,444
4	Madison	3,462		3,462
5	Columbus	1,352		1,352
4	Greensburg	338		338
6	Muncie	3,610		3,610
6	Richmond	4,860		4,860
7	Indianapolis	63,781	1,258	65,036
8	Crawfordsville	3,401		3,401
8	Terre Haute	8,940		8,940
9	Lafayette	12,201		12,201
10	Logansport	14,940		14,940
11	Peru	9,571		9,571
12	Fort Wayne	14,543		14,543
13	South Bend	21,764		21,764
	Cincinnati	8,823	5	8,828
	Cleveland	11,863		11,863
	Mansfield	3,709		3,709
	Lima	5,398		5,398
	Toledo	3,471		3,471
	Total	232,874	2,103	234,977

THE FOLLOWING TABLE SHOWS THE NUMBER INSPECTED BY MONTHS.

Month.	Approved.	Rejected.	Total.
November	27,460	840	28,300
December.	28,254	330	28,584
January	28,016	120	28,136
February	21,260	....	21,260
March	19,569	165	19,734
April	14,562	120	14,682
May.	13,143	....	13,143
June	9,474	....	9,474
July	11,286	....	11,286
August	14,917	120	15,037
September	19,363	408	19,771
October.	25,570	....	25,570
Total	232,874	2,103	234,977

The following table shows place of manufacture:

Lima, Ohio	137,612
Cleveland, Ohio	34,533
Toledo, Ohio.	7,343
Findlay, Ohio	2,148
Bradner, Ohio	419
Fostoria, Ohio	357
Marietta, Ohio.	320
Whiting, Ind	25,162
Oil City, Ind.	9,099
Pittsburgh, Penn.	6,468
Bear Creek, Penn	3,420
Washington, Penn	2,641
Freedom, Penn	968
Franklin, Penn	891
Warren, Penn	600
Reno, Penn	390
Allegheny, Penn	295
Oak Grove, Penn	240
Titusville, Penn	70
North Clarendon, Penn	60
Rossville, Penn	40
Parkersburg, W. Va	1,750
St. Louis, Mo	152
Total	234,977

Manufactured in Ohio	182,731
Manufactured in Indiana	25,162
Manufactured in Pennsylvania	25,182
Manufactured in West Virginia	1,750
Manufactured in Missouri	152
Total	234,977

While none of the rejected oil was positively dangerous nor explosive for illuminating purposes, it would not pass the standard test required by our State laws. This test is higher than that now used by any other State having an inspection law.

I wish to suggest the following changes in our present law, which would be the means, I think, of reducing the price of oil to the consumers, and at the same time insure equal safety for illuminating purposes. That is to strike out the Beaume gravity test of 46° to 50°, leaving only the specific gravity test of 820° to 750°, which would be from about 40° to 56° gravity by Beaume's scale for inspectors to take when making inspections.

Also, on railroad oils I would recommend striking out the words "300 flash" and insert "300 fire." I also wish to call to your notice the fact that gasoline has become such a prominent factor for household use that it would be advisable to amend our present law in such a way as to place gasoline under a gravity clause, and provide for the rejection of all grades that do not come within the required gravity.

The law is being rigidly enforced through the State, and, as a rule, manufacturers, dealers and consumers continue to yield a cheerful compliance with the provisions of the statutes. Deputy Hedden, of Evansville, was compelled to file an affidavit against one dealer in his district for selling uninspected oil in violation of section 5155 of the law, and the case is now in the prosecutor's hands. No other violations have come under my observation, and it affords me pleasure to report that so far as I have been able to learn no serious accidents have resulted from the use of Indiana legal test oils for illuminating purposes in the State. No lamps have exploded, no lives have been lost, no persons were injured, and no property destroyed within the past year. Frequent accidents, however, have come to my notice from the use of gasoline, and as the use of the same is taking greater proportions every year, accidents, losses of life and property, will increase proportionately with the consumption of the same. I would, therefore, recommend that the next General Assembly amend the present law so as to prohibit the sale of low grades of gasoline. Gasoline is a very dangerous article under all circumstances, and only the very best quality should be permitted to be sold for burning or illuminating purposes. By thus amending the law the public would be protected from the low grades which now infest the State, endangering the life and property of its citizens

Considerable deposits of petroleum have been found at several points in the State, notably in the counties of Blackford, Grant, Wells, Adams, Jay, Huntington, Randolph, Pulaski and White. While some other counties have shown indications of oil, the above-mentioned counties have shown the greatest yield up to the present time. As near as I have been able to learn, there have been completed about four hundred (400) wells in the above-mentioned counties. Of this number probably one hundred (100) have been abandoned as dry wells, or the quantity was insufficient to pay for the expense of pumping. The depth of the wells varies from about seven hundred (700) to eleven hundred (1,100) feet. The vigor of their development leads to the belief that Indiana will soon rank with Ohio and Pennsylvania in point of production. Already there has been constructed at Whiting, Lake County, in this State, one of the largest refineries in the world, with new additions still being added. It gives employment to upward of two thousand persons. The refinery is supplied with crude oil through large pipe lines and pumping stations, of which Indiana can boast of having one of the largest, situated near English Lake, in Starke County. While most of the oil is being pumped from the Ohio fields, it is also true that the Indiana fields are supplying large quantities from their wells. The price varies from about thirty-two (32) to forty (40) cents a barrel of forty-two (42) gallons. It is not possible at this time to form an opinion as to the limit of the territory in which oil may be found, or in what quantity. The wells vary in amount of production, some showing as low as fifteen (15) barrels, while others produce as much as two hundred (200) barrels or more per day of twenty-four (24) hours; hence no estimate can be made as to the ultimate value. But this much is known, a very valuable industry has been added to the manufacturing interests of the State as a result of the oil discoveries. The character of the oil is different from that obtained in Pennsylvania and West Virginia, but resembles that produced in the Ohio fields. A great many claim it is superior to the latter. I believe an excellent illuminating oil can be obtained from the Indiana products, equal in every respect to that procured from the oil produced in other States. An earnest effort is being made by a large number of manufacturers and others to foster the use of crude oil as a fuel. This is necessarily a slow work. From investigations I find wherever oil has been introduced the results have been most satisfactory. Some of the largest establishments in the State are using it at the present time, and I believe it is only a question of a very short time when it will be in general use, and that Indiana will produce a very large share of the crude. The following figures are, I am informed, correct, and permit an estimate of the value of the yield of the oil-producing industry of the State. The table below will show the number of oil wells completed in Indiana from July 1, 1891, to September 1, 1892, comprising the counties of Blackford, Wells, Jay, Adams and Grant, also amount of production, number of dry and abandoned wells, and the number of wells now drilling:

Year.	Month.	Completed.	Production, Bbls.	Dry.	Abandoned.	Drilling.
1891	July	6	258	.....	......	5
1891	August	6	135	2	1	13
1891	September	15	775	5	...	12
1891	October	15	330	4	1	11
1891	November	14	390	3	3	4
1891	December	8	175	1	3	11
1892	January	11	342	2	2	17
1892	February	13	250	6	1	15
1892	March	18	289	6	......	11
1892	April	14	316	2	1	12
1892	May	17	505	3	4	13
1892	June	19	545	4	......	16
1892	July	17	595	2	......	11
1892	August	30	1,395	3	2	17
Totals.	....	203	6,300	43	18	168

While my official duties are fulfilled when any given lot of oil has been inspected to determine its vaporizing point, I shall be glad at any time to examine any special samples with a view to determine their illuminating value, and shall from time to time make careful examinations of the products of the Indiana fields with a view of determining their value as compared with other oils, and shall embody my conclusions concerning them in the next report, which I shall have the honor to make. In conclusion, it affords me great pleasure to repeat that I have every reason to believe that the law is being enforced, and while this report shows a considerable amount of rejected oil, it will also show that the inspectors are vigilant and efficient, and dealers and manufacturers will realize that fact if they attempt to send illegal oil into this State. There have been but few deliberate violations of the law, and I am gratified to know that the law is accomplishing all that was intended by its enactment, and the consumer is more than compensated by its existence and enforcement in the saving of life and property.

To my deputies I extend an expression of my sense of appreciation of their efficiency and willingness at all times to aid and coöperate with me in my efforts to enforce the law fairly and impartially.

Respectfully submitted,

N. J. Hyde,

State Supervisor of Oil Inspection.

REPORT OF STATE SUPERVISOR OF NATURAL GAS.

OFFICE OF SUPERVISOR OF NATURAL GAS,
INDIANAPOLIS, IND., January 1, 1893.

To Hon. S. S. Gorby, State Geologist, Indianapolis, Ind.:

SIR—Complying with the provisions of the Statutes of Indiana relating to the supervision of natural gas and the inspection of gas wells and gas plants, I have the honor to submit to you the following detailed report of the transactions of this department for the year 1892.

In this, my second annual report, I have endeavored to show to you the condition of the gas area of Indiana as to the supply of this fuel. How long natural gas will last is the question that is now engaging the attention of a vast number of people; capitalists, manufacturers and private consumers are all alike seeking for a solution of this problem. In order to assist in the solution, as far as lays within my power, I have made careful tests and measurements in all parts of the field, with the results given in my report, and to which I would call the thoughtful attention of all persons who are interested in the preservation of this valuable fuel. The collection of statistics of the manufacturing industries using natural gas has been omitted during the last year, as that comes within the duties of the State Statistician, and may be found in his published reports.

The inspection of plants furnishing gas to private consumers has received my careful attention, as the lives and property of vast numbers of people depend upon the gas plants and machinery being in good condition. In most instances I have found the machinery in fair condition, and comparatively safe. However, as the machinery becomes old and worn more frequent and careful attention will be necessary. I wish to say in this connection that in far too many instances have I found gas plants in charge of wholly incompetent persons, who were profoundly ignorant of the dangerous and powerful agent under their control. I am glad to report, however, that but few accidents have occurred, and these have resulted largely from defective house plumbing.

It is with pleasure that I am able to report to you that the reckless and criminal waste of this most precious fuel that formerly was practiced in many parts of the field has been almost wholly stopped. While some waste is still practiced in some localities, yet by far the larger number of consumers are advocating the husbanding of this resource in every way possible.

Laws regulating the tubing and packing of wells, as well as the plugging of abandoned wells are needed, and are hereby recommended.

A large oil field is being developed in Blackford, Jay, Wells and Grant counties. Where oil wells are drilled in the neighborhood of gas wells the methods used for obtaining the oil flow are injurious and destructive to the gas wells and the gas territory. It is to be hoped that such methods may be adopted in the production of each of these resources as will not injure the other.

I would recommend that a law be enacted requiring oil wells to use what are known as separators, whereby the gas that is found in such wells may not be wasted, as is done by the present methods.

I take this method of expressing my sincere thanks for the many acts of assistance and for the kind and courteous treatment I have received while in the discharge of my duties.

Respectfully,

E. T. J. Jordan,

Supervisor of Natural Gas.

NATURAL GAS.

REPORT OF STATE SUPERVISOR.

No form of mineral wealth has awakened as wide-spread interest in our day as natural gas. Certainly there is no other mineral production in the search for which so many people are directly or indirectly engaged. Vast sums of money have been expended in explorations by individuals and private corporations. Propositions to use public money in this way by villages, towns and counties almost always prevail. It may be safely said that millions of people in the Mississippi Valley are actively interested at the present time in the various questions pertaining to this subject. In no other locality has this interest been more manifest than in the gas area of Indiana. In no other place have explorations and developments been carried on more extensively or more rapidly.

The cause of this excitement and interest is not hard to find. It is the money value of the gas that leads to the extraordinary interest that pertains to good territory. The charm that invests a gas field is precisely the same as that which invests a mining district of phenomenal richness.

The great advantages of natural gas, in addition to the luxury it affords as a domestic fuel, are found in the support which it gives to different manufacturing industries. It is so happily adapted to certain lines of manufacturing, that competition, without it, is almost out of the question.

Its presence in such large quantities in Indiana has invited and stimulated manufacturing to a wonderful degree. Not less than three hundred manufactories of various sorts have been located and put in operation as a direct result of the discovery and development of natural gas.

Many of them are wonderful for their magnitude, an example of which is the DePauw Plate Glass Works at Alexandria, which is said to be the largest of its kind in the world. Millions of dollars are invested in these manufactories with the almost certain hope of profitable returns. In addition to the direct value of a gas field, alert business men have been quick to recognize the fact that no other element in the list of natural advantages of a town can be made to exert half the attractive power that the possession of a good supply of the new fuel can give. Real estate speculation has sprung up in many of the favored towns of Indiana during the last few years based wholly upon the presence of this new element. As a result of the building up of the immense manufacturing interests which I have noted above, together with the real estate speculation which has been induced, a wonderful growth of the villages and towns in this favored territory has been observed. Places that a few years ago contained only the country store, the postoffice and the village blacksmith shop have developed into large towns, and towns have grown into thriving cities. In many cases this real estate speculation has been of the most violent and unreasonable sort. In these places the boom spirit ran wild, and prices were advanced beyond reason or justification. To the influence of this speculative spirit I attribute, in a large degree, the lack of economy in the consumption of gas, and the criminal waste that has been practiced. A slow growth, long continued, is far better than quick returns accomplished by the exhaustion of the natural resources. He is a false economist and an enemy to the highest interests of his town or community, who is willing, for the sake of present gains, to sacrifice the resources upon which his town depends.

Natural gas is so admirably adapted in all its ways as a household fuel that it ought to be kept by every community that obtains it largely for this use. The factories may well enough forge along on the old system. The comfort of life for the many is certainly to be preferred to the undue business advantage of the few.

CONDITION OF THE FIELD.

Is the supply of natural gas failing? In view of the great advantages that are being derived from the use of this fuel within the area under consideration, this question assumes great importance. It may not be possible to give a definite answer to this question, as there are so many and varied conditions to be considered. The conditions necessary to the production of this fuel are area, thickness, density, initial pressure and structural arrangements. These conditions have been described in my report to the State Geologist, made January 1, 1892, and published in the Seventeenth Geological Report of Indiana. I do not care, in this connection, to repeat what is there published. In order that an approximate answer to the above question may be had, I will consider the initial pressure alone. This is commonly known as the rock pressure, but I consider the term misleading, hence I will use that which I consider the better term, initial pressure. This, I believe, will give the best idea of the present condition of the supply within the area under consideration. It is admitted by all scientists, as well as by others who have had practical experience in the development and handling of natural gas, that any material reduction in the initial pressure indicates a corresponding, if not an increased diminution in the volume of the supply. The original initial pressure within the Indiana field was 325 pounds to the square inch.

This pressure is still found in some of the new wells in localities in which the consumption has been unimportant in amount. The following is the results of careful tests made by me in different localities within the field. The measurements were made in most cases with a mercury gauge or with carefully tested spring gauges. The showings are not as favorable as could be desired, but I vouch for their correctness, and give them to show the present condition of the field.

GREENFIELD, HANCOCK COUNTY.

GREENFIELD NATURAL GAS COMPANY.

Wells Tested June 6, 1892.

Well No. 1—Initial pressure, 102½ pounds to the square inch. This well was drilled in May, 1886, and showed at that time the original pressure of the field. The original volume was 5,000,000 cubic feet in twenty-four hours. The present yield is 1,266,000 cubic feet per day.

Citizen's Well—Initial pressure, 106 pounds; present volume, 1,266,000 cubic feet.

Well No. 4—Present volume, 110,880 cubic feet.

City Well—Initial pressure, 60 pounds. The volume was not ascertained.

Gooding Well, No. 1—Initial pressure, 170 pounds.

Gooding Well, No. 2—Initial pressure, 215 pounds; volume, 400,000 cubic feet.

Gooding Well, No. 3—Initial pressure, 225 pounds; volume, 1,266,000 cubic feet.

Baldwin Well, No. 2—Initial pressure, 170 pounds; volume, 414,000 cubic feet.

PEOPLE'S NATURAL GAS COMPANY.

Wells Tested June 14, 1892.

Well No. 1—Initial pressure, 120 pounds; volume, in 1½-inch pipe, 394,540 cubic feet.

Well No. 2 (also called the New well)—Initial pressure, 142½ pounds; volume, 313,660 cubic feet.

Well No. 3—Initial pressure, 90 pounds; volume, 350,670 cubic feet.

East Well, No. 4—Initial pressure, 125 pounds; volume, 246,135 cubic feet.

Henry Well, No. 5—Initial pressure, 190 pounds; volume, 221,160 cubic feet.

SOUTHERN INDIANA GAS COMPANY.

Wells Tested June 28, 1892.

Slifer Well, No. 1—Exhausted.

J. Slifer Well, No. 2—Initial pressure, 250 pounds; volume, 271,630 cubic feet.

J New Well, No. 3—Initial pressure, 230 pounds; volume, 700,000 cubic feet.

Bowen Well, No. 4—Initial pressure, 252 pounds; volume, 700,000 cubic feet.

Martindale Well, No. 5—Initial pressure, 230 pounds; volume, 2,357,-100 cubic feet.

Boyd Well, No. 6—Initial pressure, 200 pounds; volume, 300,000 cubic feet.

Glasscock Well, No. 7—Initial pressure, 225 pounds; volume, 700,000 cubic feet.

Baldwin Well, No. 8—Exhausted.

Marsh Well, No. 1—Initial pressure, 230 pounds.

Marsh Well, No. 2—Initial pressure, 200 pounds; volume, 300,000 cubic feet.

In taking these pressures it required from one to six minutes to reach the pressures given. The wells of the first two companies given are located within a radius of one and one-half miles from the court house, in the town of Greenfield. The wells of the last company given are located from one to four miles east and north of the town of Greenfield. I have been particular in giving so many wells in order to show the variations both in pressure and volume that is observed in the same locality. These wells have been in use from two to five years, and all of them show more or less of salt water. Within the area in which these wells are located are a number of other wells belonging to private individuals and manufactories. These wells will average with the wells given above, with the exception of Well No. 1, belonging to the nail works, which showed an initial pressure of 250 pounds when drilled in 1891, and when tested June 28, 1892, the initial pressure was 140 pounds, with a volume of 3,995,000 cubic feet. This well showed a large quantity of salt water, which appeared to affect the initial pressure, but not the volume.

MARION, GRANT COUNTY.

Wells Tested July 7, 1892.

Charles Well, No. 4—Drilled July, 1887. Initial pressure, 220 pounds; volume, 1,895,000 cubic feet.

Bradford Well, No. 4—Initial pressure, 240 pounds; volume, 1,465,000 cubic feet.

Crosby Well—Initial pressure, 225 pounds; volume, 2,020,000 cubic feet.

Mississinewa, No. 9—Initial pressure, 290 pounds; volume, 3,250,000 cubic feet.

Soldiers' Home Well—Initial pressure, 308 pounds; volume, 4,550,000 cubic feet.

Soldiers' Home New Well—Initial pressure, 315 pounds.

The wells given above are probably above the average for this locality. Many of the other wells are filling up with salt water, and some have been abandoned, having become worthless. A number of failures to obtain gas in this locality have been made within the last year. It is but just to state, however, that these failures have all been confined to one part of the locality. There appears to be a syncline in the rock, in which no gas is found, owing to its density and the presence of salt water.

JONESBORO, GRANT COUNTY.

JONESBORO MINING COMPANY.

Wells Tested September 6, 1892.

Well No. 1—Drilled in April, 1887.

It is claimed for this well that the original pressure was 330 pounds, and according to a measurement made by Prof. Orton, State Geologist of Ohio, that its original volume was 5,500,000 cubic feet in twenty-four hours.

This well has been in constant use since it was drilled, supplying an average of 350 fires, together with two or three small factories. When I tested this well it was supplying 400 fires. With this consumption the initial pressure was 305 pounds. I had no opportunity to measure the volume, but do not think that there has been any great falling off from its original measurement. The gas obtained from this well is perfectly dry.

HARRISBURG GAS AND MINING COMPANY.

Well No. 1—Drilled April, 1889. Initial pressure, 310 pounds. This well was drilled fifty-two feet in the Trenton limestone, and is perfectly dry.

GAS CITY LAND COMPANY.

Well No. 2—This is a new well. Initial pressure, 310 pounds.

THOMPSON & COMPANY.

Well No. 1—This is a recent well. Initial pressure, 310 pounds.

Coleman Well—Initial pressure, 300 pounds.

This well is three and one-half years old, and was supplying four large boilers and twenty-five stoves when the measurement was made. The wells in this locality have penetrated the Trenton limestone from forty to sixty feet, and all show dry gas.

KOKOMO, HOWARD COUNTY.

The Kokomo Gas Company has its fourteen wells, located from two to seven miles south of the city. The initial pressure varies from 240 to 300 pounds.

The wells that are located within and immediately around the city are practically valueless, having filled up with salt water. Kokomo, however, is well supplied with gas, as in addition to what is furnished by the above company, the Chicago Gas Company has recently laid an eight-inch line from their wells near Greentown.

This company owns a large amount of the best producing gas territory in the State, upon which they have drilled a great number of wells. With the facilities at their command they, alone, can furnish gas in quantities to supply the needs of this city. Taking the capacities of these two companies, together with two other private lines which are owned and operated by some of the manufactories, and extend from four to eight miles into the country, this city is as well supplied with this valuable fuel as any town in the State.

NOBLESVILLE, HAMILTON COUNTY.

The wells in this locality show an initial pressure varying from 150 to 250 pounds, and many of them are filling up with salt water. Separators are used on many of them to keep the water out of the lines. Some have been abandoned as worthless. Among the abandoned ones is the old "Wainright Wonder." This was one of the first wells drilled in the locality, and originally one of the largest producing wells in the State. It was a monster among gas wells, and was visited by thousands of people from far and near curious to see the wonderful exhibition of its power. For weeks and months it was allowed to stand open, belching forth its millions of cubic feet of valuable fuel. This policy soon brought the inevitable result. The draft was so great that its initial pressure was so much reduced that salt water was introduced and steadily increased until the "Wonder" was rendered worthless.

ANDERSON, MADISON COUNTY.

In this locality the greatest initial pressure obtained in my measurements was 245 pounds. This was in wells recently drilled, and located two miles from the city. The territory within the limits of the city proper is practically exhausted, and filled with salt water. As a proof of this a well drilled by the Commissioners of the County in the jail yard and near the center of the city proved a total failure.

The location of this well in close proximity to some of the first wells drilled in that locality, and which had formerly been large producers of gas. The citizens are beginning to realize the exhausted condition of their immediate territory and are making preparations to extend pipe lines into the country places in order to obtain a supply of gas sufficient for the great and growing needs of their city. Of this reserved territory, it may be said that there is still a large amount within the country, and within easy reach. When this reserve, which has not been touched except by a few farmers' wells, is made available, and economy is used in its consumption, then the comfort and prosperity of the city is assured for sometime to come.

ALEXANDRIA, MADISON COUNTY.

Tests Made April 28, 1892.

The wells in this locality made as good a showing as any in the whole field. This is accounted for on the grounds that the draft on this territory has been to the present time comparatively trifling, and that the condition of thickness of the gas bearing portions of the Trenton limestone is as favorable here as in any other portion of the field. In the wells located here the drill has penetrated the Trenton limestone to the depth of fifty feet without encountering salt water, and with a constantly increasing flow of gas.

Plate Glass Well No. 1—Initial pressure, 325 pounds; volume, 7,014,000 cubic feet.

In this well there was a small consumption going on when the measurements were taken, so that the above figures are below the actual volume,

Plate Glass Well No. 3.—This was a new well, and had not been tubed and packed. The flowing pressure from a five and five-eighths inch casing pipe, indicated a volume of 12,435,000 cubic feet. When properly packed and tubed with three-inch tubing, this showing of volume would be reduced to probably nine or ten million cubic feet. I had no means for inclosing the well, consequently a measurement of the initial pressure could not be taken. I have since been informed that this well showed 325 pounds after it had been tubed and packed.

A well belonging to the Alexandria Land and Gas Company, which I tested while supplying some forty or fifty stoves, showed an initial pressure of 325 pounds, and a volume of 6,248,000 cubic feet.

The original well of this town, which is five years old, and which has been in constant use, although not drafted heavily, showed an initial pressure of 300 pounds, and with a very little diminution of volume.

ELWOOD, MADISON COUNTY.

Test Made April 29, 1892.

In this locality, notwithstanding the heavy draft that has been made on this territory by the domestic consumption of a town that has grown to a city of four thousand inhabitants, together with a number of very extensive manufactories, the wells make a remarkably good showing. The new wells show an initial pressure of 325 pounds and the old ones did not go below 250 pounds.

DeHority Well, No. 5—This is a recent well and is located within seven hundred feet of one of the oldest wells. Initial pressure, 325 pounds; volume, 6,738,000 cubic feet. In this locality the drill, in some of the wells, was driven into the Trenton limestone to the depth of forty-five feet, and obtained a constantly increasing flow of perfectly dry gas. Salt water, however, is now encroaching on some of the older wells.

CARMEL, HAMILTON COUNTY.

Tested September 1, 1892.

Well No. 1—Drilled in 1888. Initial pressure in 14 minutes, 240 pounds; volume less than 250,000 cubic feet.

Well No. 2—Drilled in 1888. Initial pressure in 8 minutes, 225 pounds; volume less than 250,000 cubic feet.

Well No. 3—Drilled in 1891. Initial pressure in 2 minutes, 297 pounds; volume less than 1,140,500 cubic feet.

These wells only penetrate the Trenton limestone to the depth of eight feet and were not "shot!"

The salt water in this territory lies so near the top of the rock that wells drilled to a greater depth than those above mentioned, or that are "shot," immediately fill up with water and are worthless.

DUNKIRK, JAY COUNTY.

Inspected August 25, 1892.

Well No. 1—Showed an initial pressure of 262 pounds.

Well No. 2—Initial pressure, 292 pounds.

These wells are old and have been heavily drafted. I had no means for measuring the volume, as the wells could not be disconnected from the line.

ENTERPRIZE WINDOW GLASS COMPANY.

Well No. 1—This is a new well and showed an initial pressure of 310 pounds; volume in 3-inch tube, 6,738,000 cubic feet.

Vance Well—This is a recent well and showed an initial pressure of 290 pounds; volume in 3-inch tube, 7,014;000 cubic feet.

WESTFIELD, HAMILTON COUNTY.

WESTFIELD GAS AND MINING COMPANY.

This company owns three wells which are located three miles southeast of town. These wells show a pressure of 250 pounds. Originally the same wells showed an initial pressure of 325 pounds. So far, no showing of salt water has been discovered.

SUMMITVILLE, MADISON COUNTY.

SUMMITVILLE, MINING COMPANY.

Inspected November 8, 1892.

Well No. 1—Four years old. Back pressure 200 pounds. This showing was made while the well was supplying five hundred fires, which could not be disconnected.

KNIGHTSTOWN, HENRY COUNTY.

Reported November 2, 1892.

The new wells in this locality show an initial pressure of 245 pounds; the old wells 200 pounds. The Knightstown Gas Company have abandoned five wells, they having filled up with salt water.

The Soldiers' Orphans' Home, which is located in the immediate neighborhood, has abandoned four wells for the same reason. The volume found in the wells of this locality varies from one-half million to two million feet.

ARCADIA, HAMILTON COUNTY.

Inspected November 30, 1892.

This town has two wells which gives back pressure of 170 pounds, while supplying a consumption of three hundred and fifty stoves and one large brick kiln, one flouring mill, one tile factory, one elevator, one saw-mill, one plaining mill and one harness factory.

CICERO, HAMILTON COUNTY.

Inspected November 30, 1892.

Well No. 1—Initial pressure, 240 pounds.

Well No. 2—Initial pressure, 242 pounds.

A well recently drilled for a glass factory at this place proved a failure.

Tests were made during the year at Frankton, Albany, Red Key, Montpelier and other points, but I consider those given above sufficient to show the condition of the field in regard to the initial pressure. The original normal pressure in this field was 325 pounds to the square inch. The tests given above show in many places a reduction from the original pressure. That this reduction is greatest in localities that have had the largest consumption is evident to every observer. With this reduction in pressure there has been a corresponding reduction in volume. When the decrease in pressure has reached certain points, which differ in different localities, salt water has been introduced, which tends to hasten the end, not only of the individual well, but of the immediate surrounding territory. That there will be ultimate exhaustion is now no longer denied. That this end has been hastened by the reckless extravagance and criminal waste that has been practiced is also admitted.

EXHAUSTION OF GAS.

Under this head I can not do better than to quote from the report of the Superintendent of the eleventh census of the United States, as given under the head of mineral industries:

"That the supply of natural gas is limited and will ultimately be exhausted has never been questioned. When the great reservoirs of Western Pennsylvania, Northwestern Ohio and Eastern Indiana were first struck the supply was so bountiful that many were led to believe that it was practically inexhaustible; at least there is no other sensible explanation of the wastefulness with which it was used at first or the readiness with which manufacturing plants were located in the natural gas regions, away from cheap supplies or other fuel. But even while these parties by their actions expressed their confidence in the continuation of the supply of gas at least for the near future, they were ready to concede that ultimately it would be exhausted. The question at issue was, How long could the supply be depended upon?

In the early history of natural gas, say in 1884 and 1885, there were various theories advanced as to the origin of it. The belief as to the continuance of the supply of gas depended somewhat upon which of these theories was accepted. They were generally known as the storage theory and the continuous production theory. The advocates of the storage theory asserted that the supply would be exhausted when the gas in the storage reservoirs had been consumed. The advocates of the continuous production theory, while they claimed that the supply was being added to by production going on continuously at a point below the storage reservoirs, yet conceded that it was not probable that the supply could be maintained in the face of the enormous consumption by any probable rate of production that is at present going on in the earth's interior. The advocates of the latter theory, of course, held that as production was continuous, the day of exhaustion was further in the future than was admitted by the advocates of the storage theory, and that even when the vast store-houses that existed in the earth's crust prior to their being tapped were exhausted, production would still continue, and gas be supplied, though in smaller quantities.

The statistics of the census year 1889 show that the period of the exhaustion of the supply had been entered upon, and that the day had passed when this wonderful fuel could be used so wastefully as it had been in many operations, and in the very near future it would be possible to use it only for those purposes which could afford to pay comparatively high rates for the convenience of having such a fuel, or at points where the demand does not bear such a relation to the supply as it does in Western Pennsylvania, and the other great gas producing districts. It is probable that at many points it will continue to be used for years for domestic purposes, but its use in large establishments, demanding greater quantities of fuel, is, in many sections of the country, a thing of the past. These works can make artificial fuel gas by some one of the many known processes, at less figures in many instances, than natural gas can be furnished. This is especially true at Pittsburgh, where there is such a demand for gas for domestic purposes, and by other small consumers, that the natural gas companies are refusing to continue to supply large industrial establishments except at a price that is prohibitory. Hence the use of natural gas in large industrial establishments in the Pittsburgh district and others, is falling off, and these works are returning to solid fuel, or using artificially prepared gas. Some interesting facts regarding the exhaustion of gas in certain fields have been observed. It is found as a rule, for example, that shallow wells, 200 to even 1,000 feet deep, whatever may be the pressure or supply when first struck, give out much sooner than what are known as deep wells. In certain fields the supply at individual wells is soon exhausted, and the amount furnished by new wells, when first bored, is a constantly decreasing quantity, as compared with that supplied by the earlier wells. In other districts the life of wells is longer, but the earlier wells are now quite weak or entirely exhausted, and new wells sunk do not produce any such amount of gas as those at first drilled. In other districts, as the gas is exhausted, the salt water is finding its way into the wells drilled nearest to the borders of the pool in which the gas is found. Many wells in this way have been drowned out; while other wells in the district are still producing. In no district of any importance do the "great gassers" supply gas either at the same pressure or with same volume as when first struck.

The gas areas of the country are evidently small, scattered irregularly, and hemmed in by water areas and oil areas, and, if the theory of Prof. Lesley is to be adopted, they are not absolutely stationary, but shift their positions slightly as a result in part of the pressure of these water and oil areas and in part of other seismic causes. This shifting of gas areas Prof. Lesley suggests will be comparatively rapid in the direction of the working wells as the stock of gas is drawn off, and what was at first a gas flow will become changed to an oil or water field.

WASTE OF GAS.

I am glad to be able to report that as the consumer begins to realize that their stock of precious fuel is limited in quantity they are beginning to husband it as best they can. Much of the reckless waste that has heretofore been practiced has been stopped. Wells, when first drilled, are not allowed to stand open for days and weeks as was formerly the custom. By a law of the State owners and contractors are compelled to pack their wells as speedily as the work can be done, and a failure to do so renders them liable to heavy penalties. Many other reckless extravagancies have been abolished, and consumers are being thoroughly aroused to the necessities of the occasion.

THE TRANSPORTATION OF NATURAL GAS.

Since the first pipe line was laid, some twenty years ago, for the conveyance of natural gas from wells a few miles distant, and especially within the last eight years, large sums of money have been expended in this line of work, and a great deal of valuable information has been gained. The conveying of enormous volumes of gas from wells that in some instances have an initial pressure of from 300 to 700 pounds to the square inch, in pipe lines, which sometimes reach well nigh a hundred miles in length, and its perfect distribution throughout the streets and dwellings of a great city for every use to which fuel is applied, gives rise to an almost new branch of mechanical engineering. Serious difficulties have been overcome and threatened dangers have been obviated, and the safe and successful introduction of the new fuel has been fully accomplished.

The pipes through which gas is transported and distributed are made of lap-welded wrought iron, or of steel, when used in the high pressure portions of the lines. Cast-iron pipes of large size have been used of late on the low pressure sides of pipe lines where the pressure does not exceed ten or fifteen pounds to the square inch. Cast iron is not considered safe to be used in those portions of the line that are exposed to the full pressure of strong wells, but since the initial pressure in some of the gas areas of Pennsylvania and Ohio have fallen so materially, cast iron lines have been laid in a few instances, for the entire distance, from the wells to the points of consumption.

Naturally the sizes of the pipe lines vary greatly according to the demand made upon them. In the Indiana field they range from one inch to twelve inches in diameter. The usual sizes range between four and eight inches. The smaller sizes, one, two and three inches, are used in short distances and where small supplies are required. In those localities having feeble wells and where the pressure has materially lessened, a great advantage can be derived in having pipes of large diameter. The capacities of pipes vary with the squares of their diameter; for example: A six-inch pipe carries two and one-fourth times as much gas as a four-inch pipe. An eight-inch pipe carries four times as much gas as a four-inch pipe. From a pipe four times as long as another, one-half as much gas can be obtained, other things being equal.

From a pipe one-fourth as long as another, twice as much gas can be discharged, other things being equal.

Pipe lines should always be laid below the reach of frost. More or less water finds access to the line. The expansion of the gas, as it reaches the surface, considerably reduces the temperature of the pipe; and consequently it is an easy matter for any water in the line to freeze, if low atmospheric temperature can affect it. However, in the gas area of Indiana many of the smaller companies, and especially what are known as "Farmer Companies," the pipes are laid on the surface of the ground. This is done to save expense, and heaters are placed at intervals along the lines which prevent freezing.

The danger of introducing the enormous pressure of the wells into towns has been overcome by the use of regulators. These are of various patterns and are capable of controlling the flow of the strongest wells.

By means of the regulators the pressure is reduced to any required amount at any point on the line.

As the supply of gas weakens from natural causes, it often happens that there is no longer force enough in the wells to send even the gas that is produced to its destination. When this is the case it will be necessary to supplement the pressure from the wells by the use of compressors or blowers, along the line. This is done by the use of pumps of the same sort as those employed in forcing air into deep mines. This system is now in successful use in bringing natural gas to Louisville, Ky., and Chicago, Ill. As the gas weakens, all pipe lines of any length will have to reinforce the pressure in this way. The pressure in any pipe line in Indiana is limited by law to three hundred pounds to the square inch.

METERS.

On this subject I will quote Professor Orton. In his report on the "Petroleum and Natural Gas of Kentucky," he says: "There is a growing disposition to introduce meters into all the distributing systems of the natural gas companies. As is well known, when natural gas was first brought into use the supply was abundant, and the most reckless waste was tolerated. Five years ago, a calculation showed that 60,000,000 feet per day were burning from waste pipes connected with the Pittsburgh supply alone. The prices for gas at that time were fixed for the use required; as, for example, so much for every ton of iron or steel worked with gas; so much for glass pot; so much for a steam boiler, with and sometimes without regard to its horse power, and on the same basis prices were fixed for stoves, grates and furnaces. No inducement was offered to the users of gas to adopt economical methods. As the use of gas has rapidly extended, while at the same time the original supply has been rapidly reduced, a new state of things has been brought about, and the gas companies are now using all means in their power to effect an economical consumption of fuel, and to avoid all forms of waste. Nothing works more efficiently in this direction than the introduction of meters.

"Meters are now constructed so as to be adapted to every demand of the new fuel, and wherever natural gas is introduced it ought to be sold, from the outset, by measured volume."

In regard to the piping of natural gas it is to the decided advantage of every town that is fortunate enough to find a supply to use only the best methods in introducing it. All the problems of a safe and economical distribution have been solved by the leading companies that are engaged in this work, and it is a great mistake on the part of any town to fail to avail itself of this experience.

There are, it is true, many parties ready to underbid the rates of the great companies; but the money saved by the substitution of inferior and unskilled work will, in all probability, be lost several times over in attempting to remedy the defects of a line laid in such a way. Indeed, the defects are generally irremediable, and lines of this sort are sure to be sources of constant annoyance, danger and waste. To provide supervision of the entire work by piping and distributing the gas by a thoroughly skilled and experienced pipe line engineer, is the very least that can be asked of any town into which natural gas is being introduced.

ORIGIN OF NATURAL GAS.

In regard to the origin of natural gas a great deal has been said. Many and various theories have been advanced to account for this wonderful product, each of which has been supported by more or less show of reason. Each of these theories has had its supporters and its day. Some of them have had some foundation to build upon, while others have been absurd and totally false. Scientists and men who have had practical experience now agree as to the source and origin of this fuel. Without taking up and discussing the different theories that have been advanced, I will give the one that is now practically accepted by everybody who is interested in this product. I do this in this place for the benefit of those who have not had the advantage of the writers on this subject. In so doing I do not claim anything new or original for myself, but shall aim to give the theory that is now generally conceded.

It is not necessary, and indeed it would be impossible to consider the origin of natural gas and petroleum separately. They have a common history. They are produced from the same source, accumulated by similar agencies, and stored in the same reservoirs. In order of formation, petroleum is probably first, and as it is more complex in composition it is thus nearer to the organic world from which it is derived. Gas is the same substance nearer to the simplicity of inorganic compounds. There is no process known by which gas can be made into oil, but the generation of petroleum into gaseous products is seen to be constantly carried on in nature, and it is also effected artificially.

Neither petroleum nor gas is ever found free from the other, but sometimes gas has been found that had no apparent connection with petroleum. The connection, however, exists, and if the dryest gas could be followed throughout its underground reservoirs, it is altogether probable that accumulations of oil would be found.

Petroleum and natural gas are derived from the organic world. Both vegetable and animal substances are sources of supply for these products. The petroleum and gas that are found in the shales and sandstones are in the main derived from vegetable matter, and as a large amount of the stocks, especially of petroleum, are found in the sandstones, vegetable matter may be said to be the chief source. As the limestones themselves are known to be a product of animal life, it is fair to presume that the oil and gas contained therein are derived from animal matter. The vegetable and animal life represented in oil and gas are of the lower orders. Sea-weeds and other allied groups, and the lower groups of marine animals being altogether the most conspicuous elements. Destructive distillation has been given as an answer to the question: "How were petroleum and gas formed out of organic matter?"

Destructive distillation is defined as the decomposition of animal and vegetable matter at high temperatures in the absence of air. By this process gaseous and semi-liquid products are evolved, and a coke or carbon residue remains behind.

If shales, sandstones or limestones holding large quantities of organic matter, as they often do, and which buried at a considerable depth, should be subjected to a range of temperature, the lower limit of which may not exceed 400° or 500° Fahrenheit, there is no reason to doubt that petroleum and gas would result from this action. This is no doubt true in volcanic regions. Petroleum and gas, on a large scale, are not the products of destructive distillation, for the reason that all the regions of great petroleum and gas productions are remarkably free from all igneous intrusions and from all signs of excessive or abnormal temperatures. The condition of the rocks in which these products are found emphatically disproves this theory. Another theory given to account for the formation of petroleum and gas out of organic substances is called "spontaneous distillation at low temperatures." By low temperatures, ordinary temperatures are meant. It is only necessary, in order to disprove this theory, to state that destructive distillation is the only process known to science, under the name of distillation, which can account for the origin of oil or gas, and this does not go on at ordinary or low temperatures. A process that goes on at ordinary temperatures may be a chemical decomposition, but is certainly not a destructive distillation.

The "spontaneous distillation" theory has probably some apparent support in the fact that, where petroleum is stored in a rock, gas may be constantly escaping from it. The oil may be part of a primitive store, slowly escaping, and the gas may be constantly derived from the partial breaking up of the oil that is held in the shales. The term "spontaneous distillation" might apply to this stage, but it has nothing to do with the origin of either substance.

I think it can be safely claimed, and, in fact, all geologists and most chemists agree that these substances result from the primary chemical decomposition of organic substances buried with the forming rocks, and that they are retained as petroleum in the rocks from the date of their formation. This petroleum is considered the original form, and is supposed to have volatilized in porous strata, liberating gas and leaving a heavy residue behind.

While our knowledge of the formation of petroleum and natural gas is still incomplete and inadequate, the following statements, made in regard to it by Professor Orton, are offered as embodying the most probable view:

1. Petroleum is derived from vegetable and animal substances that were deposited in and associated with the forming rocks.

2. Petroleum is not in any sense a product of destructive distillation, but is the result of a peculiar chemical decomposition by which the organic matter passes at once into this or allied products. It is the result of the primary decomposition of organic matter.

3. The organic matter still contained in the rocks can be converted into gas and oil by destructive distillation, but, so far as we know, in no other way. It is not capable of furnishing any new supply of petroleum under normal conditions.

4. Petroleum is, in the main, contemporaneous with the rocks that contain it. It was formed at or about the time that these stratas were deposited.

As petroleum and natural gas is found stored, and had its origin in stratified or sedimentary rocks, the question might be asked, Why is it not found in all localities where these rocks occur? For answer it may be said that over many areas where organic matter was deposited in large quantities the conditions were such that immediate decomposition took place and the oil and gas escaped into the air instead of being imprisoned in the porous reservoirs of the rocks. Second, in many large areas where these products were generated, probably in immense quantities, subsequent disturbances fractured and fissured the rocks in such a manner as to allow the stored oil and gas to escape. In other places large areas covered by the ancient ocean were almost barren of organic life, just as we now find portions of existing seas destitute of life, consequently these are naturally destitute of oil and gas in paying quantities.

COMPOSITION OF NATURAL GAS.

Rock gas, or, as it is now generally recognized, natural gas, has long been technically known as a light carburetted hydrogen. In composition it closely approaches the inflammable marsh gas that may be frequently seen bubbling from the muddy bottoms of stagnant pools or sluggish streams. Its composition is as follows, as indicated by the mean result of the analysis of four specimens from Indiana and three from Ohio, made by Professor C. C. Howard, for the United States Geological Survey:

Marsh gas	93.36
Nitrogen	3.28
Hydrogen	1.76
Carbon monoxide	0.53
Oxygen	0.29
Olefiant gas	0.28
Carbon dioxide	0.25
Hydrogen sulphide	0.18
Total	99.93

Marsh gas, the principal constituent of natural gas, is a simple compound of carbon and hydrogen in the proportion of 75 per cent. of the former to 25 per cent. of the latter, the chemical formula being C. H. 4. It is one of a large number of carbon compounds running through petroleum, asphaltum, coal, jet and graphite or plumbago, and ending with the diamond.

The following are the lighter hydrocarbon compounds which constitute the bitumen series, and are given in the order of their weight:

1. Gaseous—Marsh gas, rock gas, etc.
2. Volatile (or semi-gaseous)—Naptha.
3. Fluid—Petroleum.
4. Semi-fluid—Maltha (or natural tar).
5. Solid—Asphaltum, geocerite, etc.
6. Rigid and brittle "asphaltum glance," albertite, etc.

From the above it may be seen that natural gas is simply the lightest known member of the bitumen family, which is itself the lighter part of the unstable hydrocarbon series. The several bitumens are so closely related that it is impossible to discuss the distribution or origin of any without considering the like attributes of all.

COMPOSITION OF TRENTON LIMESTONE GAS.

The following analyses were published by Professor Orton, but for the information of those to whom Orton's publications are inaccessible, they are reprinted in the following table:

DESCRIPTION.	OHIO.			INDIANA.			
	Fostoria.	Findlay.	St. Marys.	Muncie.	Anderson.	Kokomo.	Marion.
Hydrogen	1.89	1.64	1.94	2.35	1.86	1.42	1.20
Marsh gas	92.84	93.35	93.85	92.67	93.07	94.16	93.57
Olefiant gas	.20	.35	.20	.25	.47	.30	.15
Carbon monoxide	.55	.41	.44	.45	.73	.55	.60
Carbon dioxide	.20	.25	.23	.25	.26	.29	.30
Oxygen	.35	.39	.35	.35	.42	.30	.55
Nitrogen	3.82	3.41	2.98	3.53	3.02	2.80	3.42
Hydrogen sulphide	.15	.20	.21	.15	.15	.18	.20

NOTE.—The Muncie gas was taken from wells Nos. 1, 2, 3, 4 and 6; the Anderson gas from the McCullough; the Kokomo gas from wells Nos. 1 and 2, and the Marion gas from well No. 3.

WASTE OF GAS IN DOMESTIC CONSUMPTION.

That there is an immense waste of gas by the domestic consumers is a fact that is patent to the most superficial observer. Natural gas, like any other fuel, requires a certain amount of air, or rather the oxygen that is contained in the air, in order to have a perfect combustion. Without the perfect combustion the value of the fuel, in the production of heat, is largely diminished. The blacksmith at his forge requires an intense heat in order to get the iron and steel that he works into the proper condition. In order to do this and, at the same time economize his coal, he uses his bellows, getting as great an admixture of air with his fuel as is possible. By so doing, he obtains the desired results as to heat and saves money in the economy of his fuel. In other words by his methods he obtains the greatest amount of heat from a given amount of fuel. That this result is not obtained, and that an enormous waste is practiced in the domestic consumption of gas, is due to the inefficient appliances in use. With the mixers now in use a pressure of from six to ten ounces in the lower pressure mains furnish as much, if not more, gas than can be perfectly consumed, though many of the smaller towns, as well as some of larger growth, are carrying from three to five pounds. The result is that the gas passes through the stoves and grates and is only partially consumed. This high pressure is not only unnecessary, but wasteful and dangerous.

The following table is given to show the amounts of gas that is consumed through different sized mixers and at different pressures. The tests which produced these results were made with a Westinghaus meter, and may be relied upon as correct:

CUBIC FEET OF GAS BURNED IN ONE HOUR.

PRESSURE.	Size of Mixer.			
	No. 3. $\frac{3}{32}$-inch.	No. 5. $\frac{4}{32}$-inch.	No. 7. $\frac{5}{32}$-inch.	No. 9. $\frac{6}{32}$-inch.
$\frac{3}{10}$-inch	36	66	96	156
$\frac{4}{10}$-inch	41	76	108	164
$\frac{1}{2}$-inch	45	84	116	178
$\frac{6}{10}$-inch	48	96	134	196
$\frac{7}{10}$-inch	55	100	144	208
$\frac{8}{10}$-inch	60	108	156	228
$\frac{9}{10}$-inch	64	114	168	240
1-inch	68	120	179	256

The fractions of an inch given in the size of the mixers denote the diameter of the orifice through which the gas passes at the point of admixture with the air.

It will be seen from the above table that the greater the pressure in any size mixer, the greater number of cubic feet of gas is consumed with only a fixed amount of air. It follows, then, that the higher the pressure the greater the amount of gas that passes through the mixer, and the more imperfect is the combustion. It is wasteful, as I have shown above, and it is dangerous from the fact that this half burned gas is liable to escape into houses and occasion suffocations or explosions. Consumers have been slow to adopt improved mixers and burners. This is largely owing to the method of paying for the gas by the month or year, instead of by meter measure. If the latter method had been the rule, consumers would have found it to their interest to adopt the improved methods of using this valuable fuel and would have economized its use in every way possible. To the present method of selling gas may be charged a very large amount of the extravagance and waste that has been practiced, and until the method is changed and this fuel is sold by meter measurement, I can see but little hope for economy in its use. The waste will continue and the end will be correspondingly hastened.

It has been shown that petroleum and gas have their origin in the organic substances that were imprisoned in the sedimentary rocks at the time of their formation. They are the products of the chemical decomposition of the animal and vegetable matter deposited in the sand and mud beds of the ancient oceans under the conditions that prevailed at that period. As these substances were limited in their extent, and in some localities the conditions favorable to the generation of oil and gas did not exist, hence it must logically follow that these products must be limited in amount. In other words, it may be said that at the beginning of the development of these valuable fluids a certain amount existed within the reservoirs of oil and gas bearing rocks. Also that the generation of these products in commercial quantities, if indeed any at all, has ceased many ages ago. Now if this be true, and it has been amply proven, then we may calculate that the time is fast approaching when the entire quantity will be exhausted. Turn whatever way we may in our explorations and theorizings, this fact stares us in the face. Within the fields of Indiana, as well as in the rich areas of other States, this end has been hastened and brought in sight all too soon by the reckless extravagance and waste that has been practiced. Within the Indiana field, alone, during the first years of gas developments, it can be shown that 100,000,000 cubic feet of this inestimable fuel was wasted every day. At the low prices that have obtained in this area, the waste to the present time would amount to upwards of twenty millions of dollars. The waste has been criminal, and the day of repentance is fast approaching, and can only be delayed by practicing the most rigid economy and unrelaxed efforts in the husbandry of this valuable resource of our State.

Final exhaustion is inevitable, and the time has been hastened by the reckless folly of the consumers. However, I am glad to note that the people who are most deeply interested in the preservation of this valuable fuel are awakening to their true interest. An earnest and united effort is now being put forth by the gas companies of the State looking to its preservation. Upon the success of these efforts depends the lengthening of the time of the prosperity that has prevailed in this favored area of Indiana since the discovery of natural gas.

INDIANA'S STRUCTURAL FEATURES AS REVEALED BY THE DRILL.

BY E. P. CUBBERLY.

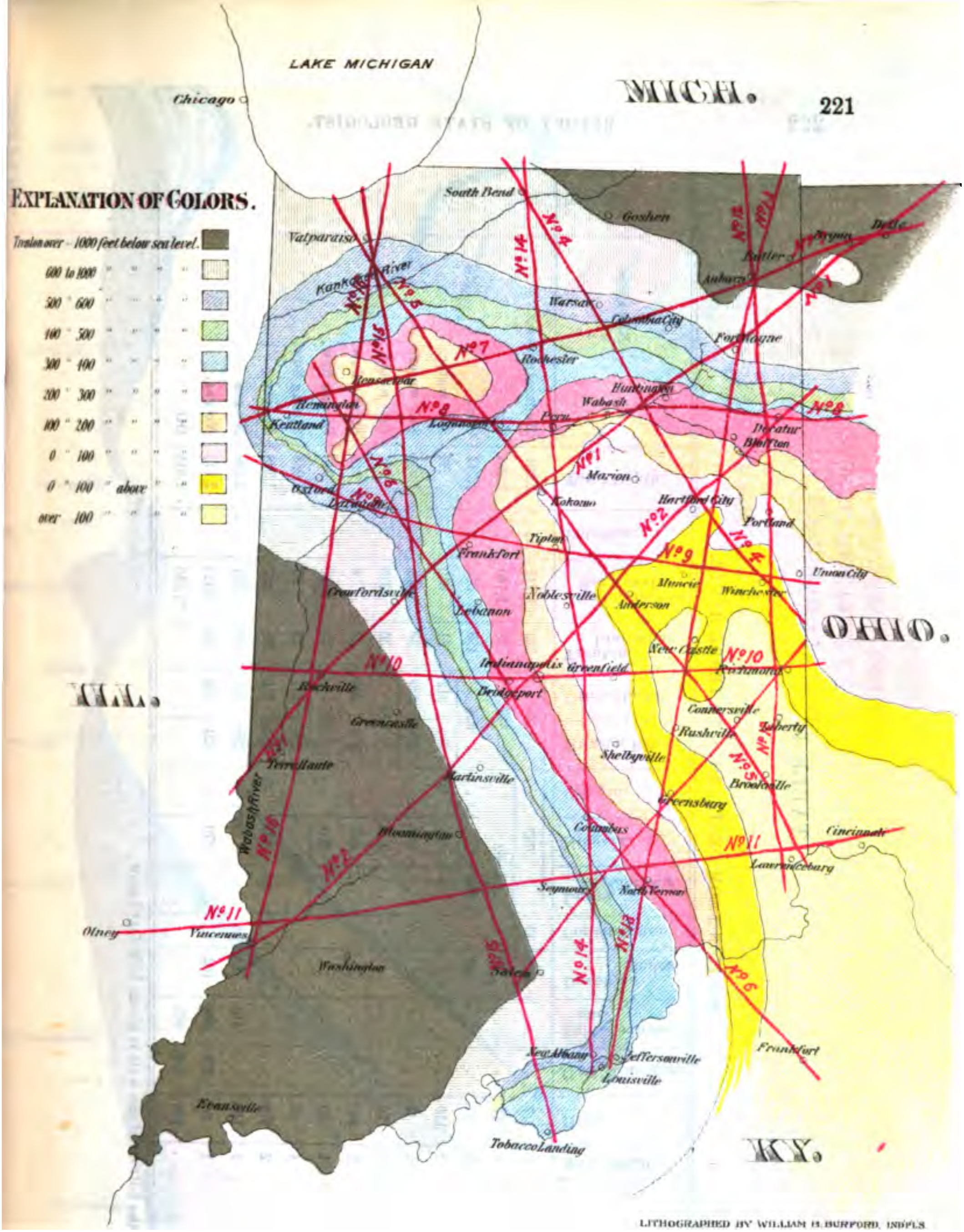
If we should cut out a small outline map of our State from some rather heavy draughting paper, such as a medium weight Bristol board, and pick it up by taking hold of it near Liberty, on the eastern border, with the right hand, and at the point where the Kankakee River enters Illinois on the western with the left hand, and then, while lowering the left hand a short distance below the right so as to make a small slope toward the northwest, allow the northeast and southwest parts of the State to slope downward a few degrees, the southwest greater than the northeast in proportion to its greater size and weight, we would have a rough approximation to the general structure of our State. I say the general structure, for these methods in no way show the smaller folds. To show even a very few of these we must have recourse to geological sections, and the material from which to construct these has been furnished by the gas and oil drills only within the last few years.

To show a few of these smaller folds, I have constructed sixteen sections in different directions across Indiana, as well as a map of the State showing areas of different elevation and depression of Trenton rock referred to sea level. While the sections and the map are approximately correct, they are also at least ninety-five per cent. ideal. In general outline they are as true as the facts at hand enable one to make them, though in local flexures of strata they not only do not make any pretensions to absolute accuracy, but do not even try to represent them.

A rough glance at the map of Trenton areas will show that the axis of the anti-cline runs entirely across the State in a northwest and southeast direction, though it does not keep either a uniform elevation or slope. At Cambridge City it reaches its maximum elevation with Trenton rock 174 feet above sea level, declines rather gradually to a little beyond Kokomo, then sinks to 350 feet below at Delphi, then rises in the vicinity of Monticello, Remington and Renssalear to 158 feet, and then sinks again as it approaches the Kankakee. To the northeast and southwest of the axis the slope is very gradual for some distance, but in the vicinity of Huntington and Decatur on the north, and Fowler, Indianapolis and Columbus on the south, the gradual downward slope changes to an abrupt one, and Trenton rock soon reaches a depression of over 1,000 feet below tide, the slope being about twice as rapid to the southwest as to the northeast.

Across this map, in various directions, I have drawn lines, prepared tables of strata from drill records, and constructed geological sections to show in a graphic manner the results. On each section I have located the wells and recorded the depth and results. The tables and sections are indeed instructive, especially from the bearing they have on the anticlinal theory of natural gas. In general, the gas and oil are found in wells marked anti-clinal arches, and where such arches exist in any section, and neither gas nor oil has been obtained, it will generally be found, by comparison with the map of Trenton areas and the other sections, to be due either to the fact that the supposed barren anti-cline is but a low part of a greater anti-cline extending in some other direction, or to some fracture or exposure, such as along the Wabash River and near Cincinnati, by means of which the gas has leaked out.

The following tables are the data from which the correspondingly numbered geological sections have been constructed, and the direction of the sections may be found by reference to the map of lines and Trenton areas. To follow the sections along the lines, comparing elevations of Trenton rock on the sections with those on the map, will not only be found very entertaining and instructive, but will also explain some things in the sections which might seem peculiar. For example, in section IV, the sudden elevation of Trenton rock from Montpelier to Dunkirk, and its sudden depression from Dunkirk to Red Key, are easily explained when we look at the map and see that line No. 4 at Dunkirk crosses a northeast prolongation of the high Trenton area:



MAP SHOWING LINES OF GEOLOGICAL SECTIONS AND THE RELATION OF TRENTON ROCK TO SEA LEVEL.

Drawn by E. P. Cubberley.

FOR EIGHTEENTH REPORT, S.S. GORBY, STATE GEOLOGIST.

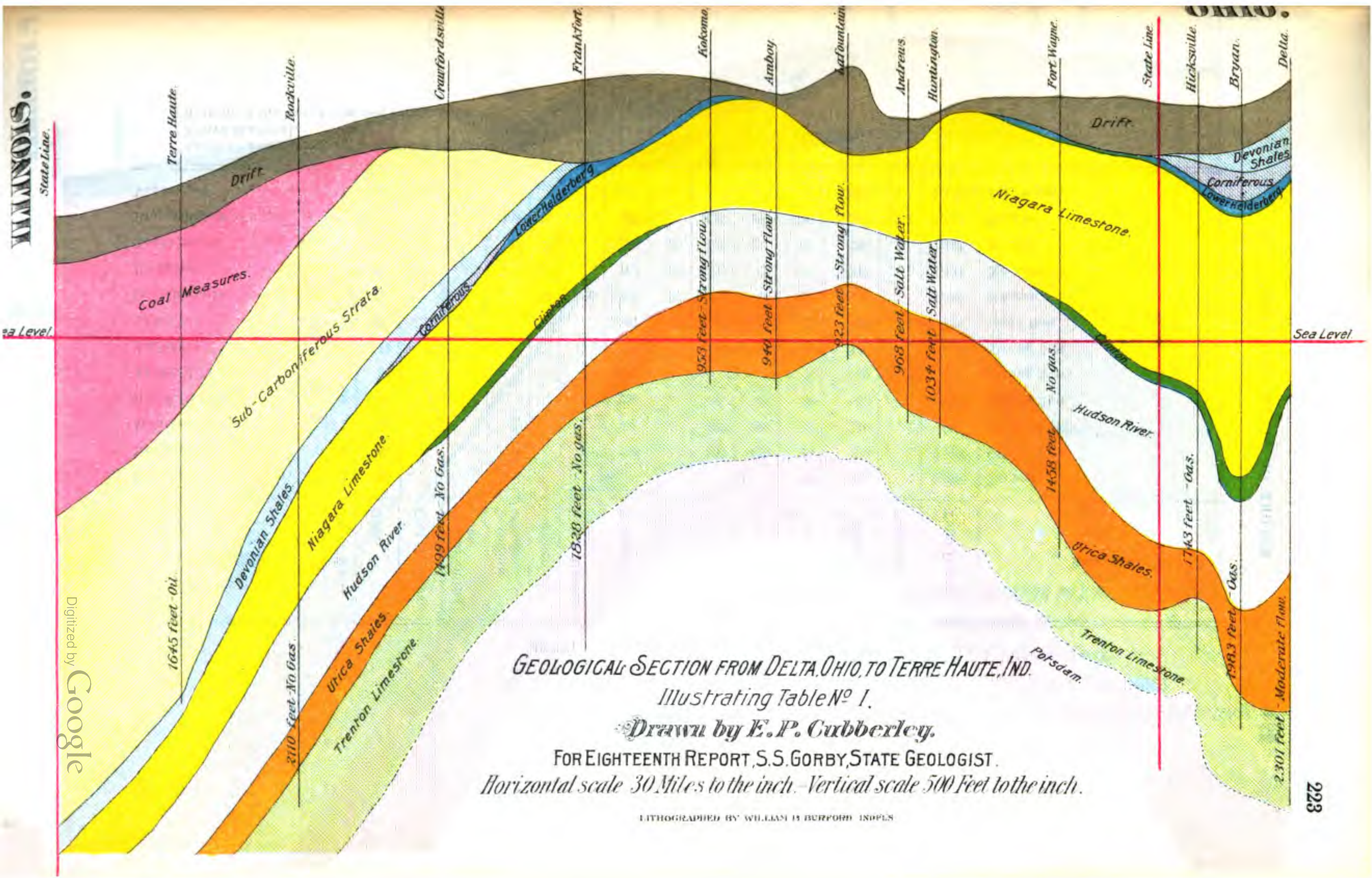
TABLE I.

SECTION FROM DELTA, OHIO, TO TERRE HAUTE.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	Remarks.
Delta, Ohio	1	117	...	...	133	45		737		1,030		229	1,241	...	2,301	Moderate flow.
Bryan, Ohio	1	176	...	...	74		1,060			635		38	1,180	...	1,983	Gas.
Hicksville, Ohio.	1	142	...	...	16	...	802	...	...	624		159	822	...	1,743	Gas.
Fort Wayne, Ind	2	110	...	...	...	...	34	551	20	410	312	21	650	...	1,458	Salt water.
Huntington, Ind	1	2	...	...	...	...	...	398	...	275	320	39	255	...	1,034	Salt water.
Andrews, Ind	1	70	...	...	...	...	...	300	...	562		36	†215	...	968	Salt water.
Lafontaine, Ind	1	300	...	...	...	...	...	225	...	175	200	23	6	...	923	Strong flow.
Amboy, Ind	1	35	...	...	...	...	...	350	...	522		33	†100	...	940	Strong flow.
Kokomo, Ind	4	61	...	...	...	...	359		...	265	251	22	97	...	958	Strong flow.
Frankfort	2	278	...	...	...	...	60	300	30	250	150	260	227	...	1,328	No gas.
Crawfordsville, Ind	1	140	...	410	80	55	...	380 (?)		250	115	69	664	...	1,499	No gas.
Rockville, Ind.	1	96	259	689	102	...	...	370	...	324	108	10	1,412	...	2,110	No gas.
Terre Haute, Ind	..	150	573	922	...	.	...	...	...	...	...	...	*1,150	...	1,645	Oil.

*At Terre Haute the bottom of the well is about 1,150 feet below.

†Approximately.



GEOLOGICAL SECTION FROM DELTA, OHIO, TO TERRE HAUTE, IND.

Illustrating Table No 1.

Drawn by E. P. Cubberley.

FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.

Horizontal scale 30 Miles to the inch. - Vertical scale 500 Feet to the inch.

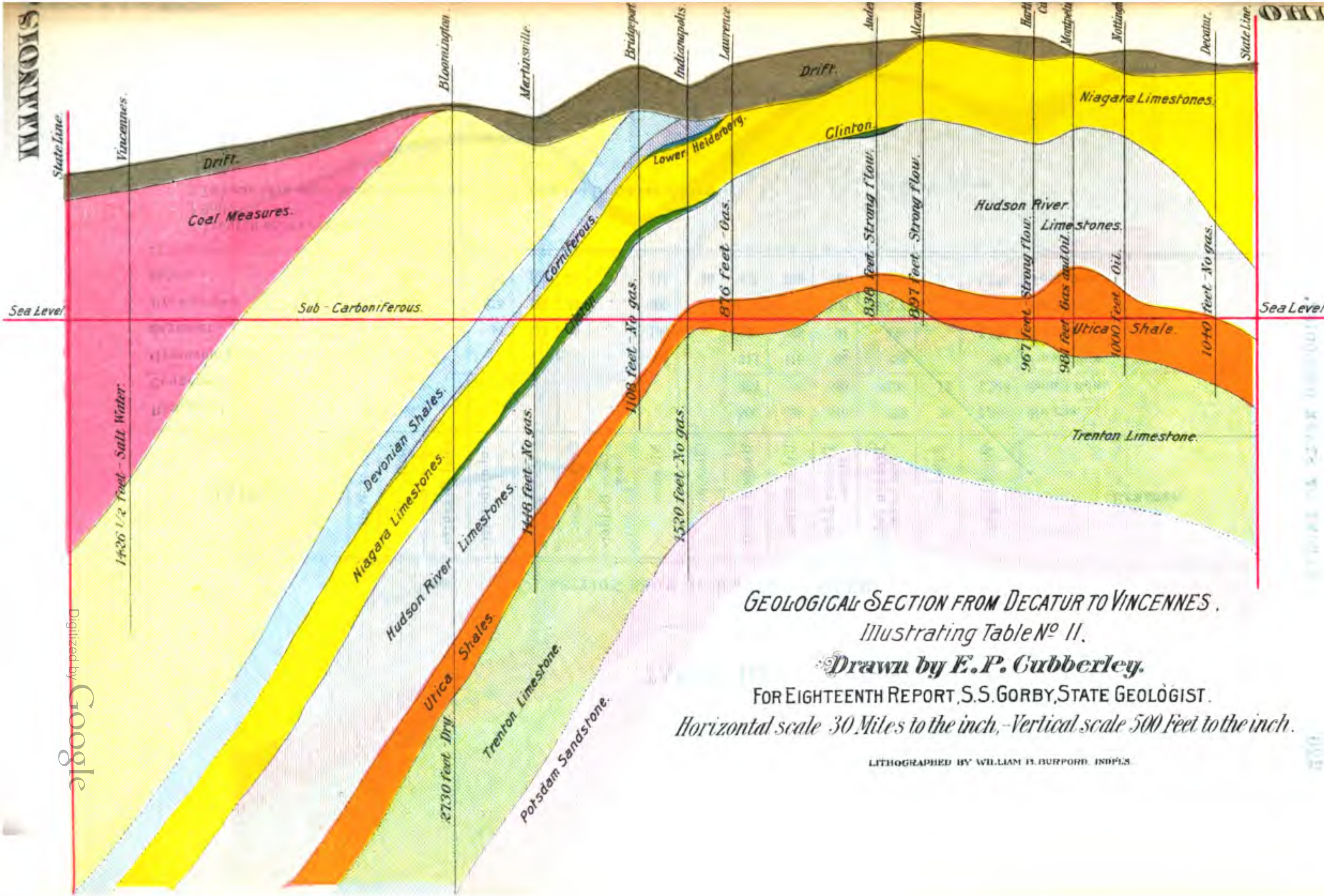
LITHOGRAPHED BY WILLIAM B. BURFORD INDPLS

TABLE II.

SECTION FROM DECATUR TO VINCENNES.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	Remarks.
Decatur	1	30	..	...	...	..	480		...	511		10	223	...	1,040	No gas.
Nottingham*	1	80	.	...	...	..	..	200	...	500	200	20	130	...	1,000	Oil.
Montpelier	1	17	...	..	...	..	..	233	...	432	280	19	110	...	981	Gas and oil.
Hartford City	2	82	...	..	...	..	...	280	...	483	140	32	40	...	967	Strong flow.
Alexandria	1	20	...	...	...	..	.	261	.	611		5	40	...	897	Strong flow.
Anderson	2	114	...	...	...	..	...	186	20	440	54	24	†66	...	838	Strong flow.
Lawrence	..	161	..	...	...	..	...	207	...	476		22	60	...	876	Good flow.
Indianapolis	..	118	...	...	...	68	20	200	20?	300	74	620	179	...	1,520	No gas.
Bridgeport	1	140	..	...	124	40	...	200	24	455	55	70	247	...	1,108	No gas.
Martinsville	1	85	..	323	120	62	...	216	20	420	131	51	780	...	1,448	No gas.
Bloomington	1	6	..	749	155	15	...	240	...	485	180	626	1,108	274	2,730	No gas.
Vincennes	1	80	845?	501½?	..	...	...	...	...	...	...	...	‡950	...	1,426½	Salt water.

* Approximate records from memory by the driller.
† Above sea level.
‡ Bottom of the well below sea level.



GEOLOGICAL SECTION FROM DECATUR TO VINCENNES.
Illustrating Table Nº 11.
Drawn by E. P. Cubberley.
FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.
Horizontal scale 30 Miles to the inch, - Vertical scale 500 Feet to the inch.

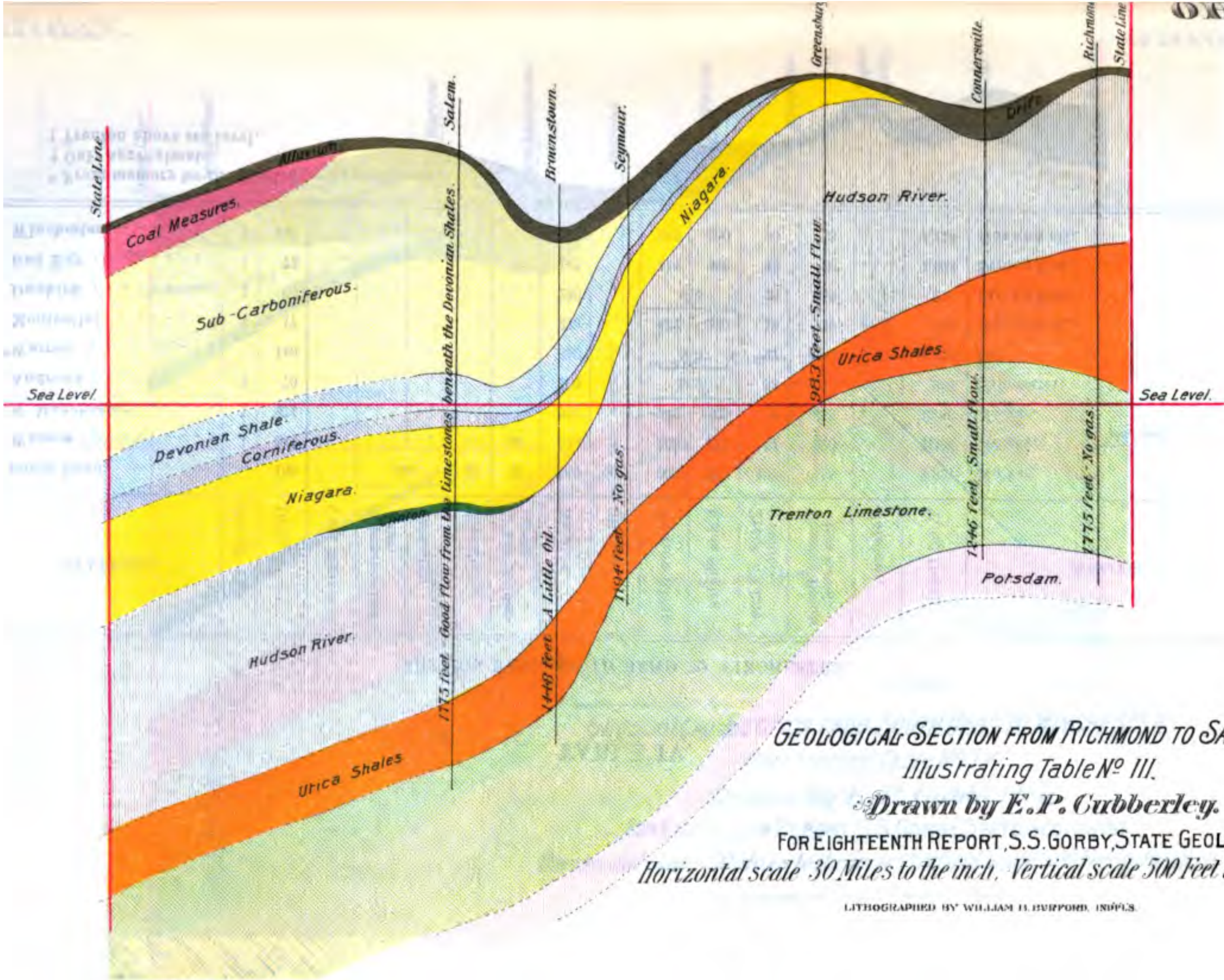
LITHOGRAPHED BY WILLIAM B. BURFORD, INDPLS.

TABLE III.

SECTION FROM RICHMOND TO SALEM.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
Richmond	1	5	. . .	. . .	. . .	. .	. . .	. . .	. . .	500	380	510	*79	10	1,405	No gas.
Connersville	1	97	. . .	. . .	. . .	.	. . .	. .	. . .	375	240	522	*120	12	1,246	Small flow.
Greensburg	1	7	. .	.	.	. .	. . .	90	. . .	713	110	63	*22	. . .	983	Small flow.
Seymour	1	75	. . .	15	115	20	. . .	190	. . .	520	165	94	472	. . .	1,194	No gas.
Brownstown	1	43	. . .	275	147	25	. . .	200	. . .	658		100	850 ?	. . .	1,448	Little oil.
Salem	1	†7	. . .	620	103	40	. . .	215	30	535	180	45	1,000	. . .	1,775	‡Good flow.

* Trenton above sea level.
† Soil.
‡ The gas here came from the limestone underlying the Devonian shales.



GEOLOGICAL SECTION FROM RICHMOND TO SALEM.
Illustrating Table No. III.
Drawn by E. P. Cubberley.
FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.
Horizontal scale 30 Miles to the inch. Vertical scale 500 Feet to the inch.

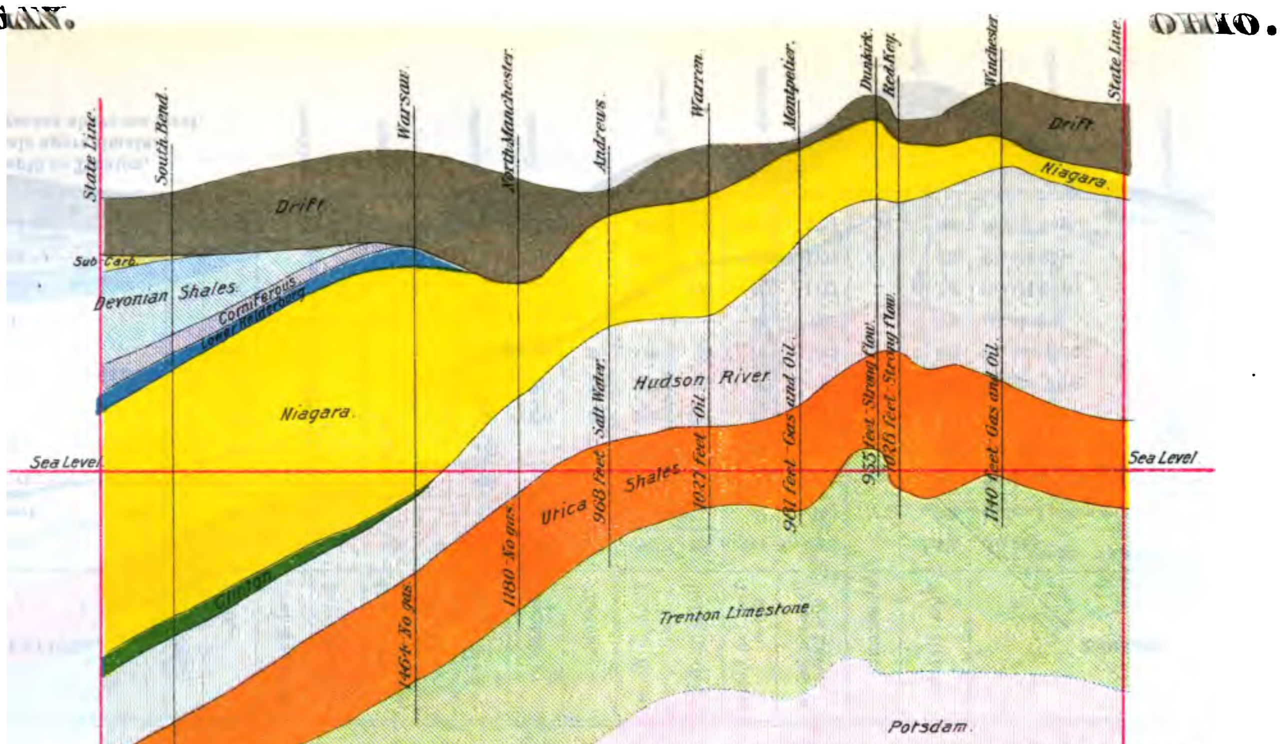
LITHOGRAPHED BY WILLIAM B. BURFORD, INDPLS.

TABLE IV.

SECTION FROM SOUTH BEND TO WINCHESTER.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	Remarks.
South Bend	..	160	...	220		60	40	640	60 ?	200	200	427	855	...	2,027	No gas.
Warsaw	1	248	...	...	...	..	60	592	?	200	287	77	570	...	1,464	No gas.
N. Manchester	1	274	...	...	...	..	.	300	...	250	306	50	355	...	1,180	No gas.
Andrews	1	70	...	...	...	..	..	300	...	562		36	†215	...	968	Salt water.
*Warren		140	...	..	...	..	..	310	...	550		27	†160	...	1,027	Oil.
Montpelier	1	17	...	...	...	..	...	233	...	432	280	19	110	..	981	Gas and oil.
Dunkirk	1	60	...	...	...	..	...	230	...	610		25	‡39	...	955	Strong flow.
Red Key	1	72	...	..	...		...	143	...	415	350	48	90	...	1,028	Strong flow.
Winchester	1	147	...	...	...	..	..	71	...	582	250	90	43	...	1,140	Gas and oil.

* From memory by Dr. Good, Sr.—Approximate.
† Only approximate.
‡ Trenton above sea level.



GEOLOGICAL SECTION FROM SOUTH BEND TO WINCHESTER,

Illustrating Table Nº IV.

Drawn by E. P. Cubberley.

FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.

Horizontal scale 30 Miles to the inch.—Vertical scale 500 Feet to the inch.

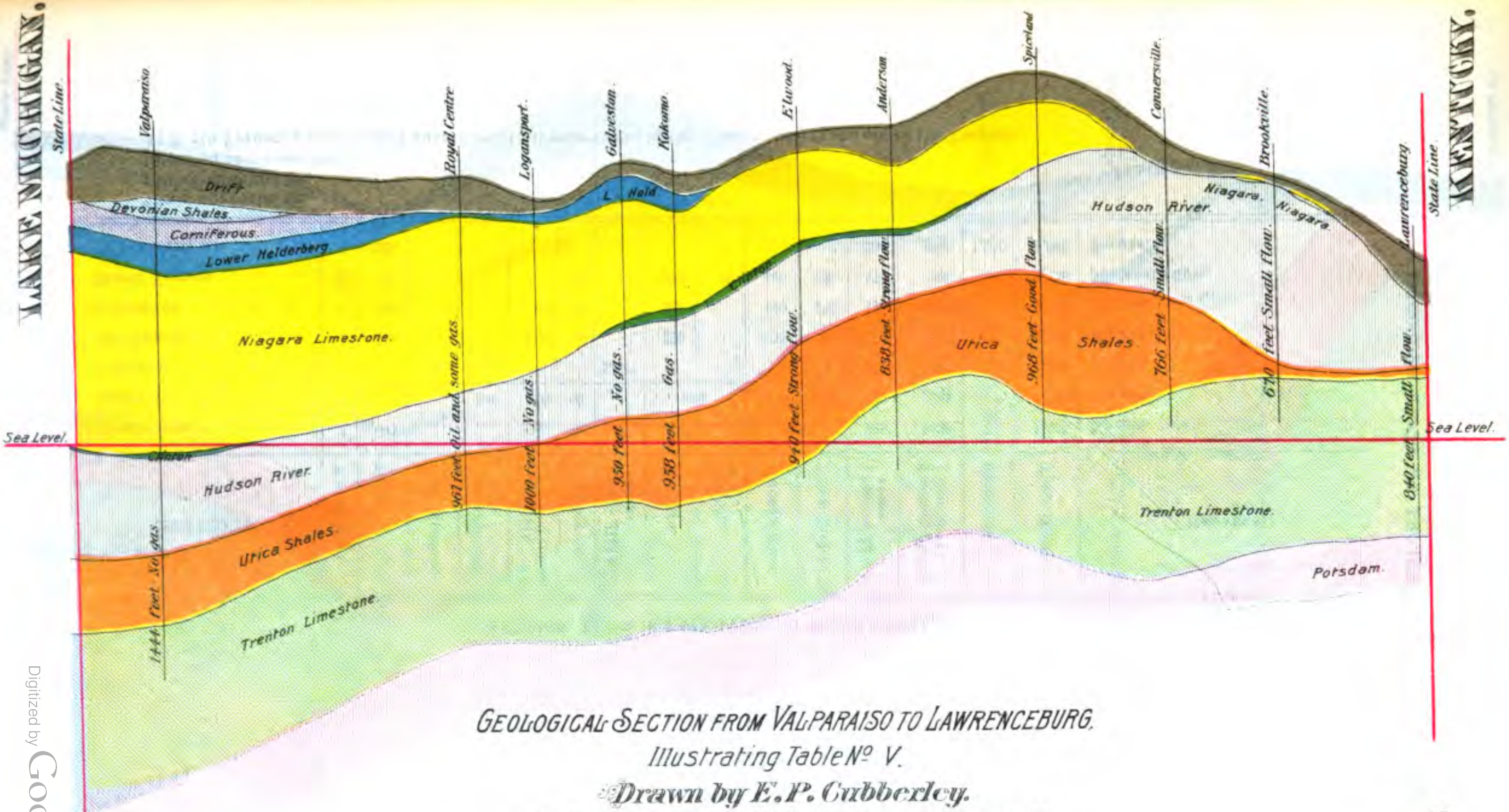
LITHOGRAPHED BY WILLIAM B. BURFORD, INDPLS.

TABLE No. V.

SECTION FROM VALPARAISO TO LAWRENCEBURG.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
Valparaiso	1	125	. . .	. .	65	70	80	495	10 ?	260	195	144	602	. . .	1,444	No gas.
Royal Centre	1	109		. . .	. .	. .	. . .	486	. . .	330		42	190	. .	967	Oil and some gas.
Logansport	1	995										. . .	334	. . .	. . . .	No gas.
Galveston	1	40	. .	. . .	. . .	410			. . .	480		20	†180	. .	950	No gas.
Kokomo	4	61	. . .	. . .	. . .	. .	59	270	30	265	251	22	97	. . .	958	Gas.
Elwood	2	54	. . .	. . .	. . .	. .	. . .	250	20	260	340	16	66	. . .	940	Strong flow.
Anderson	2	114	. . .	. .	. . .		. . .	186	20	440	54	24	‡66	. .	838	Strong flow.
Spiceland	. .	940										28	‡85	. .	968	Good flow.
Connersville	1	90	. .	. . .	. . .	. .	. . .	. . .	. . .	375	240	61	‡117	. .	766	Small flow.
Brookville	. .	. . .	. . .	.	. .	. .	. . .	. . .	. .	518	32	120	‡174	. . .	670	Small flow.
Lawrenceburg	. .	139	. . .	. . .	. .	. .	. .	. . .	.	185	25	451	‡158	40	840	Small flow.

* Depth to Trenton.
† Only approximate.
‡ Trenton above sea level.



GEOLOGICAL SECTION FROM VALPARAISO TO LAWRENCEBURG.

Illustrating Table No. V.

Drawn by E. P. Cubberley.

FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.

Horizontal scale 30 Miles to the inch.–Vertical scale 500 Feet to the inch.

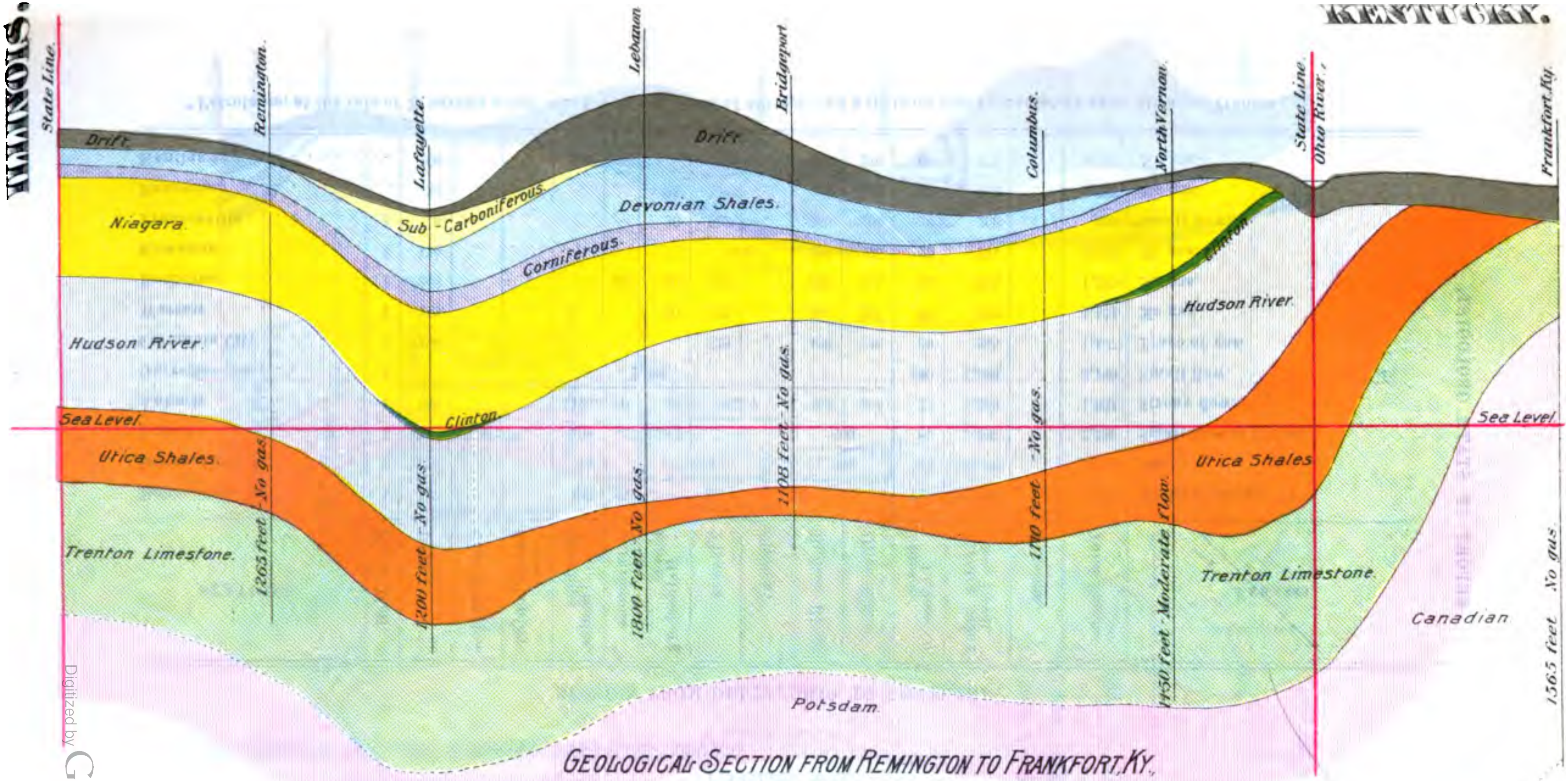
LITHOGRAPHED BY WILLIAM B. BURFORD, INDPLS

TABLE VI.

SECTION FROM REMINGTON TO FRANKFORT, KY.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Canadian.	Total Depth.	REMARKS.
Remington	1	5	.	.	85	50	. . .	260	. .	570		295	*225	. . .	1,265	No gas.
Lafayette	1	.	. . .	100	120	60	.	350		300	198	72	548	. . .	1,200	No gas.
Lebanon	1						1,227					271	302	. .	1,800	No gas.
Bridgeport	1	140	. . .	. . .	124	40	. . .	220	. . .	455	55	74	247	. . .	1,108	No gas.
Columbus	1	26	. .	. . .	87	32	. . .	235	. . .	440	135	155	311	. . .	1,110	No gas.
North Vernon	1	11	. . .	. .	. . .	58	. . .	222	29	440	220	470	253	. . .	1,450	Moderate flow.
*Frankfort, Ky	1	†125	. . .	. .	. . .	. .	. . .	. . .	. . .	. .	. . .	250	‡550	1,250	1,565	No gas.

* Only approximate.
† River alluvium.
‡ Trenton above sea level.
At North Vernon, gas and small quantities of oil were found in the Niagara limestone, above the Trenton.



GEOLOGICAL SECTION FROM REMINGTON TO FRANKFORT, KY.,
Illustrating Table No. VI.
Drawn by E. P. Cubberley.
FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.
Horizontal scale 30 Miles to the inch. Vertical scale 500 Feet to the inch.

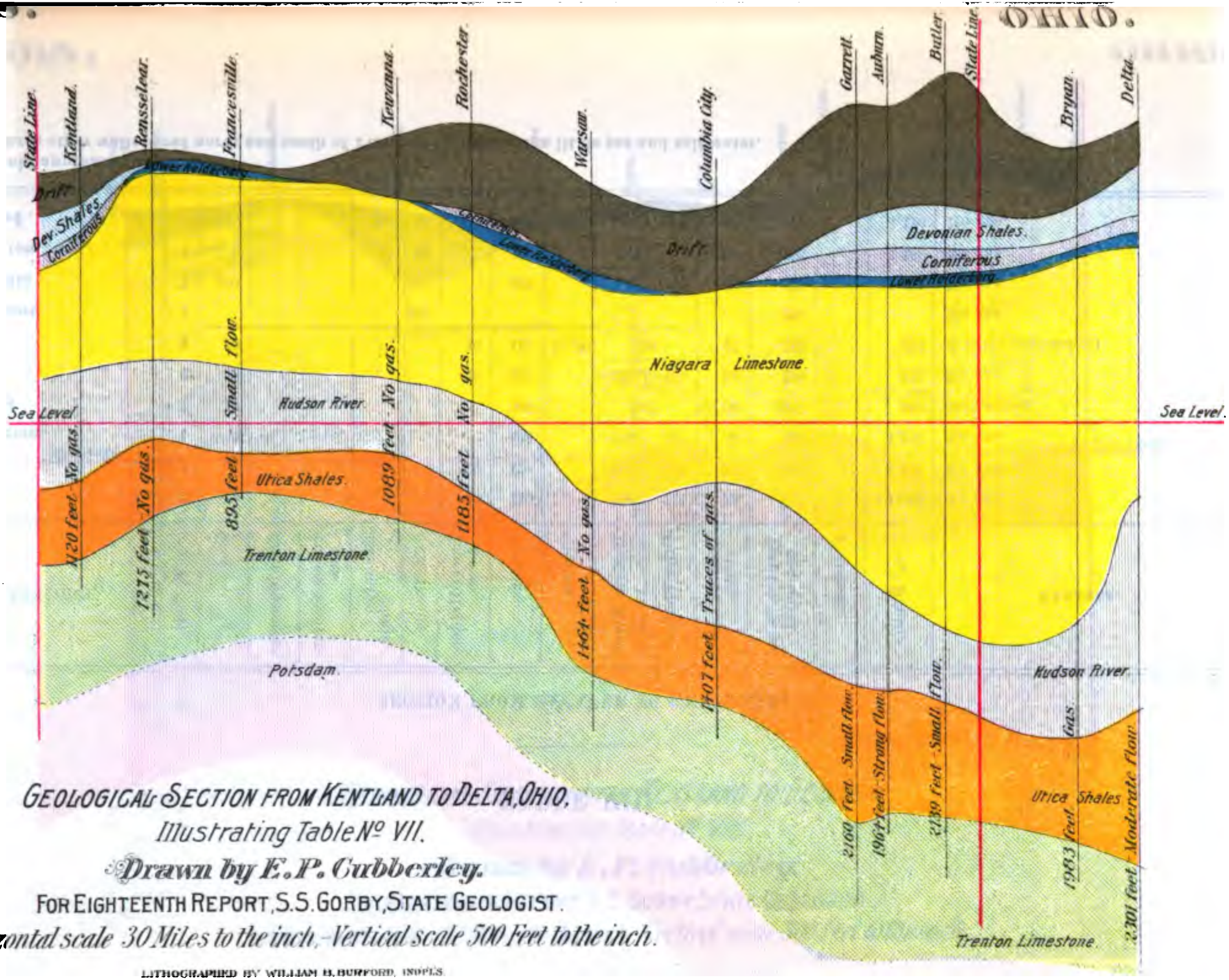
LITHOGRAPHED BY WILLIAM B. BURFORD, INDPLS

TABLE VII.

SECTION FROM DELTA, OHIO, TO KENTLAND.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarbonifer-ous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
Delta, Ohio	1	117	. . .	. . .	133	45		737		1,030		229	1,241	. . .	2,301	Moderate flow.
Bryan, Ohio	1	176	. .	. . .	74		1,060			635		38	1,180	. . .	1,983	Gas.
Butler	1	378	. . .	.	108	. .	1,064	. . .	. . .	500		89	1,187	. . .	2,139	Small flow at 27 feet.
Auburn	1	280	. . .	. .	120	80	40	823 ?		300	268	27	1,069	. . .	1,964	Strong flow.
Garrett	1						1,980					180	1,098	. . .	2,160	Small flow.
Columbia City	1	224	. . .	. . .	. . .	. .	. . .	526	. . .	400	218	39	545	. . .	1,407	Trace of gas.
Warsaw	1	248	. . .	. . .	. . .	. .	60	592	. . .	200	287	77	570	. . .	1,464	No gas.
Rochester	1	245	. . .	. . .	. . .	40	40	460	. . .	260	101	24	351	. . .	1,185	No gas.
Kewanna	1	170	. . .	. . .	. . .	. .	. .	540 ?		205	175	29	274	. . .	1,089	No gas.
Francesville	1	8	. .	. . .	. . .	. .	30	512	. . .	235	100	10	200	. . .	895	*Small flow.
Rensselear	. .	30	. .	. . .	.	. .	35	500	. .	225	100	385	158	. . .	1,275	No gas.
Kentland	. .	100	. .	.	100	45	. . .	305 ?		300	210	60	379	. . .	1,120	No gas.

* Petroleum, at the rate of 25 barrels a day, was found at a depth of 630 feet, and a little oil also immediately upon striking Trenton.



GEOLOGICAL SECTION FROM KENTLAND TO DELTA, OHIO.

Illustrating Table No. VII.

Drawn by E. P. Cubberley.

FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.

Horizontal scale 30 Miles to the inch, - Vertical scale 500 Feet to the inch.

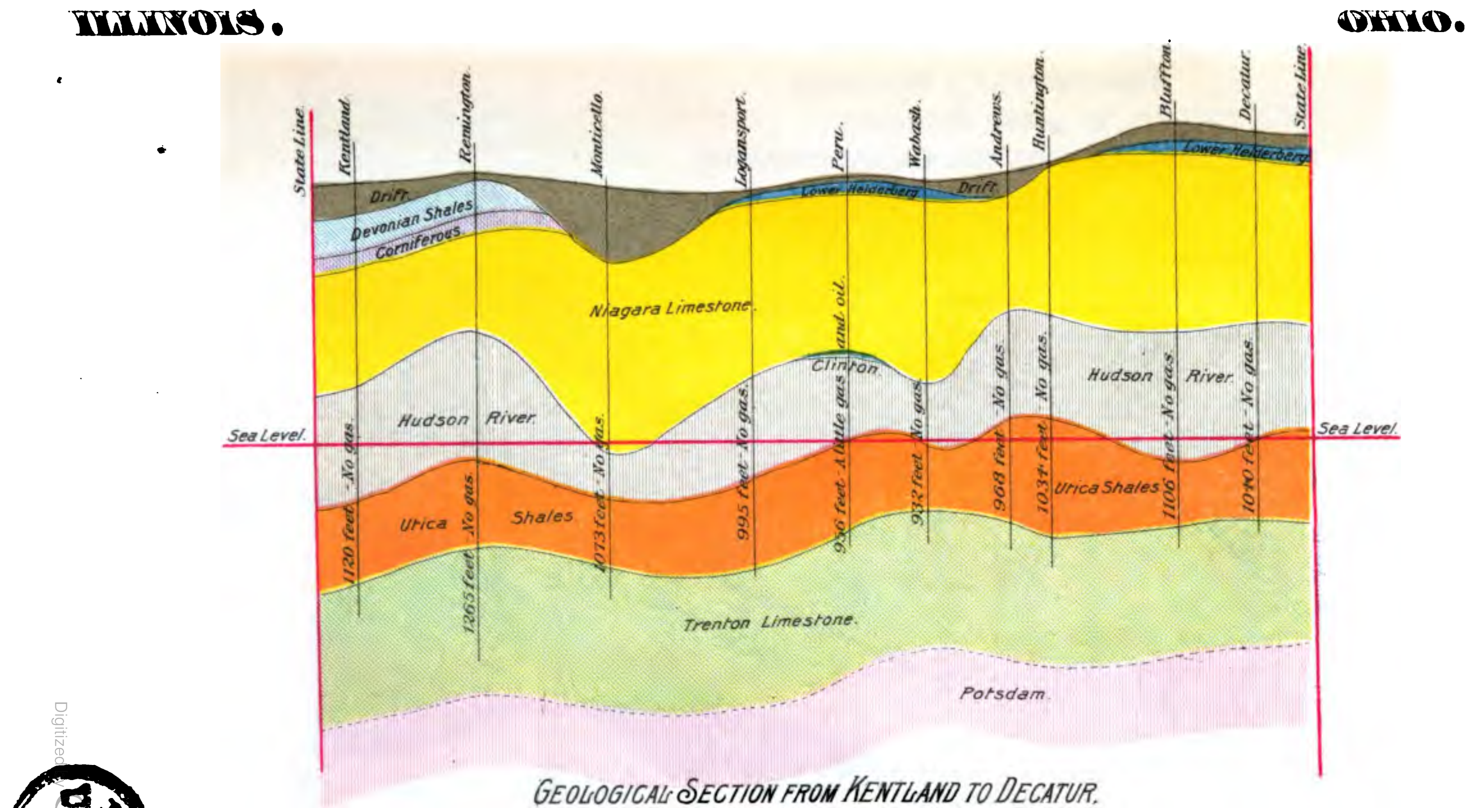
LITHOGRAPHED BY WILLIAM B. BURFORD, INDPLS.

TABLE VIII

SECTION FROM DECATUR TO KENTLAND.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shale.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
Decatur	1	39	...	...	...	..	40	440	...	300	211	10	223	...	1,040	No gas.
Bluffton	2	51	...	...	...	..	30	479	...	340	175	31	238	..	1,106	No gas.
Huntington	1	2	...	...	...	..	...	398	...	275	320	39	255	..	1,034	No gas.
Andrews	1	70	...	...	...	..	...	300	...	562		36	†215	...	968	Salt water.
Wabash	2	28	...	..	...	..	40	485	..	160	165	54	198	...	932	No gas.
*Peru	2	10	...	...	...	..	40	415	15 (?)	449		27	229	...	956	A little gas and oil.
Logansport	1					995						...	334	...	.....	No gas.
Monticello	1	205	...	...	...	..	...	515	..	120	170	63	338	...	1,073	No gas.
Remington	1	5	...	...	85	50	...	260	...	570	...	295	†225	...	1,265	No gas.
Kentland	..	100	...	...	100	45	...	305	?	300	210	60	379	...	1,120	No gas.

† Only approximate.
* Three other wells bored north and south of Peru gave a little oil, a little gas and salt water.



GEOLOGICAL SECTION FROM KENTLAND TO DECATUR.

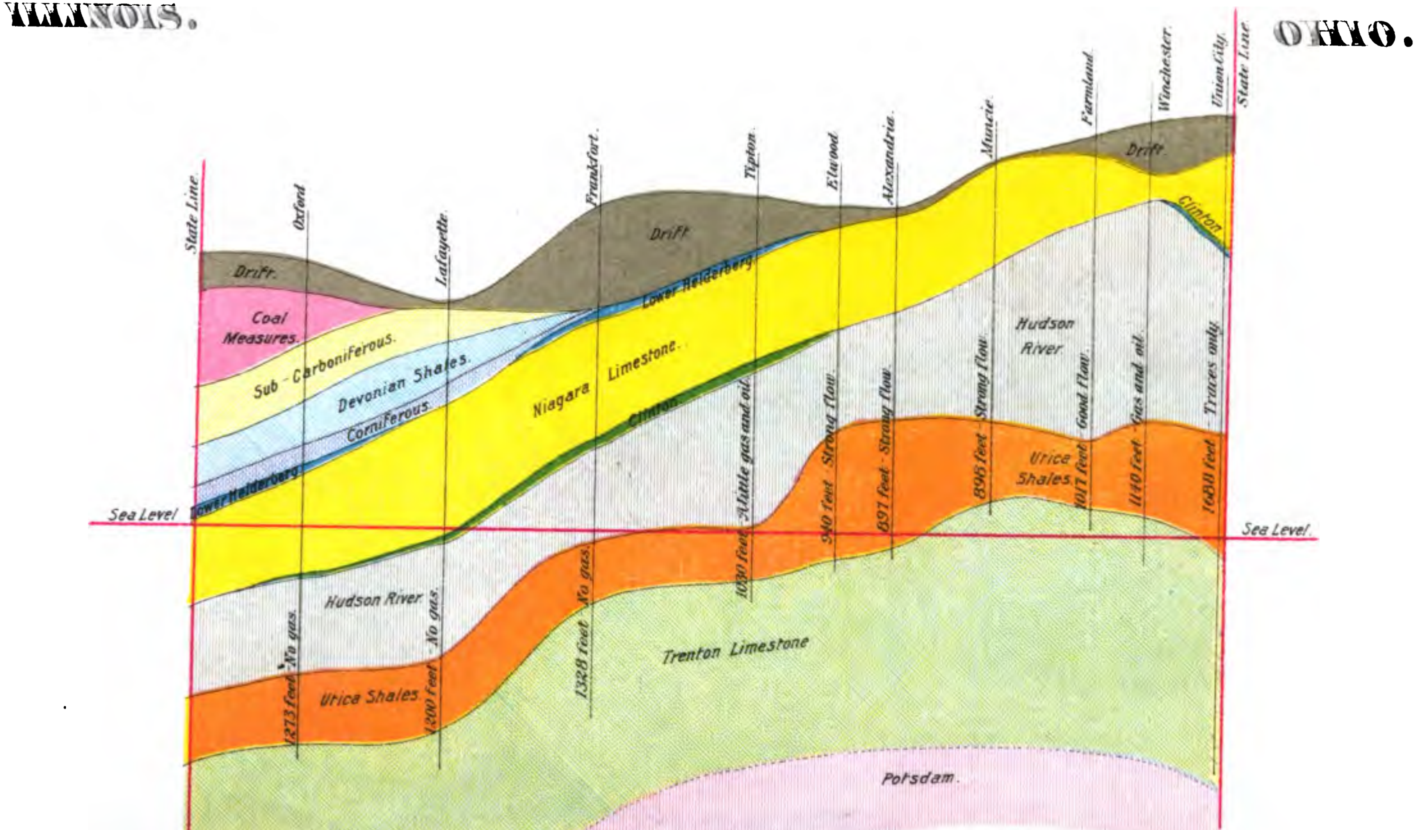
Illustrating Table No VIII.

Drawn by E. P. Cubberley.

FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.

Horizontal scale 30 Miles to the inch. - Vertical scale 500 Feet to the inch.

LITHOGRAPHED BY WILLIAM B. BURFORD, INDPLS.



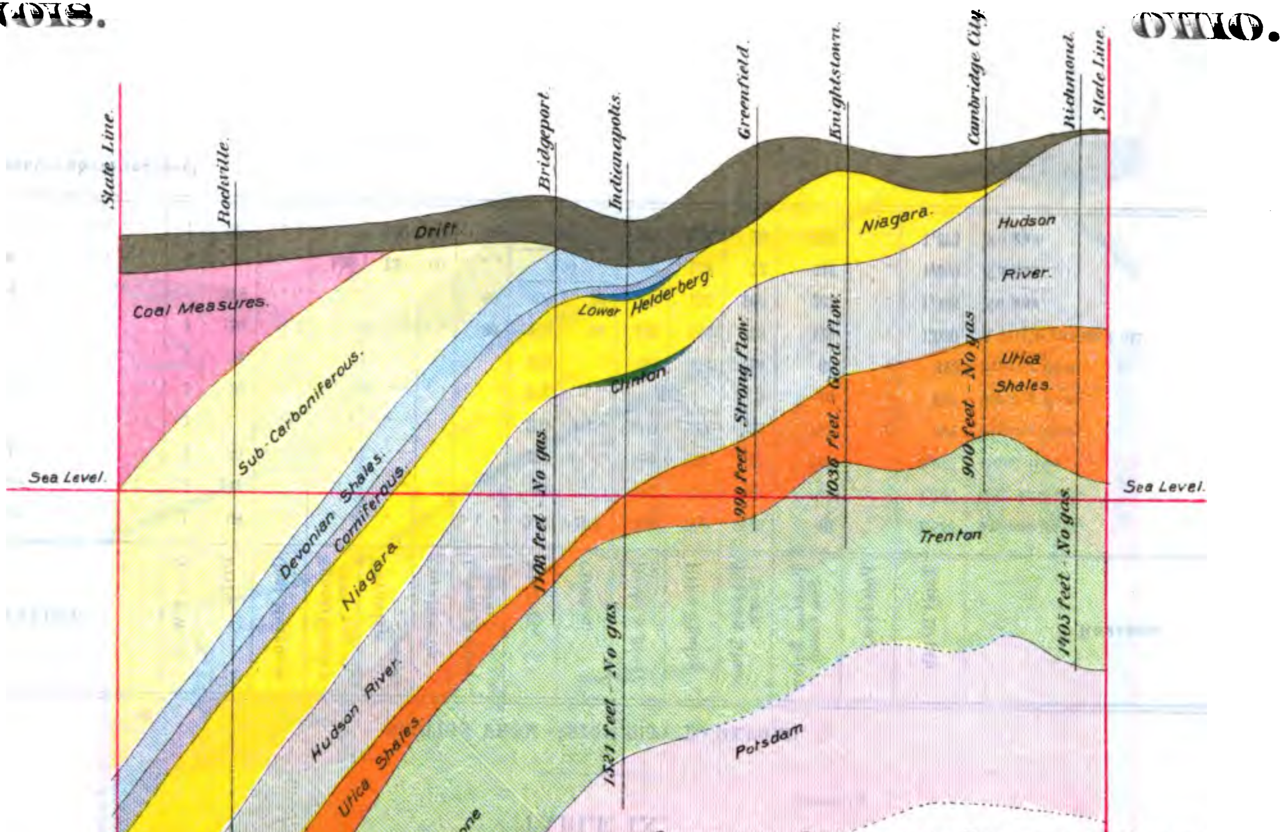
GEOLOGICAL SECTION FROM OXFORD TO UNION CITY,
Illustrating Table No IX.
Drawn by E. P. Cubberley.
FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.
Horizontal scale 30 Miles to the inch. - Vertical scale 500 Feet to the inch.

TABLE IX.

SECTION FROM UNION CITY TO OXFORD.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
Union City	1	98	...	...	...	..	...	240	10 ?	500	300	540	40	...	1,688	Traces only.
Winchester	1	147	...	..	...	..	...	71	...	582	250	90	*43	...	1,140	Gas and oil.
Farmland	1	55	...	...	...	.	...	160	...	585	185	32	*55	...	1,017	Good flow.
Muncie	1	...	...	...	...	..	...	265	...	400	211	22	*97	...	898	Strong flow.
Alexandria	1	20	...	...	...	..	...	261	...	611		5	40	...	897	Strong flow.
Elwood	2	54	...	...	...	..	...	270	...	280	340	16	66	...	940	Strong flow.
Tipton	1	139	...	...	...	..	30	260	36	400	132	33	129	...	1,030	A little gas and oil.
Frankfort	2	278	...	..	...	..	60	300	30	250	150	260	227	...	1,328	No gas.
Lafayette	1	...	...	100	120	60	...	350		300	198	72	548	...	1,200	No gas.
Oxford	1	385	..	...	100	50	30	265 ?		255	188	20	570	...	1,273	No gas.

* Trenton above sea level.



GEOLOGICAL SECTION FROM ROCKVILLE TO RICHMOND.
Illustrating Table Nº X.
Drawn by E. P. Cubberley.
FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.
Horizontal scale 30 Miles to the inch, Vertical scale 500 Feet to the inch.

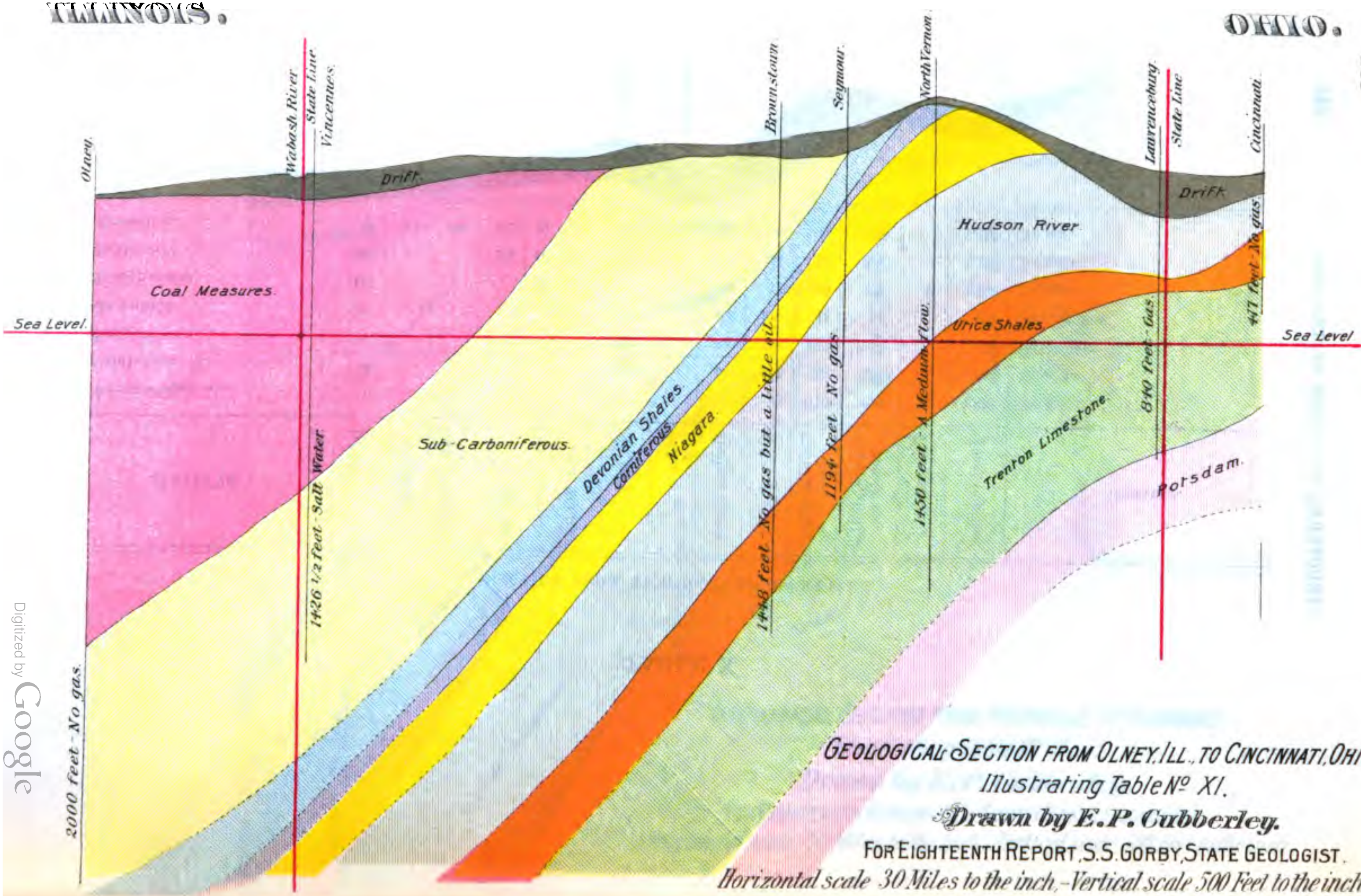
LITHOGRAPHED BY WILLIAM B. BURFORD, INDPLS.

TABLE X.

SECTION FROM RICHMOND TO ROCKVILLE.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
Richmond	1	5	. . .	. . .	. . .	. .	. . .	. . .	. . .	500	380	510	*79	10	1,405	No gas.
Cambridge City	1	96	. . .	. . .	. . .	. .	. . .	2	. . .	400	268	133	*174	. . .	900	No gas.
Knightstown	1	64	. .	. . .	. . .	. .	. . .	260	. . .	300	199	213	*113	. . .	1,036	Good flow.
Greenfield	. .	205	. . .	. . .	. . .	. .	. . .	170	. . .	400	210	14	54	. . .	999	Strong flow.
Indianapolis	. .	118	. . .	. . .	. . .	68	20	200	20	300	74	620	179	1	1,521	No gas.
Bridgeport	. .	140	. . .	. . .	124	20	. . .	244	. . .	455	55	70	247	. . .	1,108	No gas.
Rockville.	. .	96	259	689	102	62	. . .	370	. . .	324	108	10	1,412	. . .	2,110	No gas.

* Trenton above sea level.



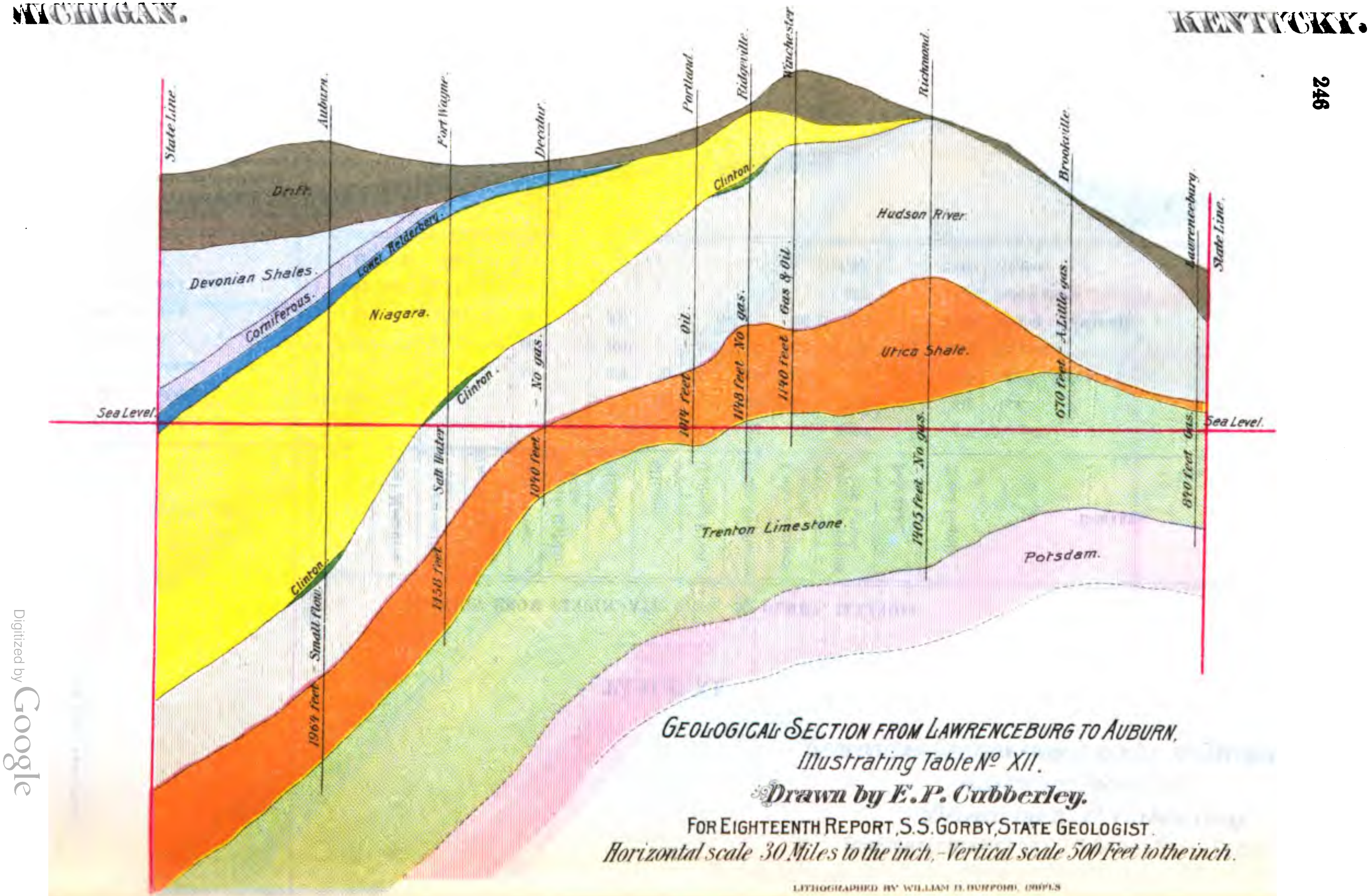
GEOLOGICAL SECTION FROM OLNEY, ILL., TO CINCINNATI, OHIO.
Illustrating Table No. XI.
Drawn by E. P. Cubberley.
FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.
Horizontal scale 30 Miles to the inch. - Vertical scale 500 Feet to the inch.

TABLE XI.

SECTION FROM CINCINNATI, OHIO, TO OLNEY, ILLINOIS.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
Cincinnati	.	48	...	...	...	..	...	...	..	124	135	110	‡*200	...	417	No gas.
Lawrenceburg	1	139	...	..	...	..	...	..	...	185	25	451	*158	40	840	Gas.
North Vernon	1	11	..	...	...	58	..	222	29	440	220	470	253	...	1,450	†Medium flow.
Seymour	1	75	...	..	130	25	...	190	...	500	165	94	472	...	1,194	No gas.
Brownstown	1	43	...	275	147	25	...	200	...	658		100	‡758	...	1,448	No gas. Little oil.
Vincennes	1	80	845 ?	501½ ?	..	..	...	...	...	...	...	..	§950	..	1,426½	Salt water.
Olney, Ill	1	12	1,319	669	.	..	...	.	...	...	...	...	§1,600	..	2,000	No gas.

* Trenton above sea level.
† Gas in Niagara Limestone.
‡ Only approximate.
§ Bottom of the well below sea level. Only approximate.



GEOLOGICAL SECTION FROM LAWRENCEBURG TO AUBURN,
Illustrating Table No. XII.
Drawn by E. P. Cubberley.
FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.
Horizontal scale 30 Miles to the inch, - Vertical scale 500 Feet to the inch.

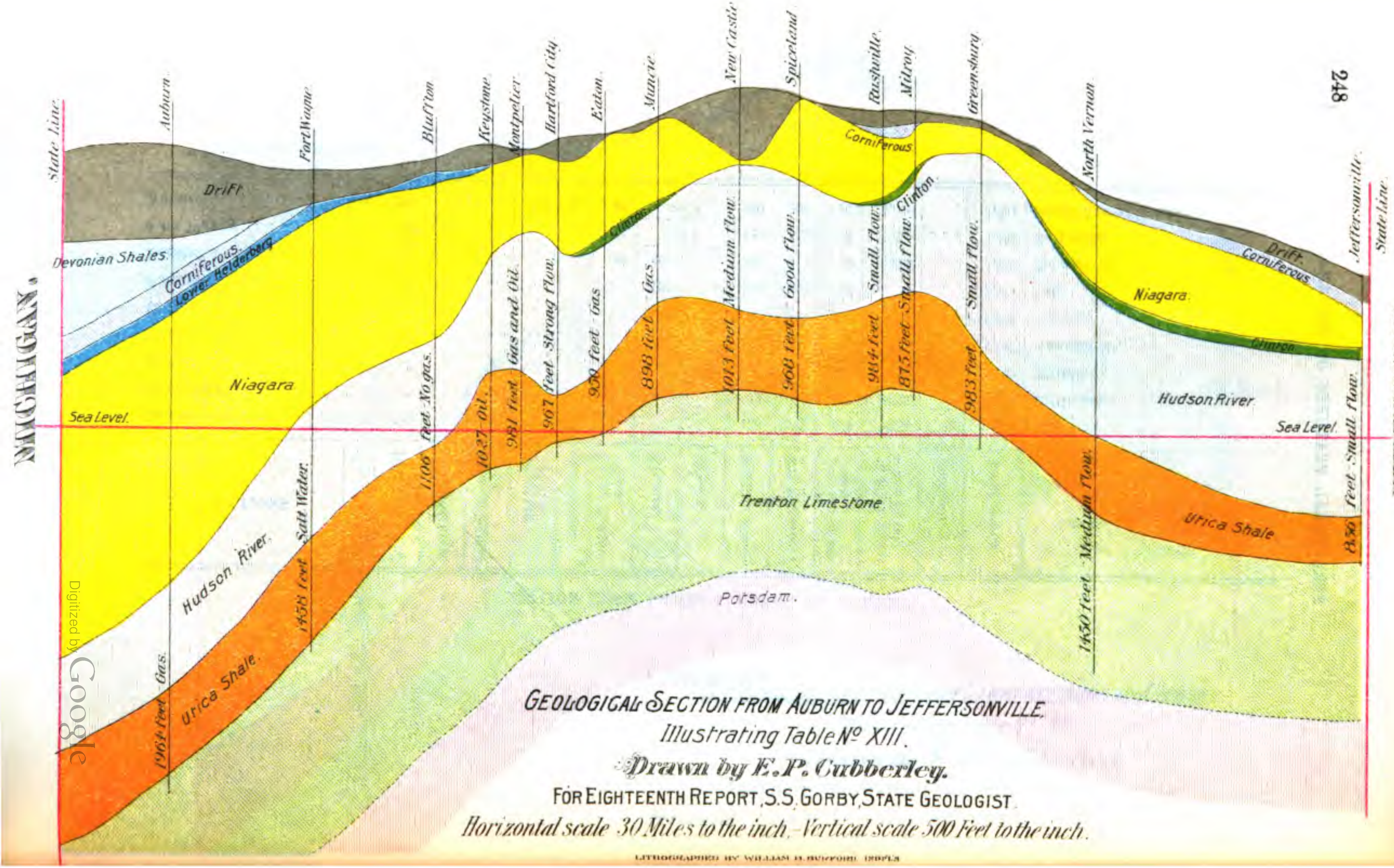
LITHOGRAPHED BY WILLIAM B. BURFORD, INDPLS

TABLE XII.

SECTION FROM LAWRENCEBURG TO AUBURN.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Coniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
Lawrenceburg	1	139	...	...	..	..	...	..	...	185	25	451	*158	40	810	Gas.
Brookville	1	...	...	...	...	..	...	...	...	518	32	120	*174	..	670	Little gas.
Richmond	1	5	.	...	..	..	...	...	..	500	380	510	*79	10	1,405	No gas.
Winchester	1	147	...	...	...	..	...	71	...	582	250	90	*43	...	1,140	Gas and oil.
Ridgeville	1	30	...	..	...	..	...	200	12	436	303	167	*1	...	1,148	No gas.
Portland	2	58	...	...	...	..	...	192	...	500	240	24	63	...	1,014	Oil.
Decatur	1	39	...	...	...	..	40	440	...	300	211	10	223	...	1,040	No gas.
Fort Wayne	2	110	...	...	...	..	34	571 ?		410	312	21	650	...	1,458	Salt water.
Auburn	1	280	...	...	120	80	40	823 ?		300	268	27	1,069	...	1,964	Small flow at 27 feet.

* Trenton above sea level.



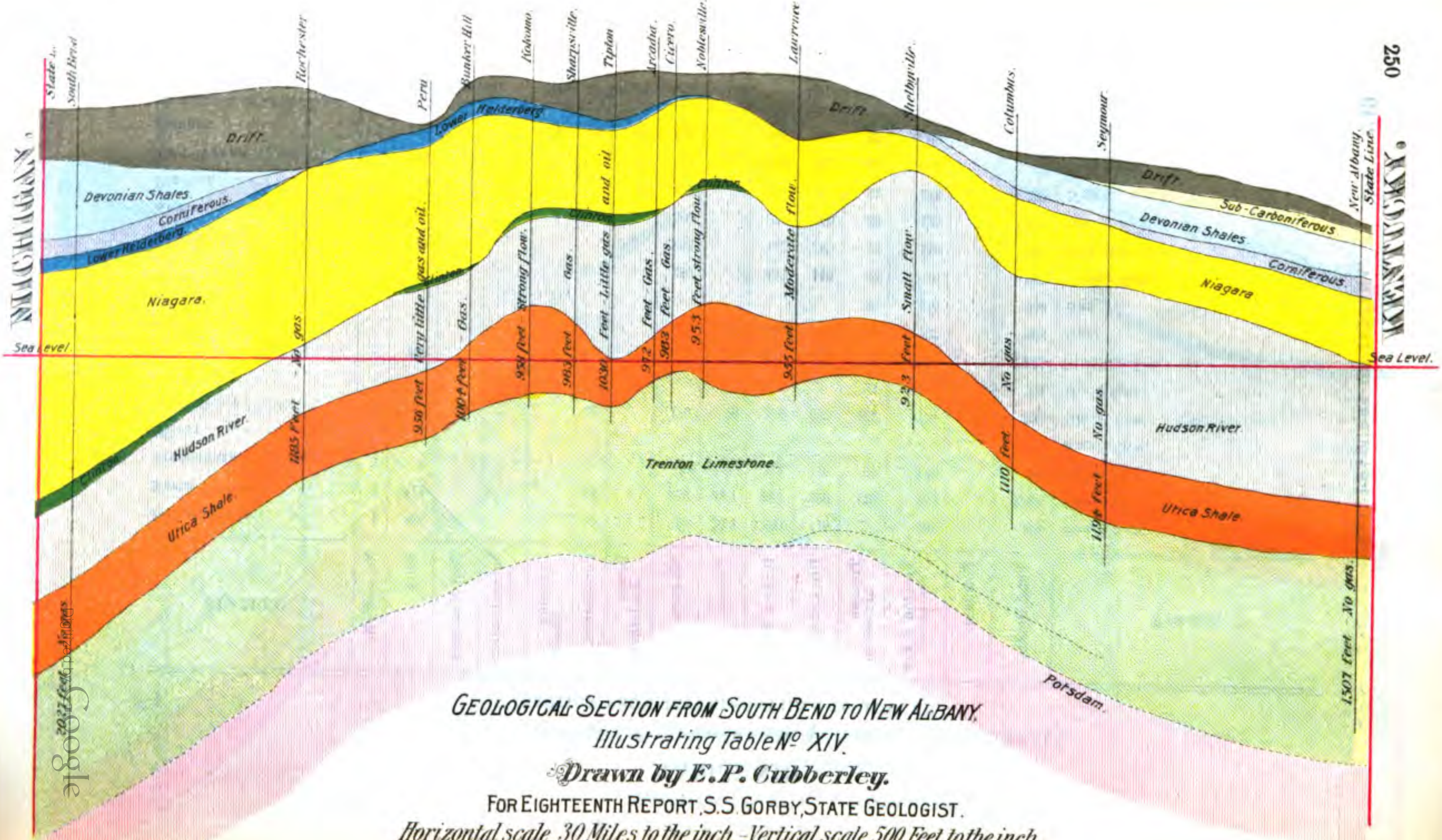
GEOLOGICAL SECTION FROM AUBURN TO JEFFERSONVILLE.
Illustrating Table No XIII.
Drawn by E. P. Cubberley.
FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.
Horizontal scale 30 Miles to the inch. - Vertical scale 500 Feet to the inch.

TABLE XIII.

SECTION FROM JEFFERSONVILLE TO AUBURN.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
Jeffersonville	1	*45	...	...	...	40	...	105	20 ?	500	146	...	401	...	856	Small flow.
North Vernon	1	*11	..	..	...	28	...	252	29 ?	440	220	470	253	...	1,450	‡Medium flow.
Greensburg	1	7	...	...	...	...	...	90	...	713	110	63	†22	...	983	Small flow.
Milroy	..	30	...	...	...	...	...	80	...	765		...	.....	...	875	Small flow.
Rushville	1	60	...	...	...	40	...	180	20	300	260	124	†124	...	984	Small flow.
Spiceland	1	...	...	...	...	...	...	...	...	...	...	28	†85	...	968	Good flow.
New Castle	2	243	...	...		...	...	5	...	452	235	78	†120	...	1,013	Medium flow.
Muncie	..	...	...	...		...	...	265	..	300	311	22	†97	. .	898	Gas.
Eaton	..	...	...	...	...	...	...	...	...	...	..	30	§10	...	950	Gas.
Hartford City	2	82	...	...	..	...	...	280	...	433	140	32	40	...	967	Strong flow.
Montpelier	1	17	...	...	..	...	...	233	...	432	280	19	110	...	981	Gas and oil.
Keystone	1	62	...	...	...	...	...	260	...	375	300	30	§125	...	1,027	Oil.
Bluffton	2	51	...	...	...	..	30	479	...	340	175	31	238	...	1,106	No gas.
Fort Wayne	2	110	...	...	...	..	34	571	...	410	312	21	650	...	1,458	Salt water.
Auburn	1	280	...	...	120	80	40	843	...	306	268	27	1,069	...	1,964	Gas.

*Alluvium. †Trenton above sea level. ‡Gas in Niagara Limestone. §Approximate.



GEOLOGICAL SECTION FROM SOUTH BEND TO NEW ALBANY.
Illustrating Table No XIV.
Drawn by E. P. Cubberley.
FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.
Horizontal scale 30 Miles to the inch, - Vertical scale 500 Feet to the inch.

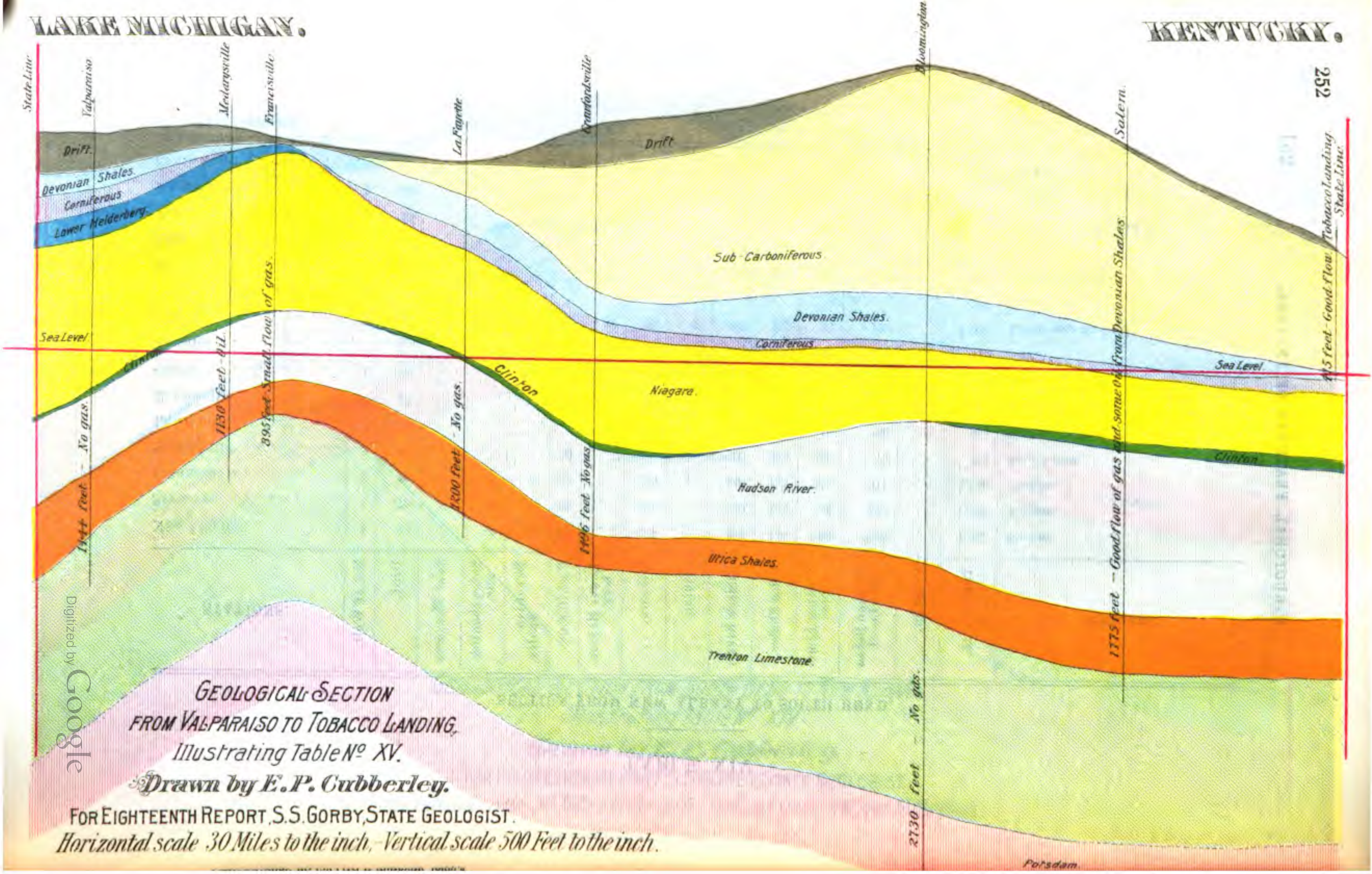
LITHOGRAPHED BY WILLIAM B. BURFORD, INDP'LS.

TABLE XIV.

SECTION FROM NEW ALBANY TO SOUTH BEND.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
New Albany	1	20	...	60	104	69	...	209	...	400	145	500	*575	...	1,507	No gas.
Seymour	1	75	...	15	115	20	...	190	...	520	165	94	472	...	1,194	No gas.
Columbus	1	26	...	..	87	32	...	235	...	440	135	155	311	...	1,110	No gas.
Shelbyville	1	48	...		...	30	...	102	..	500	157	86	79	...	923	Small flow.
Lawrence	1	188	.	...	...	...	...	272	...	300	155	40	*60	...	955	Moderate flow.
Noblesville	35	73	..	...	...	...	...	239	30	350	126	9	76	...	853	Strong flow.
Cicero	1	161	...	...	...	...	..	300	...	490		32	.....	...	983	Gas.
Arcadia	..	...	...	...	...	...	...	...	...	...	...	12	.....	...	972	Gas.
Tipton	1	139	...	...	...	...	30	260	36	400	132	33	129	...	1,030	Little gas and oil.
Sharpsville	1	...	...	...	...	...	...	...	...	...	...	8	.....	...	983	Gas.
Kokomo	4	61	...	...	...	..	59	270	30	265	251	22	97	...	958	Strong flow gas.
Bunker Hill	1	58	...	..	...	.	50	453	...	221	210	12	155	...	1,004	Gas.
Peru	2	10	...	...	...	..	50	405	15	249	200	27	229	...	956	Very little gas and oil.
Rochester	1	245	...	...	...	..	...	525	...	200	191	24	351	...	1,185	No gas.
South Bend	..	160	...	...	220	60	40 ?	640	40	220	200	427	855	...	2,027	No gas.

*Approximate.



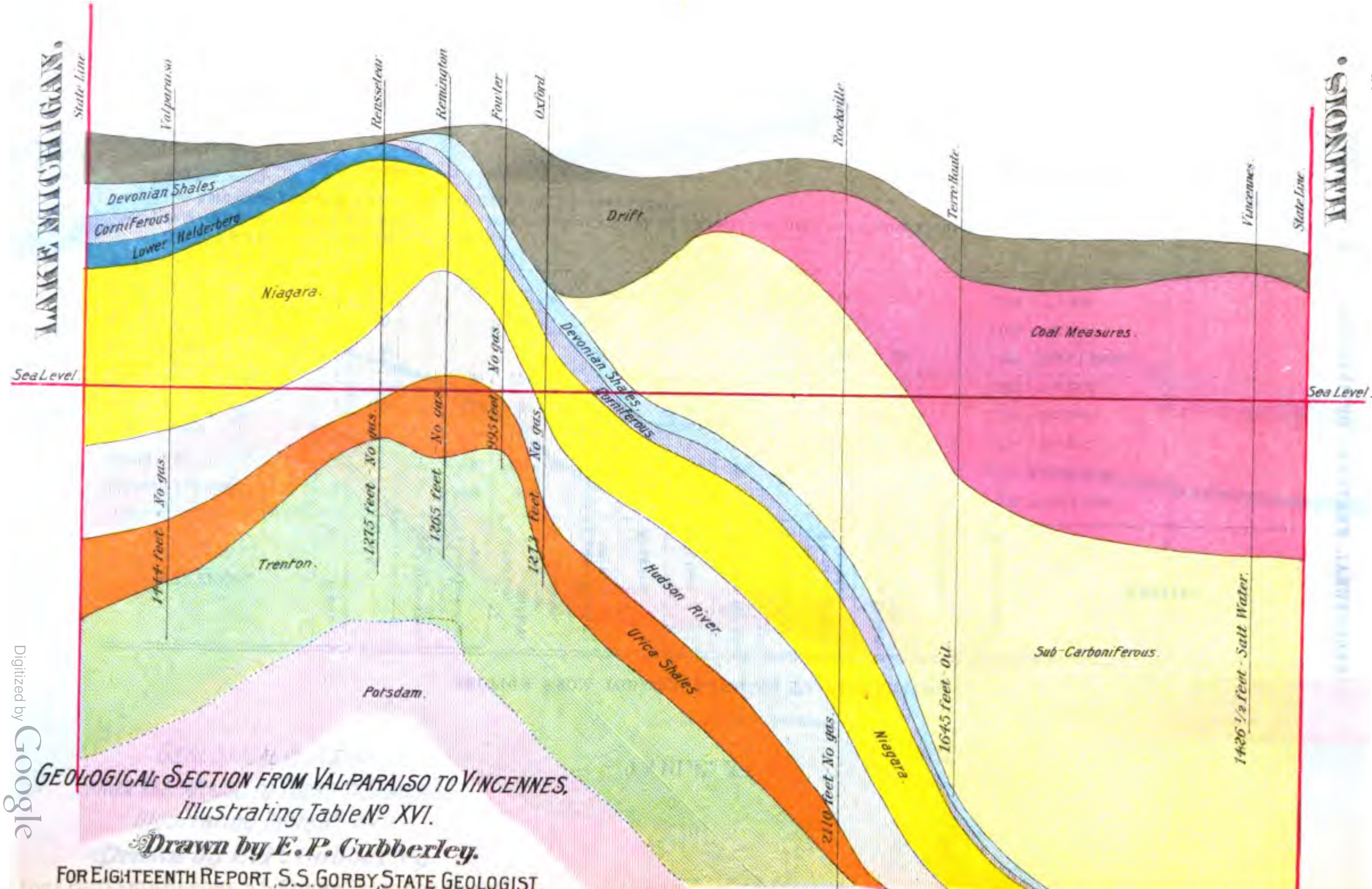
GEOLOGICAL SECTION
FROM VALPARAISO TO TOBACCO LANDING,
Illustrating Table No XV.
Drawn by E. P. Cubberley.
FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.
Horizontal scale 30 Miles to the inch, - Vertical scale 500 Feet to the inch.

TABLE XV.

SECTION FROM TOBACCO LANDING TO VALPARAISO.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
Tobacco Landing	1	. . .	. . .	405	10	.	. .	. . . .	. .	. . .	. .	. .	§400	. . .	415	*Good flow.
Salem	1	7	. . .	620	103	40	. .	215	30	535	180	45	1,000	. . .	1,775	†Good flow.
Bloomington	1	6	. .	749	155	15	. . .	240	. .	485	180	626	1,108	274	2,730	No gas.
Crawfordsville.	1	140	. . .	410	80	55	. . .	380 ? (Niagara and Clinton)		250	115	69	664	. .	1,496	No gas.
Lafayette	1	. .	. .	100	120	60	. .	350 (Niagara and Clinton)		200	198	72	548	. .	1,200	No gas.
Francesville	1	8	. .	. . .	. . .	. .	30	512		235	100	10	200	. .	895	‡Small flow.
Medaryville	2	50	. .	. . .	30	. .	60	480	10§	250	130	60	. . . .	. .	1,030	Oil.
Valparaiso.	1	125	. . .	. . .	65	70	80	495	10§	200	195	144	602	. .	1,444	No gas.

* Gas in good quantities in Devonian shales.
‡ Petroleum, at the rate of 25 barrels a day, was struck at a depth of 630 feet, and more on striking Trenton.
† Gas here came from the limestones underlying the Devonian shales.
§ Approximate.



GEOLOGICAL SECTION FROM VALPARAISO TO VINCENNES,
Illustrating Table No. XVI.
Drawn by E. P. Cubberley.
FOR EIGHTEENTH REPORT, S. S. GORBY, STATE GEOLOGIST.
Horizontal scale 30 Miles to the inch, - Vertical scale 500 Feet to the inch.

LITHOGRAPHED BY WILLIAM B. BURFORD INDP'LS

TABLE XVI.

SECTION FROM VINCENNES TO VALPARAISO.

STATIONS.	No. of Well.	Drift.	Coal Measures.	Subcarboniferous.	Devonian Shales.	Corniferous.	Lower Helderberg.	Niagara.	Clinton.	Hudson River.	Utica Shales.	Trenton Limestone.	Trenton Below Sea Level.	Potsdam.	Total Depth.	REMARKS.
Vincennes	1	80	? 845	? 501½	. . .	. .	. . .	. . .	. . .	. . .	. . .	. . .	*950	. . .	1,426½	Salt water.
Terre Haute	. .	150	573	922	. . .	.	. . .	. . .	. . .	. . .	. . .	. . .	*1,150	. . .	1,645	Oil.
Rockville	. .	96	259	689	102	62	. . .	370 (Niagara and Clinton)		324	108	10	1,412	. . .	2,110	No gas.
Oxford	1	385	. . .	. .	100	50	30	265	?	255	188	20	570	. . .	1,273	No gas.
Fowler	1	280	. .	. . .	92	45	. . .	228	. . .	185	155	. .	181	. .	995	No gas.
Remington	1	5	. . .	. . .	85	50	. . .	260	. . .	570 (Hudson River and Utica Shales)		295	†225	. . .	1,265	No gas.
Rensselear	. .	30	. . .	. . .	. . .	. .	35	500	. . .	225	100	385	158	. . .	1,275	No gas.
Valparaiso	1	125	. .	. . .	65	70	80	495	10 ?	260	195	144	602	. . .	1,144	No gas.

† Approximate.

* Bottom of well below sea level. In the case of Vincennes only approximate.

PALÆONTOLOGY.

BY S. A. MILLER.

SUBKINGDOM PROTOZOA.

CLASS PORIFERA.

FAMILY RECEPTACULITIDÆ.

RECEPTACULITES ELRODI N. SP.

Plate I, fig. 1, *lateral view; fig.* 2, *summit view; fig.* 3, *view of the tumid side; natural size.*

The illustrations will convey a good idea of this species, which is founded on a single specimen. It is a solid, arenaceous cast, not quite perfect at the base, and having a small piece chipped from one side.

Body somewhat pear-shaped in outline, one side much more tumid than the other, contracted toward the base and rounded toward the summit, with a well defined concavity in the crown, slightly inflected toward the least tumid side, and exhibiting several pores or openings, something like the crown of the well-known *Astylospongia præmorsa.*

The surface is divided into quadrangular, or more or less rhombic, elevated areas, of unequal size, formed by sigmoidial and longitudinal furrows that cross each other in quincunx. The furrows are of three kinds; the principal ones commence at the base, curve, at first, gently to the right, then become nearly transverse, and then curve upward and reach the summit concavity after having passed nearly around the specimen. These furrows are crossed, on the tumid side of the fossil, by furrows less sigmoidal, and on the less convex side by longitudinal furrows. At each crossing of the furrows a small pore may be seen penetrating the internal part of the body.

The silica in our specimen is rather coarsely crystalline, and does not appear to preserve any other characters than those described. It probably came from a limestone matrix, as it is not an uncommon thing to find silicious fossils in limestone strata of the Upper Helderberg Group at the locality in which it was discovered. It might be referred by some, on account of its form, to the genus *Ischadites*, but if that genus has a character that distinguishes it from *Receptaculites*, it consists in the single central summit aperture, while this species has a concave summit containing several apertures. I know of no species with which it might be confounded.

Found in the Upper Helderberg Group, near Hartsville, Indiana, by Dr. M. N. Elrod, in whose honor I have proposed the specific name. It is now in his collection.

SUBKINGDOM CÆLENTERATA.

CLASS ANTHOZOA.

SUBCLASS ZOANTHARIA.

FAMILY CYSTIPHYLLIDÆ.

CYSTIPHYLLUM GREENII N. SP.

Plate I, fig. 4, *a piece from the middle part of a specimen showing lateral expansions, cone within cone and vesicular structure, and rudimentary septa at the lower end; natural size.*

Corallum simple, conico-cylindrical, very much elongated, more or less curved, exterior irregularly constricted and throwing off, at irregular distances, funnel-like expansions, which, in some instances, are remarkably prolonged. Septa rudimentary, appearing only as striæ, composed of elongated cells on the inner side of the outer wall. Calyx deep, funnel-shaped. Composed of cellular tissue, which is irregular in form, generally large and arranged in layers from within outward. The largest vesicles are external. The epitheca is not preserved in our specimens, and no costæ are to be seen on the outer surface even where seemingly well preserved.

The corallum attached by an expanded base to some foreign object. The method of growth was by calicular gemmation causing the corallum to consist internally of a series of inverted cones, the newer within the older ones, the budding subcentral, the cones less than a line apart internally, and a number of them apparently converging together and producing on the concave side of the corallum external prolongations or funnel-like expansions an inch or more apart.

A specimen before me, six and one-half inches in length, with an expanded base of attachment, a diameter above the base of half an inch and at the top of nine-tenths of an inch, shows none of these prolongations. It appears externally as a solid corallum for two inches from the base, though the granular and vesicular structure is apparent and the surface is slightly pitted, and above this the large vesicles appear on the surface and the inverted cone structure becomes more and more apparent. The inference is that more than this length has been broken from the lower end of the specimen illustrated. I have three inches broken from the top of the specimen illustrated, and from these evidences it may be inferred that the fragment illustrated is part of a specimen two feet or more in length. Mr. Greene writes me that he has a specimen twenty-two inches long.

This species is distinguished by its method of attachment, extreme length, slow increase in diameter, lateral expansions at irregular distances, deep inverted conical calyces, rudimentary septa shown on the inner side of the outer wall, and large elongated vesicles. I do not know of any particular species with which it is necessary to make any comparison.

Found by G. K. Greene, in whose honor the specific name is proposed, in the Lower Helderberg Group, at the Falls of the Ohio, and now in his collection.

In the Thirty-fifth Report of the State Museum of Natural History of New York, Prof. James Hall named and briefly described fourteen new species of *Cystiphyllum*, without any illustrations. If one had all the types before him it would be much less work and require much less time to write original descriptions of them than it would to identify them from his names and descriptions, and it would require twenty times as much work to identify them from other collections as it would to write original descriptions. Such work, even by so eminent a palæontologist as Professor Hall, is a downright obstacle in the way of progress in learning, and ought not to be recognized. Indeed, unless he illustrates them in future, I very much doubt that any one will ever recognize all of them.

FAMILY CYATHOPHYLLIDÆ.

Amplexus cinctutus n. sp.

Plate I, fig. 5, point of attachment upward, natural size; fig. 6, another specimen, natural size, base downward.

Corallum simple, conico-cylindrical, elongate, slowly expanding, when complete more than six inches in length, curving more or less in the lower part, but substantially straight above, and profoundly constricted. Cup deep, margin thin. Longitudinal rays or septa very numerous in the outer wall, and in the expansions closely arranged, but most of them terminate within a short distance from the outer wall, the others approximate the center. Central part occupied by horizontal compact tabulæ, and spaces between the septa filled with coarse vesicular tissue. Exterior transversely wrinkled and when eroded showing small elevations at the junction of the cysts or vesicles with the septa; in either case showing a somewhat finely fenestrated or rectangularly roughened surface.

The corallum expands rapidly from the base and soon throws out abruptly a horizontal flange around the cup; commencing again within this flange it contracts slightly, then slowly expands for a short distance, forming a concave ring, and then throws out horizontally another flange or expanded margin of the calyx. This method of growth is repeated as the coral increases in length. The distance between the abrupt dilations or expansions of the cup does not seem to depend upon the diameter of the corallum, but varies from two-tenths to eight-tenths of an inch, as shown in our specimens. The expansions terminate in very thin edges and frequently give a depth to the annulations or constrictions equal to the distance between the expansions. It does not seem to be properly articulated, but the extraordinary expansions correspond with the articulations in typical species of the genus.

Found by Dr. Howard, in the Niagara Group, at St. Paul, Ind., and now in the State Museum, at Indianapolis.

? ? ? ? ? ? ?

Plate I, fig. 7, natural size.

This fan-shaped cast of some organism is on a blue limestone rock from the Niagara Group, at St. Paul, Ind., and belongs to the State Museum, at Indianapolis. It was collected by Dr. Howard. It appears from the fracture to have been attached to some other object, as shown in the upper end of the illustration. The surface is smooth, there is no ornamentation near the point of attachment, and it is radiately ribbed toward the margin. The circular margin of our specimen is broken and buried in the rock. The surface shows no pores or other structure. It will be noticed that the specimen constitutes nearly one-fourth of a circular plate and looks like a lady's fan partly spread out. A few years ago I saw the same organism from the magnesian limestone of the Niagara Group, at Chicago, Ill., and as I now recollect four of them formed a complete circle and constituted a single organism divided into four parts, and which had attached to some other object at the central part. It was suggested that it might be the operculum of some coral, but against this supposition is the fact that no coral has been found, either at Chicago or St. Paul, large enough for such an operculum, beside it does not resemble any known operculum. It is illustrated for the purpose of attracting attention to it, and with the hope and expectation that some one will be able to determine its relations. I have no knowledge as to what class in the animal kingdom it should be referred and, therefore, propose no name for it.

FAMILY CYCLOLITIDÆ. (?)

Microcyclus blairi, n. sp.

Plate IX, fig. 27, *a large specimen; fig.* 28, *a smaller one.*

Corallum very short, thin or discoid. Periphery sharp. Under side nearly flat and covered with a concentrically wrinkled epitheca. Upper side very slightly elevated centrally and abruptly bent down at the margin to the sharp periphery. Septa thick, one-half of them extend from the margin a little more than two-thirds of the distance to the center; and the other half, being intercalated or produced by bifurcation, extend from the margin one-fourth or less than one-fourth the distance to the center. In a small specimen there are about fifteen of the longer septa and very few of the shorter ones, some of which are indistinct, even at the margin; but in a large specimen there are about twenty-five of the longer septa and the same number of the shorter ones. The central area is smooth and nearly flat or has a small central tubercle. The fossette is shallow, slightly indents the smooth central area, and becomes obsolete before reaching the margin. Breadth of one of the largest specimens, .50 inch; height, .07 inch.

This species is comparatively thinner or shorter than *M. discus*, the septa approach more nearly to the center, and the fossette is wholly different, for in that species it is well defined and extends from the center to the margin. I have no confidence in the reference of this genus to the family *Cyclolitidæ*, for it probably belongs to an undefined family.

Found by R. A. Blair, in the Chouteau limestone, at Sedalia, Mo., and now in my collection.

FAMILY FAVOSITIDÆ (?).

Striatopora gorbyi, n. sp.

Plate VIII, fig. 1, *natural size, showing ramose method of growth, distribution of cells, and some rosettes of chalcedony on the lower part.*

Corallum ramose, solid, terete, and attaching, by a widely expanded, thin base, to some other object.

The type specimen branches in two equal parts within seven-tenths of an inch from the base; each division immediately branches again, one division rising nearly perpendicularly; and again within a very short distance each lower branch throws off a perpendicular ascending one, and again a bifurcation takes place in like manner, while the lower limb is gradually curving downward until it is nearly horizontal with the first division. The perpendicular ascending branches bifurcate at irregular distances and at varying angles, but there is a general disposition to throw off nearly horizontal branches, from which arise nearly perpendicular ones, or those ascending at angles varying from 75 to 90 degrees.

The cell apertures are distantly distributed over the base and lower part of the branches, but occupy nearly the whole surface of the smaller and higher branches; that is, they gradually approximate in the younger stages of growth. On the base the apertures are funnel-shaped and surrounded by slightly elevated margins, more or less distant from each other. On the branches they assume more and more the shape of a funnel, cut diagonally from one side of the top to near the pipe, which form becomes more and more elongated in ascending the branches. On the smaller branches these elongated half funnel-shaped cell mouths are separated only by narrow ridges and linear margins. The cell mouths are of unequal size and irregularly distributed over all parts of the corallum. They never alternate in regular order on any branch. The striæ are not visible in the apertures, on our specimen, and if they ever had an existence, as is quite probable, they were very delicate and have been obliterated.

Only two species, in this genus, have been described, from rocks of the same age, one, *S. huronensis*, from a mere fragment of a specimen, and the other, the type of the genus *S. flexuosa*. As the whole manner of growth and form of the cell apertures, in this species, is quite distinct from both, no comparison with either is necessary. The rosettes shown in the illustration are chalcedonized spots, which, of course, have nothing to do with the structure of the coral. The genus is usually classed in the Family Favositidæ, but I am by no means satisfied with the classification.

Found by Dr. Howard in the Niagara Group, at St. Paul, Indiana, and now in the State Museum at Indianapolis. The specific name is in honor of Prof. S. S. Gorby.

SUBKINGDOM ECHINODERMATA.

CLASS CRINOIDEA.

ORDER CYSTOIDEA.

FAMILY HOLOCYSTIDÆ.

Holocystites amplus, n. sp.

Plate II, fig. 1, *dorso-lateral view, natural size. Base broken off and specimen injured on the antero-lateral side.*

Body very large, elongate-subovate. Plates convex, very unequal in size and irregular in form, having from four to nine sides and a diameter from one to five-tenths of an inch. Owing to this diversity they are not disposed in ranges. All the plates are perforated by numerous pores.

The ambulacral orifice is situated centrally upon the apex of the summit and in the center of a triangle formed by three prominent arm bases. One of these arm bases is opposite the most tumid side of the specimen, and what appears to be the mouth is situated laterally outside the triangle. The plates are broken at this place and hence the mouth can not be described.

Our specimen has a diameter through the tumid side of two and one-half inches, and laterally about two and a quarter inches. The lower end is broken away leaving preserved about three inches in length. The length broken off can not be determined because we do not know whether the species was sessile, free or attached by a column and roots to some other object. If the plates in our specimen were thrown into ranges, there would be about eleven or twelve, and if the specimen were complete, it would show two or more additional ranges.

This species resembles *H. ventricosus* more than any other one heretofore described. It may be distinguished by its shorter and more ventricose form and smaller plates. The summit of *H. ventricosus* is unknown, but it is believed to be quite different from this species, because that which is preserved in the type specimen does not show the rounding in toward three large arm bases, which is a feature in this species.

Found near Madison, Indiana, in the lower part of the Niagara Group.

ÆTHOCYSTITES, N. GEN.

[*Ety. æthes*, unusual; *kustis*, bladder.]

This genus consists of the bodies of elongated, subelliptical cystoidea of undetermined family affinity. Probably they do not belong to any defined family. There are only three ranges of plates. In the first range there are only three plates; they form an obconical cup commencing from a small column. In the second range there are evidently five elongated plates, though none of our specimens show the entire circlet. The third range consists, as near as can be determined, of five much shorter plates. The plates are ornamented with wrinkles, and bear tubular ridges radiating from a central point, in the middle range, and which follow the longitudinal sutures or center of the first and third ranges, and have porous connection with the interior of the body. The plates do not possess pores after the manner of *Holocystites* or *Caryocrinus*, and no pores have been determined, except as above stated. Type, *Æ. sculptus*.

ÆTHOCYSTITES SCULPTUS, N. SP.

Plate II, fig. 2, side view, natural size.

This species, as well as the genus, is founded upon three specimens, one is illustrated, another shows the three basal plates, but no other characters not shown in the figure, and the other one is an imperfect cast on one side, and shows only part of two plates on the other.

The general form is subelliptical, being somewhat pointed at the lower end and more rotund above. It is very evident it possessed a column, because the facet for its attachment and the perforation are distinct. The three basal plates form an obconical cup, as high as wide, truncated below for a small round column. The plates are longitudinally wrinkled, and have a tubular ridge, from each upper angle to a smooth rim at the base; these run down the center of each plate and down each side of the longitudinal sutures. They connect with radiating tubular ridges, in the second range, notwithstanding they cross the transverse sutures. Pores pass through the plates from the beds of the canals, at varying distances from each other, which are open where the surface is eroded. The mouths of these canals or the outer orifices are not preserved.

As stated in the generic definition, I suppose there are five plates in the second range, and they have a length nearly equal to that of the first and third ranges. I will define a single plate, which is shown in the illustration. It is hexagonal; greatest length, 1.03 inches; diameter at the lower lateral angles, .70 inch; diameter at the upper lateral angles, .56 inch. The lateral sides are straight and converge a little upward. The plate is convex, and the summit of the convexity is below the middle, at which point there is a tubercle, from which a raised ridge radiates to each of the four lateral angles and to the lower angle, making five ridges. These ridges enlarge in their extension toward the angles; erosion has shown they are tubular a short distance from their commencement, and are connected with the internal economy of the animal by connecting pores. The three that radiate below connect with like tubular ridges in the first series of plates, and the two that radiate upward connect with like ridges in the central part of each plate, in the third series, which reach the summit. Between the two upper radiating ridges the plate is concave, the most so at the summit of the plate. Between the upper and lower radiating ridges the plate bears longitudinal wrinkles, which connect with like wrinkles on the plates above and below. Laterally between the radiating ridges the plate is transversely wrinkled, and the wrinkles connect with like wrinkles on the adjoining plates.

The plates in the third range are longitudinally convex or subangular in the central part and depressed at the sutures. Surface longitudinally wrinkled. Summit unknown.

Found by Dr. Howard, in the Niagara Group, at St. Paul, Indiana, and now in the State Museum, at Indianapolis.

FAMILY STRIBALOCYSTIDÆ.

STRIBALOCYSTITES GORBYI, N. SP.

Plate II, figs. 3, 4 and 5, lateral, summit and basal views; figs. 6, 7 and 8, azygous, summit and basal views of a smaller specimen.

Body globose, plates convex, sculptured, pores numerous; sutures beveled. Basals, four, unequal, longitudinally angular in the central part; deep columnar cavity, pierced by a small round orifice for the columnar canal. Six plates in the second series of unequal size, radiately sculptured, two pentagonal, two hexagonal and two heptagonal. The heptagonal plates are the larger plates in the series. The azygous plate is hexagonal, the plate on either side is heptagonal, the one opposite the azygous plate is hexagonal, and the one on either side is pentagonal. Eight plates, in the third series, of unequal size and not in line by reason of curving over the heptagonal plates in the second range.

The central summit plate bears a spine and is surrounded by six small convex plates, in the larger specimens, but in the smaller specimens there is no central summit plate, but five plates cover the summit, instead of seven, as represented in the larger specimens. Among some fossils such a difference would be valued as of specific importance, but among Cystideans it can hardly be so regarded. The mouth is prominent and excentric. Three pairs of pores pierce the top between the third range and the central summit plates, and there are two or three extra plates which are pierced at each pair, making about thirty-two plates in all.

This species is distinguished from *S. tumidus* by the sculptured plates, construction of the summit, arrangement of the orifices and porous character of the plates. These differences may be regarded as of generic importance, but I have treated them as only of specific value, because the fossils agree in the number and arrangement of the three ranges of plates. No pores were detected in the plates of *S. tumidus*; nevertheless, minute ones may exist, while in this species they are very distinct. In *S. tumidus* there is an ambulacral orifice in the center of the summit, while in this species, at the corresponding place, there is a spinous plate, or abutting plates, and no ambulacral orifice. The mouth, in this species, is surrounded with six plates, two of which, adjoining the third range, are very small, while in *S. tumidus* the plates separating the third range from the mouth are large. The three pairs of pores on the top is a character not represented in *S. tumidus*.

Found by Dr. Howard in the Niagara Group at St. Paul, Indiana, and now in the State Museum at Indianapolis.

ORDER AGELACRINOIDEA.

FAMILY AGELACRINIDÆ.

AGELACRINUS BLAIRI, N. SP.

Plate II, fig. 9, *magnified two diameters.*

This is a small species founded upon a single specimen that is on the arms of a *Batocrinus*. It is a little injured at the margin, but otherwise almost perfect. The body is circular, moderately and evenly convex above, and conforms to the arms of the *Batocrinus* below. The disc or outer rim is composed of numerous squamiform imbricating plates; those on the margin are the smaller ones, and they increase in size toward the inner part of the rim. The plates in the disc are proportionally smaller and more numerous than they are in *A. cincinnatiensis* or *A. pileus*. The arms are slender, depressed nearly even with the surface of the body, radiate from the central part of the body toward the rim in nearly straight lines, four of them curving slightly to the right and the other curving slightly to the left. They are composed of interlocking plates, without, so far as can be discovered, any small intercalated ones. The aperture is in the central part of the area between the sinistral and dextral arms. The interbrachial areas are covered with a few rather large imbricating plates. The arrangement of the plates at the summit is peculiar, but they are so minute and the sutures are so obscure that it is very difficult to determine their disposition.

This species is so different from all others that have been defined that no comparison is necessary. Found by R. A. Blair in the Keokuk Group, at Boonville, Missouri, and now in my collection. The specific name is in honor of the collector.

ORDER BLASTOIDEA.

FAMILY STEPHANOCRINIDÆ.

STEPHANOCRINUS CORNETTI, N. SP.

Plate II, fig. 10, *shows the length of a specimen, but it is much croded and broken away; fig.* 11, *summit of another specimen: fig.* 12 *shows the surface ornamentation, but it is broken at both ends.*

This species is remarkable for its great length. The three basal plates form a solid, truncated, obpyramidal body more than a half inch in length, and about two and a half times as long as the greatest diameter. It is hexagonal in transverse section, but unequal sided. The surface is transversely lined. The five radial plates are longer, including the radial limbs, than the basals, and expand a little more rapidly. Transversely, they are hexagonal in the lower part, with unequal sides, and have a suture in the middle of each side, and a central longitudinal ridge in each plate. Toward the top each side becomes more and more convex until obtuse angles are formed at the sutures. They are very deeply excavated above for the reception of the ambulacral structure. The surface is longitudinally lined in the flat areas, and transversely lined on the angular ridges. The summit is only slightly convex over the ambulacral areas. There is one thin, wedge-shaped plate in each interambulacral area, one of which is truncated by a round anal opening. The ambulacral opening is large, pentagonal, and covered with five plates. The ambulacra have a small central ridge.

The slender form, extreme length, long radial limbs and surface ornamentation will distinguish this form from all other species.

Found in the Niagara Group, at Madison, Indiana. The specimens represented by figures 10 and 11 belong to Mr. J. F. Hammell, and figure 12 to Prof. Geo. C. Hubbard. The specific name is in honor of Dr. W. T. S. Cornett, a geologist and naturalist of Madison, Indiana.

ORDER PALAEOCRINOIDEA.

FAMILY PLATYCRINIDÆ.

Platycrinus caducus, n. sp.

Plate II, fig. 13, *natural size.*

Calyx small, bowl-shaped, wider than high; plates convex, sutures beveled, surface granular. Column large. Basals low; upper faces concave for the reception of the first radials. First radials wider than high, slightly expanding above; articulating facets for the second radials about three-fourths the width of the plates and sloping downward and outward in the central part of the plates; upper faces slope laterally from the articulating facets to the sutures, for the reception of the small interradials. Second radials short, axillary. There are two secondary radials in each series, the second one of which is axillary. One of the inner arms in each series bifurcates again on the second plate, which gives to each series five arms, or twenty-five arms in the species. The arms are rather large in proportion to the size of the calyx, and consist of a double series of interlocking plates following one or two cuneiform plates resting on the axillaries.

This seems to be a smaller species than *P. æternalis*, the calyx is less angular, there are only twenty-five arms instead of thirty, and fewer cuneiform plates in the arms, before the commencement of the double interlocking series. It need not be compared with any other defined species.

Found by F. A. Sampson, in the Keokuk Group, at Boonville, Missouri, and now in his collection.

Platycrinus chouteauensis, n. sp.

Pate II, fig. 14, *basal view; fig.* 15, *first radial magnified two diameters.*

Species large. Calyx broadly bowl-shaped, being twice as wide as high; plates thick; sutures beveled; surface roughly granular. Some of the granules coalesce in lines, as seen on the best preserved plates, but the more common ones are so worn as to be nearly smooth; edges of the plates denticulated to hold the plates in place and give strength to the body.

Basals form a low pentagonal, saucer-shaped cup or disc, with a rather large columnar depression, which is radiately furrowed for the articulation of the column. First primary radials a little wider than high, sides slightly expanding from below, but straight or slightly contracted above; most convex at the articulating facets which are quite prominent. Articulating facets for the second radials transversely elliptical, with a protruding outer rim, occupying more than two-thirds the width of the plates and having the lower line at the middle of the plates. The facet is deep, has a transverse articulating ridge in the central part, with a serrated edge below it, and an elongated pit on each side of the ambulacral notch. Each plate has a deep ambulacral notch, acutely angular below, and on each side of this notch on the upper face there are two facets for abutting plates; hence, two secondary plates or one secondary and one tertiary plate united with the first radials in this species. First interradials not large. Arms unknown.

The general form, articulating facet, deep ambulacral notch and double articulating facets above, will distinguish this from all other described species.

Found by R. A. Blair, in the Chouteau limestone, at Sedalia, Mo., and now in my collection.

Platycrinus colletti, n. sp.

Plate II, fig. 16, *basal view, natural size; fig.* 17, *first radial magnified two diameters.*

Species medium size; calyx saucer-shaped; height to width, about as three to five; plates not very thick; sutures beveled; surface covered with tuburcles, which, when well preserved, run together and give it a rough and shaggy appearance.

Basals form a low pentagonal saucer or disc, with a medium sized columnar depression surrounded with a rim that extends a little below the end of the attaching column. First primary radials nearly one-fourth wider than high; sides straight and rapidly expanding from below to the upper lateral angles; most convex at the articulating facets, which have a slightly projecting rim nearly perpendicular to the diameter of the calyx, and are only slightly excavated within it. A facet is rather more than a half circle, occupies about one-half the width of a plate, and is located centrally in the upper half of a plate and bears a slightly concave depression, indicating the place for the ambulacral furrow. Each superior lateral angle of a plate is truncated from the margin of the facet to the suture for the reception of the interradials. First interradials large. Arms unknown.

The general form, surface ornamentation, articulating facets and large interradials, will distinguish this from all other described species.

Found by R. A. Blair, in the Chouteau limestone, near Sedalia, Mo., and now in my collection. The specific name is in honor of Prof. John Collett, late State Geologist of Indiana.

FAMILY RHODOCRINIDÆ.

Rhodocrinus benedicti, n. sp.

Plate II, fig. 18, *lateral view; fig.* 19, *summit view; fig.* 20, *basal view, natural size.*

Species small; calyx globular, rounding over to the base of the arms; diameter in the central part greater than the height to the arm bases; sutures distinct; plates convex, some of them being angular in the center or of a low pyramidal form. Basals small, forming a slightly depressed flattened pentagonal disc about twice the diameter of the column. Subradials, the larger plates of the body, highly convex in the central part, with ridges extending to each adjoining plate. First radials nearly as large as the subradials, heptagonal, convex, and having less conspicuous ridges extending to the adjoining plates than characterize the subradials. Second radials smaller than the first, convex, pentagonal. Third radials about as large as the second, pentagonal or hexagonal, axillary, and supporting on each upper sloping side two tertiary radials, the second one bearing an arm, which gives to the species ten arms. In one of our specimens there are only two primary radials in one of the series which is probably abnormal.

Regular interradials, ten; the first one truncates a subradial, the last three or four are quite small. Azygous interradial area much like the regular areas, and having only one or two more small plates. One intersecondary radial in each series. Vault convex or tumid and covered with numerous small highly convex plates. Column round and composed near the head of alternately thicker and thinner plates. Columnar canal small and round. This is a marked species that will not be confounded with any hitherto described.

Found by A. C. Benedict, in the Keokuk Group, in Harrison County, Ind., and now in his collection. The specific name is in his honor.

FAMILY ACTINOCRINIDÆ.

Actinocrinus sedaliensis, n. sp.

Plate III, fig. 1, *azygous side view of a calyx somewhat injured in the middle part; fig.* 2, *cast of the azygous side of another specimen; fig.* 3, *cast of the vault of the same specimen, only part of the outlines of the plates can be distinguished.*

Calyx large, elongated, urn-shaped, deeply depressed between the arm-bases, giving the upper part a subpentagonal outline; plates thick and tumid; sutures distinct; surface without sculpturing or other ornamentation.

Basals three, pentagonal, standing somewhat upright, very thick and tumid in the lower third, and together forming a low, bowl-shaped cup. The tumid plates give the base a somewhat truncated aspect. First primary radials large, longer than wide, tumid in the central part, three hexagonal and two heptagonal. Second primary radials about one-third the size of the first, longer than wide, tumid in the central part, hexagonal. Third primary radials about two-thirds the size of the second, longer than wide, some of them octagonal, the form of the others not determined. Only a single small secondary radial can be distinguished in our specimens, and no tertiary radials. The structure is such at this place, I am half inclined to think the species may belong to Steganocrinus rather than Actinocrinus, and this view would have support in the structure of the vault.

First regular interradials, hexagonal, larger than the second primary radials, followed by two smaller plates, hexagonal and heptagonal. There are three plates in the third range, in some areas, which separate the third primary radials, and four in others. Above the third range the plates continue over the vault without any line to distinguish the interradials from those of the vault. The first azygous plate is in line with the first primary radials, rather smaller, hexagonal, and followed by two hexagonal plates, each of which is as large or larger than a second primary radial; there are three plates in the third range and six in the fourth, which separate the third primary radials. Above the fourth range the plates graduate into those of the vault without any line to distinguish them.

Vault convex, covered with tumid, polygonal plates, depressed toward the interradial areas and having prominent rounded ridges directed to the arm openings. Proboscis is subcentral, the first plates of which are rather large and thick.

The cast of the calyx of this species is distinguished by being more pointed below, an appearance resulting from the removal of the thick, tumid basals and first primary radials. The vault shows more abrupt depressions of the interradial spaces, and each ridge directed toward the arm-openings bears a central depression that is not shown when covered with the plates. There were evidently only ten arm-openings to the vault, but the ambulacral passages were so large, they indicate very robust arms, which may have divided immediately above the part preserved in our specimens.

This species is distinguished from all others by its large, elongate form and smooth, tumid plates.

Found by F. A. Sampson in the Burlington Group, at Sedalia, Missouri, and now in his collection.

Dorycrinus elegans, n. sp.

Plate III, fig. 4, *azygous view of calyx; fig.* 5, *summit view of calyx.*

Calyx medium size, somewhat obconoidal, most rapidly expanding toward the arm bases, truncated below; vault depressed convex; sutures well defined, slightly beveled; plates convex; surface granular.

The basals are thick, subpentagonal, nearly perpendicular to the column, and project half their length below the point of attachment, so as to leave a rather deep, round columnar pit; column less than half the diameter of the base. First primary radials larger than the second and third together, a little wider than long, slightly expand from the base to the upper lateral angles; three hexagonal and two heptagonal. Second radials quite small, quadrangular, and nearly twice as wide as high. Third radials larger than the second, expand from the base to the upper lateral angles, twice as wide as high, three of them pentagonal; the one on each side of the azygous area being slightly truncated at its upper lateral angle by a regular interradial plate gives these two a regular hexagonal outline, and each bears upon its upper sloping sides two secondary radials. First secondary radials are about one-half wider than high and of unequal size and shape, some being quadrangular and others pentagonal by reason of abutting two interradials. Second secondary radials more than twice as wide as high, pentagonal and hexagonal, and supporting on the upper sloping sides single tertiary radials. There are four tertiary radials in each radial series, and twenty arm openings to the vault.

Regular interradials, three in each area; the first one about two-thirds as large as the first radials, rather longer than wide, and having eight or nine sides; those having nine sides abut against a first secondary radial. The other two are small, more or less elongated—in some areas nearly equal in size, in others very unequal. They are separated from the vault plates by the tertiary radials. The first azygous plate is longer than wide, heptagonal, larger than a first radial, and supports three plates in the first series, three in the second series, and above this, as shown by our specimen, a single elongated plate separates the tertiary radials and extends to the thickened protuberance surrounding the azygous or anal opening. The plates in the first series are somewhat smaller than the first regular interradials, and the middle one shorter and smaller than the lateral ones. The plates in the second series are not half as large as those in the first, and the middle one is proportionally still more reduced The elongated plate occupies a rather deep sinus between the tertiary radials, and may consist of two or three plates which are anchylosed in our specimen.

The vault is slightly elevated above the arm openings, flat on top and covered with convex, polygonal plates of unequal size A rather large, subcentral plate is surrounded by four plates of about the same size, two small plates and one side of the thickened protuberance surrounding the aperture. The number of plates in this thickened protuberance can not be ascertained from our specimen From the distal sides of the four large plates surrounding the central one, as above described, one or two elongated plates separate the radial series. Between these there are four plates covering the subtriangular space between each angle formed between the large plates and the four arm openings. The one in the angle is the larger one; the two lateral ones are highly convex or tumid, and these are separated by a smaller plate.

The arms are unknown, but if there were two arms springing from each arm opening, as is usual in this genus, there would be forty arms.

Collected by F. A. Sampson, in the Burlington Group, near Sedalia, Missouri.

ACTINOCRINUS (?) CHOUTEAUENSIS, N. SP.

Plate III, fig. 9, *azygous view; fig.* 10, *summit view; fig.* 11, *basal view, all natural size.*

This species clearly belongs to the family *Actinocrinidæ*, and is as nearly related to *Actinocrinus* as to any other genus in the family, though it appears to be as far removed in structure from that genus as *Dorycrinus* or *Eretmocrinus*. The vault is essentially different from other genera, and for that reason there are authors who would not hesitate to make it the type of a new genus; but I am convinced they have laid too much stress on this part of some fossils, beside I have only a single specimen and the establishment of a new genus may be safely left to the future.

Calyx medium size, obpyramidal, moderately truncated below, pentagonal above, secondary radials directed outward; columnar cavity deep; vault slightly convex; sutures well defined, beveled more or less; plates tumid; surface granular, not sculptured.

Basals three, thick, tumid, sharply rounded into the columnar cavity, pentagonal, twice as wide as high, project more than half their length below the point of columnar attachment, leaving a deep, round columnar pit. Column less than half the diameter of the base. First primary radials very large, tumid, as long as wide, very moderately expanding from the base to the upper lateral angles; three hexagonal and two heptagonal. Second radials about half as large as the first, hexagonal, tumid, a little wider than high. Third radials smaller than the second, pentagonal, twice as wide as high, expand from the base to the upper lateral angles, and bear upon each of the upper sloping sides, a single secondary radial. Secondary radials, short, directed outward from the calyx at an angle of forty-five degrees, pentagonal, and bear upon each of the upper sloping sides tertiary radials which support the free arms. Arm openings to the vault twenty.

Regular interradials, four in each area; the first one rather larger than the second primary radials, tumid, hexagonal, and supports two interradials on the superior sloping sides. The two in the second range are each larger than a third primary radial. hexagonal, and support between the upper converging sides the fourth interradial, which separates the radial series and unites with the plates of the vault. First azygous plate in line with the first primary radials, hexagonal, longer than wide, and supports two plates in the second series, one of which is hexagonal and the other heptagonal; these are followed by four plates in the third series, which are succeeded by a single plate that separates the radial series and unites with the plates of the vault, adjoining the azygous opening.

The vault is depressed convex, being elevated only the thickness of the plates over the radial areas, and depressed somewhat in the interradial areas. The central plate is small, pentagonal, and surrounded by the five larger plates of the vault, one of which, on the azygous side, is much larger than the others, and to which the radial series are directed. Outside of this ring of five tumid plates a single subspinous radial dome plate is followed, in each radial series, by two subspinous radial plates, one of which is located above each double series of arm openings, at the margin of the vault. The interradial dome areas are depressed and covered with two plates, followed by one that reaches the superior interradial in the calyx. The large plate, as shown in the illustration, may include part or all of the azygous opening, but the azygous opening appears to be small and located immediately below it. The specimen is a little defective at this place, and hence I am not overconfident that the azygous opening is shown correctly in the illustration. The radial channels being directed to this large plate shows that it can not represent any part of the azygous opening unless the vault in this species is constructed differently from all other known crinoids. It shows no indications of sutures or divisions of any kind, and, hence, while it is so different from all other crinoids, as I have interpreted it, nevertheless I think the illustration is correct.

In *Agaricocrinus*, by way of example, the central dome plate is the largest plate in the body, and the radial series are directed to it; in this species the central dome plate is small, and the largest plate of the body is between it and the azygous orifice and the radial series are directed to it. As this species possessed no proboscis, those who think one is essential to an *Actinocrinus* must refer it to an undefined genus.

Found by F. A. Sampson, in the Chouteau limestone, near Sedalia, Missouri, and now in his collection.

AGARICOCRINUS SAMPSONI, N. SP.

Plate III, fig. 8, *natural size; the specimen is on a slab in high relief.*

The calyx is slightly concave in the region of the basal plates, extending to the middle part of the first primary radials; it then gradually rounds over on the radial series, but rapidly curves into the interradial areas. The calyx is, therefore, nearly flat, except as to the sunken interradial fields, which gives it a remarkably strong pentalobate aspect. The surface of the plates is smooth.

The basal plates expose an hexagonal ring surrounding a small, round column, composed of thin plates with radiately lined faces. The first radial plates are the largest plates in the body; width greater than length; three hexagonal and two heptagonal. Second radials very short and very difficult to determine in the type specimen. Third radials short, pentagonal, and on each upper sloping side support a single secondary radial. Secondary radials very wide, thin, and arch around toward the vault, pentagonal, and support upon each upper face a double series of arm plates.

There are ten very large arms arranged in five pairs, which are united by the first two adjacent plates in each pair. Each arm consists of a double series of plates, alternately arranged and united in the middle of the dorsal side of the arm by a zigzag suture. The arms are directed almost or quite horizontally from the calyx, and though they may have been more or less flexible toward the distal ends, it does not appear they ever could have curved upward at or near the calyx on account of the great depth of the arms from the dorsal to the ventral side.

The first regular interradials rest on the upper lateral sides of the first primary radials and curve upward toward the vault, so that the succeeding interradials, if any exist, which is very doubtful, are remarkably small and not visible in a basal view of the calyx. The first azygous plate is in line with the first primary radials and of the same form and of the same length, but a little narrower, heptagonal, and supports upon each upper lateral side a single interradial, and upon the superior face either a single or a double plate that curves upward to the vault.

This species is remarkable for the proportionally large arms, very short second primary radials, small secondary interradials and its general form.

Found by F. A. Sampson in the Chouteau limestone, near Chouteau Springs, Missouri, and now in his collection. The specific name is in honor of the collector.

AGARICOCRINUS BLAIRI, N. SP.

Plate III, fig. 12, *summit view; fig.* 13, *lateral view of calyx; fig.* 14, *basal view of calyx, all natural size.*

Species medium size. Calyx very low, moderately concave in the region of the basals and primary radials, then gradually rounds over on the radial series, but rapidly curves into the interradial areas. The concavity at the place of attachment of the column extends deeper or higher than the dorsal side of the first arm plates. The outline of the top of the calyx is subquadrate rather than subpentagonal, for the lateral sides are nearly straight, but slightly expand from a shorter, nearly straight azygous side, while the side opposite thereto is the longer one and arched from the lateral angles; plates smooth or granular.

Basals small, extending so slightly beyond the column they are hard to distinguish in a basal view. First radials moderately large, length equaling the width; three hexagonal and two heptagonal. Second radials nearly as large as the first, quadrangular, about one-half wider than long Third radials pentagonal, more than twice as wide as high, inferior lateral sides rapidly diverging, and superior sloping sides supporting single secondary radials. Secondary radials wide, thin, arch around toward the vault, pentagonal, and support upon each upper face a double series of arm plates, except the ray opposite the azygous side, which supports a single series of arm plates only, on each side.

There are nine arm openings to the vault and only nine arms in this species There are two arms for each radial series, except the one opposite the azygous side, which has only one. The arm plates preserved show the arms consisted of a double series of short plates, united by the usual zigzag suture.

The first regular interradials rest on the upper lateral sides of the first primary radials and curve upward toward the vault. They do not appear to reach the two plates shown in the interradial areas on the vault, but the connection appears to be cut off, at least in some of the areas, by the arm plates coming in contact with each other. The first azygous plate is in line with the first primary radials and of the same form and length, but only half as wide; it is followed by three plates in the second range, the middle one being quite narrow and having nearly straight sides; and these are followed in the third range by two elongated plates that separate the radial series and unite with the vault plates.

Vault low, convexity very little more than the thickness of the plates, and covered with numerous slightly convex, polygonal plates. The large, tumid plates that usually extend from the arms to the summit, in this genus, do not characterize this species. A moderately large, tumid plate occupies the center and the small azygous orifice adjoins it, a rather large plate separates each of the four double series of arm openings, otherwise the plates are small and therefore quite numerous.

The depressed short body, subquadrate outline of the calyx, small plates of the vault and nine arms are features that distinguish this species from all others.

Found by R. A. Blair and F. A. Sampson in the Chouteau limestone at Sedalia, Missouri. The specific name is in honor of one of the collectors. The type is in Mr. Sampson's collection.

BATOCRINUS DIVALIS, N. SP

Plate III, fig. 6, azygous side of calyx and vault, showing part of two radial series; fig. 7, showing calyx and arms, specimen somewhat crushed, and the sutures of a few plates destroyed, natural size.

Species large. Calyx depressed, shallow, saucer-shaped; each radial series bears a low angular ridge from the basal plates to the free arms. There are eighteen arm bases with the openings directed horizontally. Surface smooth.

Basals three, forming a pentagonal disc, very little larger than the column. First primary radials nearly twice as wide as long, upper faces slightly arcuate, for the reception of the second radials. Second radials quadrangular, twice as wide as long, greatest length in the central part, as both the upper and lower faces are slightly convex. Third radials about twice as wide as long, and supporting on the upper slightly sloping sides the secondary radials. Secondary radials two in each of eight series, and four in each of the other two series. In the two series opposite the azygous area there are no tertiary radials, but two free arms arise from the last plate in each. There are two or three tertiary radials in each of the sixteen series, from the last of which two free arms arise, making thirty-two arms from four of the primary radial series, and four from the other one, or thirty-six arms in all. The arms consist of a double series of plates from the beginning, the inner ones being very short, until the arms are fully separated. Arms long, strong, and bear coarse pinnules.

First regular interradials, decagonal, larger than any other plates in the calyx, and rest between the lateral sloping sides of the first primary radials, and between the second and third primary radials and the first secondary radials. It is followed by two small plates in some of the areas, and one in others, which unite with plates of the vault. The azygous area has one plate in line with the first primary radials, which is followed by three plates, and these by three, the middle one reaching the plates of the vault. Vault convex, a little depressed in the interradial areas, covered with convex polygonal plates, and supporting a subcentral proboscis.

This species is distinguished from all others by the depressed calyx, angular ridge on the radial series, interradials connecting with the plates of the vault, and by having thirty-six arms.

Found by R. A. Blair, in the Keokuk Group, at Boonville, Missouri, and now in my collection.

BATOCRINUS.

In 1854 Samuel A. Casseday described the genus *Batocrinus* and the species *B. icosidactylus* and *B. irregularis*, in the German language in Abdruck a. d. Zeitschr. d. deutschen geologischen Gesellschaft Jahrg. 237, and also illustrated both species. The work has never been translated into the English language, nor his figures reproduced. Through the kindness of Victor W. Lyon, of Jeffersonville, Indiana, I have been permitted to copy the illustrations, and have been furnished with a manuscript translation of the entire article, which I take great pleasure in making part of this palæontological report. I have changed the numbers of the figures on the plate to make them conform to the other numbers, or what he called "Figur 1, 1a, 1b, 1c, und Figur 3," I have marked 1, 2, 3, 4, 5, and his fig. 2, 2a, 2b, 2c, I have marked 6, 7, 8, 9. The translation may also be called a liberal one to conform to the present system of nomenclature, though I believe nothing is omitted from the article. The translation is as follows:

"DESCRIPTION OF A NEW GENUS OF CRINOIDS FROM THE MOUNTAIN LIMESTONE OF NORTH AMERICA, BY MR. CASSEDAY, OF LOUISVILLE, KENTUCKY.

(The fossils are from the Warsaw Group.)

"The number of Crinoids distributed through all the Western States of North America, in the Palæozoic beds is astonishing, it probably surpasses that of the continent of Europe, and will for a long time offer an extremely rich field of the most varied interest and greatest instruction to the researches of the Geologist and Palæontologist. Since the report of Prof. Troost to the Legislature of Tennessee, containing 16 new generic names with 88 new species, at least 15 new species have been found in Kentucky, Indiana and Illinois, although but few portions of these States have been examined. Of these a considerable number have been described by Prof. Yandell and Dr. Shumard, and will shortly be published by the Smithsonian Institution.

"In the following pages I give the description of one of the numerous hitherto unknown forms of American Crinoids, which I propose to distinguish as a new genus, under the name of Batocrinus (Etymology, *batos* and *krinon*). The principal locality of this Crinoid is twenty-five English miles from New Albany, Indiana, at the foot of Spurgen Hill, in a railroad cut. Considerable masses of limestone were blasted off and were knocked into fragments and distributed along a new road, where they had been exposed to the atmosphere for about four years. The limestone gradually disintegrated and brought to light an immense number of fossils, almost completely separated from the rock, amongst which were the remains of the Batocrinus, most of them almost completely preserved. Other specimens of the genus I found at another place in the neighborhood, but according to my researches, it is wanting at Salem, and only reappears on the same railroad between Cooperstown and the White River. A Crinoid resembling the Batocrinus is found seven English miles further on, near Bedford. These beds belong to the Carboniferous System, which is probably similar to that of Scottsville, in the neighboring Kentucky. I distinguish two species of the genus Batocrinus."

I. Batocrinus icosidactylus.

Plate IV, figs. 1, 2, 3, 4 *and* 5.

"The column of this Crinoid I can only describe from memory, since I have brought no specimens of it with me to Europe. It is small and has a five-sided alimentary canal; its joints are throughout of about the same thickness and character. The calyx is depressed conical, and at the place of attachment of the arms sharply separated by a ring from the upper cover or vault. The base at the extremity of the column is cup-shaped and hollow, showing radiating striæ of the last joint of the column. There are three basal plates, two of which are somewhat larger than the third. After these, six pieces form a closed circle, five of them are regular radial plates of the first order (first primary radials), the sixth is an irregular interradial plate (first azygous plate). On the upper concave side of each radial piece of the first order are placed the radial plates of the second order (second primary radials), of an almost quadrangular form; above these are the radial plates of the third order (third primary radials or axillary radials), of a transverse, five-sided shape, with an obtuse angled summit. Upon each axillary radial plate there are two small plates (secondary radials), each of which supports a plate pointed at its upper extremity (second secondary radials). Upon these latter there are upon the sloping sides of the calyx two more longitudinal rows of commonly, three more rarely, two narrow distichal plates (tertiary radials), which immediately conduct to the twenty arms.

"Between the radial plates of the second and third order, and between the lower distichal radial plates (second and third primary radials) there are interradial plates all around, but the plates of the upper distichal radial rows (tertiary radials) join immediately together, so that the points of attachment of the arms form a closed circle at the border of the calyx. Thus on the side of the calyx five isolated interradial fields are formed, the plates of which are not connected with those of the superior row of the calyx (not connected with the plates of the vault). We distinguish four small interradial fields from an odd larger one at the side, where there is an interradial plate already inserted between two radial plates of the first order (four regular interradial areas and the azygous interradial area). In the four smaller interradial fields there is a large six-sided (eight-sided) interradial plate which joins inferiorly to two radial plates of the first order, and fills the entire space between the radial plates of the second and third order. Above these are generally two smaller plates, one of which is a little larger than the other, inserted between the lower distichal radial plates (secondary radials); sometimes they are entirely wanting. In the odd larger interradial field (azygous area), above the single odd interradial plate of the first order, there are three other interradial plates, a median and two lateral ones, placed on the three upper sides of the six-sided radial plate of the first order. Above the median interradial plate there are sometimes one or two small rudimentary plates.

"On none of my specimens were the arms preserved. Among about fifty specimens there was but one abnormal, with twenty-one arms, instead of the regular number, twenty.

"The superior cover of the calyx is highly conical and covered with numerous strong spines, which afford a very prominent distinguishing mark of the species. It is prolonged above into a large tube of double the length of the calyx. It is likewise covered with strong spines.

"The sculpture of the surface consists, on the plates of the cover of the calyx, of fine, close, almost microscopic granulated lines, starting from the center and becoming more prominent toward the border. On the spines they become circular; I could not observe the very rarely preserved sculptures on the lower side of the calyx.

"Fig. 1 represents the complete calyx with the tubular prolongation of the cover, as seen from the side. Fig. 2 is a view of the calyx as seen from below. Fig. 3 gives an analysis of the composition of the calyx up to the arms. The isolated interradial fields are surrounded by punctured lines. Fig. 4 shows the sculpture of the plates on the cover of the calyx magnified. Fig. 5 represents the single odd interradial plate of the first order with three interradial plates above it.

"Batocrinus irregularis.

"*Plate IV, figs.* 6, 7, 8, 9."

"This species agrees with the *B. icosidactylus* in the general proportions of shape, and in the composition of the calyx. It is distinguished by the following marks: Instead of the twenty arms of the *B. icosidactylus*, it has but eighteen, which is caused by one of the five radial fields being developed differently from the four others, which are equal, while of the four equal radial fields, as in *B. icosidactylus*, each encloses four arms by a double distichal division, in the *B. irregularis* the one lateral field has only a simple double row of distichal radial plates, and in consequence receives but two arms The two-armed radial field is always opposite the larger interradial field. Figures 8 and 9 explain this different development of the radial fields. Figure 9 shows the composition of one of the four equal radial fields. Figure 8 the composition of the single odd radial field in *B. irregularis.* The latter figure could not be drawn exactly from nature in its detail, but it is correct for the manner of its composition and the number of plates.

"Another difference between the two species is shown in the development of the odd interradial field. In *B. irregularis* there are above the lower interradial plate of the first order five others of a six sided form of which three are interradial plates of the second order, and two interradial plates of the third order. They are so arranged that the median one of the three interradial plates of the second order is completely surrounded by the five other plates of the interradial field. Figure 7 explains this arrangement and is to be compared with the corresponding part of the odd interradial field of the *B. icosidactylus* in figs. 3 and 5. This difference in the odd interradial field is constant and makes a good character for the distinction of the two species.

"The two last of the distichal radial plates, which, in this species, also form an almost completely closed circle, are of a different shape from those of the *B. icosidactylus.* They are curved and unsymmetrical in *B. irregularis,* while in the other they are nearly regular and symmetrical.

"The species on the superior cover of the calyx, and its tubular prolongation are not so prominent as in *B. icosidactylus;* they commence at the exterior border of each plate, rise very gradually and are at last developed into a sharp, but not very prominent point. This gives this species an exterior aspect very different from the *B. icosidactylus.* None of my specimens have the surface well enough preserved to give any exact information as to the sculpture of this species.

"The genus *Batocrinus* is by the composition of its calyx nearest allied to the genus *Actinocrinus*, the type of which is in the Carboniferous limestone formation, subject to so many various modifications. The composition of the base of three plates, the constantly equal composition of the radial fields, and especially the presence of a single large interradial field, commencing already with an interradial piece inserted in the circle of the first radial plates, are to be depended upon for the common distinguishing mark of a series of genera forming the natural family of the *Actinocrinidæ*. The genus *Melocrinus* classed with this family by F. Roemer in the explanation of the genus *Dorycrinus* (Archiv f. Naturgesch. Jahrg. XIX. Bd. I, p. 207 bis. 218) does not belong to it, since it has neither the characteristic composition of the base, nor the odd interradial field. I think this genus is more closely allied with *Ctenocrinus* and other Devonian forms. By the tubular prolongation of the cover of the calyx, at the end of which the mouth is situated, *Batocrinus* connects more closely with the genus *Actinocrinus*, in its narrower limits, than with *Amphoracrinus*, in which the mouth is lateral and below the summit of the cover of the calyx. From both these genera, and in general from, all other *Actinocrinidæ*, *Batocrinus* is distinguished by the singular circumstance that the interradial fields are not connected with the cover of the calyx, crossing through the five groups of arms, but are separated above, the distichal radii connecting again above the interradial fields so that the arms rise at the border of the cover, as it were, in a closed ring. By this peculiarity of the structure, *Batocrinus* seems to me to be more independently established and still more recommended to acceptation than the genus *Dorycrinus* established by Mr. Roemer, which really is only distinguished by several extremely long spines on the cover of the calyx, that is, only by a very striking external ornament from *Amphoracrinus*. The long spines of *Dorycrinus*, with the corresponding base of the calyx, and some other isolated plates, I found tolerably numerous about five hundred yards from the locality of *Batocrinus*, although I never was so fortunate as to obtain a complete specimen of the crinoid."

STEGANOCRINUS BENEDICTI, N. SP.

Plate IV, fig. 10, *azygous view; fig.* 11, *opposite side; fig.* 12, *summit of same specimen, natural size.*

Calyx large, subpyramidal, truncated below; plates highly convex, sculptured; sutures distinct. Arms very robust and directed laterally at right angles to the calyx. The lower part of the arm extensions are remarkable for their height and width, and transversely, have a subquadrate outline.

Basal plates short, thick, truncated below so as to form a subpentagonal outline, the outer angles being slightly nodose. First radials large, about as wide as high, very convex, two heptagonal and three hexagonal, transverse angular ridge in the central part of each, from which three or four angular ridges extend to the basal plates below, two or three to the second radial, and one to each adjoining the lateral sides. Second radials hexagonal, about half the size of the first radials, highly convex, with a transverse angular ridge in the center, from which an angular ridge extends to each adjoining plate. Third radials wider than long, heptagonal, two interradials abutting on each side, directed almost horizontally or at right angles to the calyx, about two-thirds as large as the second radials, tumid, the swelling being transverse, and supporting on each of the upper or outer sloping sides a single, axillary, secondary radial, which is hexagonal, when it abuts two interradials on one side, in other cases it is pentagonal; it is tumid in all cases. There are three convex tertiary radials, the last one axillary in one of the rays in our specimen, and, as far as the other rays are preserved, they are constructed in the same way, hence there appears to be at least forty arms in the species before they leave their contact with the interradial plates. It would have required a basal view to show these plates, hence they are not visible in the illustrations, but they may be inferred from the summit, as shown in figure 12, for they occupy the lower side of the wide extensions of the arm bases.

First regular interradials about the size of the second radials, hexagonal, highly convex, with an angular ridge radiating from the center of each to each adjoining plate. There are two plates in the second range, separating the third radials, and of about the size of the third radials; they are less convex, and show radiating ridges toward the inferior and lateral plates, but none to the superior interradials. There are three plates in the next range, in the area on the left of the azygous side, five in the area on the right, and four in each of the other areas. The arm extensions are thus placed at unequal distances from each other. These ranges are followed by irregular ranges of plates that separate the deep basal arm-extensions and connect with the plates of the vault. Indeed, the plates of the calyx and those of the vault graduate into each other so as to leave no distinct line of separation between them.

First azygous plate about the same size as a first radial, equally convex and sculptured in like manner. It supports two plates in the second series, each nearly as large as a first regular interradial, hexagonal, highly convex, and with an angular ridge radiating from the center of each to each adjoining plate. These are followed by five moderately convex plates of nearly equal size that separate the third radials and form an arch over each of the two plates in the first range. Above these, numerous smaller plates separate the high basal arm-extensions and graduate into the plates of the vault.

Vault highly elevated to give depth to the arm-extensions, convex, abruptly depressed into the interradial areas, somewhat flattened over the radial extensions and covered with numerous convex, polygonal plates, some of which are tumid or subspinous, especially the large plate, in the angle, at the commencement of each interradial area and those over the arm-openings above the third tertiary radials. The height of the vault, above the under side of the arm bases, is about equal to the height of the calyx to the same place, and, on account of the thickness of the basal plates, a cast would show a calyx shorter below the arm-extensions than the distance from that place to the top of the vault. The capacity of the body is greater above the under side of the arm-extensions than it is below, which gives a specimen a top-heavy aspect. The basal plates being transversely truncated below, our specimen will stand unsupported on a table in the position of figures 10 and 11. In fact, it will stand on either end or lay on either side, or in almost any other position in which it is placed, without support.

The proboscis is comparatively quite small and situated eccentrically on the azygous side. It is broken off in our specimen close to the vault, but, judging from appearances, it was short as well as small.

This is the first species in this genus described from the Keokuk Group, and it differs from all those described from the Burlington Group so obviously and materially that no comparison with any of them is necessary.

Found by A. C. Benedict in the Keokuk Group, at Canton, Washington County, Indiana, and now in his collection. The specific name is in honor of the collector.

SACCOCRINUS BENEDICTI, N. SP.

Plate V, fig. 1, *a large specimen; fig.* 2, *azygous side of a medium sized specimen.*

Species a little below medium size, but quite variable. Calyx urn-shaped, constricted below the arm bases, rather higher than wide; plates sculptured, very tumid; sutures deep and beveled.

The three basal plates form a moderately expanded cup, one-half wider than high. The expansion of the cup is most rapid from the basals to the second radials. First radials very large, height greater than width, three hexagonal, two heptagonal, very convex, margins beveled, face slightly, radiately sculptured and having a peculiar central pit. Second radials about one-third the size of the first, hexagonal, as high as wide, very convex, margins beveled. Third radials a little smaller than the second, axillary, and bearing upon each upper sloping side three secondary radials, the latter support the free arms. The secondary radials are directed almost horizontally to the axis of the calyx. There are only ten arm openings to the calyx; beyond this, the arms are unknown.

There are eight regular interradials in each area as follows: 1–2–2 and 3; the latter separate the arm-plates and connect with the plates of the vault. The first interradials are larger than the second radials, and the following ranges gradually decrease in size. There is one small intersecondary radial in each intersecondary space, but it has no connection with the vault. There are nineteen azygous interradials, as follows: 1–3–5–5 and 5, the latter separate the arm-plates and connect with the plates of the vault. The ranges of plates are not in line, but aré irregularly disposed. The area is very wide between the arms, and the plates rise nearly perpendicularly and graduate into the proboscis, which is near the margin on the azygous side.

This species is so different in the number and arrangement of the plates, and in the surface ornamentation, from all other described species, that it is unnecessary to make a comparison with any of them.

Found in the Niagara Group, at St. Paul, Indiana, and now in the State Museum at Indianapolis.

Saccocrinus howardi, n. sp.

Plate V, fig. 3, side view; fig. 4, azygous view; fig. 5, summit view.

A small species, quite distinct in general outline from any heretofore described. Calyx somewhat urn-shaped, higher than wide, broadly truncated at the base and only slightly expanding or almost subcylindrical above; plates tumid; sutures beveled.

The three basal plates form a short rim, squarely truncated below and beveled toward the sutures, which has a diameter about equal to two-thirds of the greatest diameter of the calyx. First radials moderately large, having a height equal to the greatest diameter, three hexagonal, two heptagonal, very tumid. Second radials two-thirds as large as the first, hexagonal, as high as wide, tumid. Third radials much smaller than the second, pentagonal, axillary, upper faces directed outward at an angle of seventy-five degrees from the axis of the body, and supporting upon each, three secondary radials, the latter support the free arms. The secondary radials are directed almost at right angles to the axis of the calyx. There are only ten arm openings to the calyx; beyond this the arms are unknown.

There are two tumid regular interradials in each area of about the same size, one following the other; above these the plates are quite small and graduate into the vault. There are no intersecondary radials. The azygous area is large in comparison with the others, and covered with twelve plates before they graduate into the plates of the vault. The first plate is in line with the first radials and a little smaller; it is followed by three plates, and these by three in the third range, and these by five in the fourth range, though they are not in line. The area is very wide between the arms, and the plates rise nearly perpendicularly and then graduate into the plates of the vault. The vault is nearly level over the radial areas and abruptly depressed in the interradial spaces. It is only a little convex in the central part. It is covered with numerous small polygonal plates. The azygous opening is near the margin on the azygous side.

Found in the Niagara Group, at St. Paul, Indiana, and now in the State Museum at Indianapolis. The specific name is in honor of Dr. Howard, who collected all the St. Paul fossils described in this article.

CYLICOCRINUS, N. GEN.

(*Ety. kulix, ikos*, a cup; *krinon*, a lily.)

Calyx urn-shaped, truncated below. Basals three, expanded. Primary radials three by five, the first one very large, second one small, quadrangular, third small, pentagonal. Secondary radials two or more. Arms ten. Regular interradials consist of one large plate followed by very small ones between the arm-bases that connect with the vault plates. First azygous plate in line with the first radials, followed by three plates in the second and in the third ranges, which are connected with smaller plates that connect with the vault. The vault is convex and covered with minute plates, except the ambulacral grooves, which are open and have serrated edges as if protected by some kind of cilia. The primary radials resemble those in some species of Batocrinus, the azygous area resembles Saccocrinus. The vault is different from that in all other known genera of crinoids. Type, Cylicocrinus canaliculatus.

CYLICOCRINUS CANALICULATUS, N. SP.

Plate V, fig. 13, *side view; fig.* 14, *azygous view.*

Calyx urn-shaped, a little wider than high, base broadly expanded, middle part round, interradial areas depressed between the arms, giving the upper part a pentalobate aspect; plates smooth and very slightly convex.

The three basal plates are broadly expanded below in a pentagonal outline with the under surface flat, except a small hemispherical pit for the insertion of the column; they are abruptly contracted to the suture above. The first radials are very large, longer than wide, three hexagonal and two heptagonal; they form a cup only a little expanded at the top. Second radials small, quadrangular, about one-third wider than high. Third radials a little wider than the second, pentagonal, axillary and support on each upper sloping side three secondary radials, the last of which support the free arms. The secondary radial ridges are quite convex and protuberant, while the interradial spaces are sharply depressed, which gives the calyx the pentalobate form in the upper part. There are no intersecondary radials, and hence the arms are grouped in five pairs.

There is one large regular interradial in each space that rests between the upper sloping sides of the first primary radials and extends as high as the top of the third radials, and is larger than the second and third radials together. It is followed by small plates that fill the narrow, deep sinus between the secondary radials and unite with the plates of the vault. The first azygous plate is in line with the first radials, and as large as any of them. It is followed by three plates in the second range and three in the third range, and above the middle one in the third range there is a plate of the same size preserved in our specimen, but the other plates in this area are not preserved and are, therefore, unknown.

The vault is convex, the radial areas raised in convex ridges, and the interradial spaces depressed. It is covered with minute convex plates, except the ambulacral grooves which are uncovered and expose serrations or places for the attachment of cilia or minute pinnules. The grooves from each pair of arms come together about half way from the arm bases to the summit of the vault. These ambulacral grooves were evidently never covered with plates, as in other palæozoic crinoids. Only one-half the vault is preserved in our best specimen, and hence the continuation of the azygous area and the presence or absence of a proboscis is unknown.

Found in the Niagara Group, at St. Paul, Indiana, and now in the State Museum, at Indianapolis.

BATOCRINUS COMPARILIS, N. SP.

Plate V, fig. 18, *a side view; fig.* 19, *azygous view; fig.* 20, *summit view with the proboscis broken off.*

This species belongs to that section of Batocrinus that will include *B. æquibrachiatus*, *B. trochiscus*, *B. brittsi*, etc. The lower part of the calyx to the top of the primary radials is bowl-shaped, it then rapidly expands to the arms. The vault is moderately convex near the outer margin, which gives to the calyx and vault a form somewhat like a wheel with a big hub; the radial series are subequal, and are separated by a slight sinus, in each interradial space, that becomes more conspicuous on the vault. The height of the calyx is about four-fifths the diameter at the arm bases. The plates are tumid; sutures distinct, but not beveled.

The basal plates are short, having a height about equal to one-fourth the diameter. The columnar cavity is hemispherical. First radials one-half larger than the second and third together, width greater than height or about equal to the height of the first and second together; three hexagonal and two heptagonal; they expand and are very tumid. Second radials short, about twice as wide as high, quadrangular. Third radials about the same height, but a little wider than the second, pentagonal, axillary, and support on each upper sloping side two secondary radials, the second much wider than the first, on account of the expanded rim, and axillary. The second secondary radial supports on each upper sloping side two tertiary radials, the latter of which supports the free arms. There are twenty arm openings to the vault.

The first regular interradial is as large as the second and third radials together, and very tumid; it supports two small plates in each interradial area. There are four plates in the azygous area, the first one in line with the first radials, and of about the same size and equally as tumid; it is followed by two smaller tumid plates, and these by one.

Vault convex and covered with numerous tumid polygonal plates, the radial areas are most convex, and are covered with the larger tumid plates; the interradial areas and intersecondary radial areas are a little depressed, and are covered with the smaller plates. The proboscis is central, but is broken off in our specimens.

This species is distinguished by its general form and by the number and arrangement of the tumid plates from all others heretofore described.

Found by F. A. Sampson, in the Burlington Group, at Sedalia, Missouri, and now in his collection.

Batocrinus brittsi, n. sp.

Plate V, fig. 21, side view; fig. 22, azygous view; fig. 23. summit view.

This species belongs to that section of Batocrinus that will include *B. æquibrachiatus*, *B. trochiscus*, etc. The lower part of the calyx to the top of the first radials is subcylindrical; it then rapidly spreads until the secondary and tertiary radials are nearly at right angles with the central axis of the body. The vault rises slowly from these projecting plates, which produces a narrow rim or wheel-shaped projection at the arm openings; each radial series, however, is separated by a sinus in each interradial space. The height of the calyx is only about half the diameter at the arm bases. The plates are moderately convex, and the sutures distinct, but not beveled.

The basal plates form a rim half the height of the diameter, the lower face is slightly beveled from a rim, above which there is a slight contraction. The columnar cavity is hemispherical and radiately lined for the attachment of the column. First radials very large, one-half larger than the second and third together, height and width about equal, three hexagonal and two heptagonal, moderately convex. Second radials small, nearly twice as wide as high, quadrangular. Third radials a little wider and a little shorter than the second radials, pentagonal, axillary, and support upon each upper sloping side two secondary radials, the second much wider than the first, on account of the expanded rim, and axillary. The second secondary radial supports on each upper sloping side a single tertiary radial, which is notched for the ambulacral furrow. There are twenty arm openings to the vault.

The first regular interradial is nearly as large as the second and third radials together; it is followed, in some interradial areas, by one small plate, and in others by two small plates. The first azygous interradial is in line with the first radials, and somewhat smaller; it is followed by three plates in the second range, the middle one being much the larger of the three, and the second range is succeeded by two small elongated plates that rest on the upper sloping sides of the middle plate, in the second range, and unite over its apex.

The vault is highly convex over the radial areas and depressed in the interradial spaces, and covered with numerous convex polygonal plates. Proboscis central, but as it is broken off in our specimen, we know no more about it.

There is no described species that can be reasonably confounded with this one, and, therefore, it is unnecessary to draw any comparisons.

Found by F. A. Sampson, in the Burlington Group, at Sedalia, Missouri, and now in his collection. The specific name is intended as a compliment to the distinguished naturalist, Dr. J. H. Britts, of Missouri.

Batocrinus decrepitus, n. sp.

Plate V, fig. 24, side view, showing the proboscis extending beyond the arms.

This species belongs to that section of biturbinate Batocrinus including *B. gorbyi*, *B. boonvillensis*, *B. gurleyi* and a large number of other species, in the Keokuk Group. The calyx is of medium size among these biturbinate forms, obconoidal, truncated below, a little less than one-half wider than high; each radial series bears a rounded ridge from the basal plates to the free arms; arm openings directed upward; surface of the plates radiately sculptured.

Basal plates form a disc one-third wider than the column, which is contracted above so as to appear as an enlarged, rounded rim surrounding the column. First radials convex in the central part and radiately sculptured, a little wider than high and upper face slightly arcuate. Second radials nearly as high as wide, quadrangular. Third radials one-half wider than high, pentagonal, axillary, and support on the upper sloping sides the secondary radials. There are two secondary radials in each of the six series shown in our specimen, the second one pentagonal, axillary, and bearing on each of the upper sloping sides three tertiary radials, the last of which is axillary and bears the free arms.

Each tertiary radial supports two arms, which are composed of double series of interlocking plates. They are comparatively short, the distal ends are curled up like claws around the base of the proboscis. The three primary series, preserved, support twenty-four arms, and if the other two are like them, as appearances indicate, there are forty arms in this species.

Regular interradials, five in each area, the first one large, strongly sculptured: it is followed by three small, convex plates, each more or less tuberculated in the central part, and these by one which projects high between the tertiary radials. Azygous interradials much more numerous, but their exact number and arrangement can not be determined from our specimen. Vault moderately convex and bears a central proboscis, which is covered, as far as observed, with hexagonal plates. The proboscis is remarkably long and extends far beyond the distal ends of the arms and pinnules.

It is distinguished by the number of arms, radial ridges, sculptured plates, interradial areas and long proboscis; no other species is like it in any three of these characters.

Found in the Keokuk Group in Montgomery County, Indiana, and now in the collection of Prof. A. C. Benedict.

ACTINOCRINUS BLAIRI, N. SP.

Plate V, fig. 27, side view of calyx and part of the vault; fig. 28, part of the azygous side of another specimen showing slight sculpturing toward the sutures; fig. 29, basal view of same, slightly compressed.

Calyx obconoidal and broadly truncated or like the frustrum of a cone, without the usual depressions between the arms or lobes at the top of it. Plates convex and, where well preserved, show a little radiate sculpturing near the sutures.

Basals large, thick, twice as wide as high, and have a large concave depression below, which includes and surrounds the area occupied by the column. First primary radials large, convex, three hexagonal and two heptagonal, rather higher than wide. Second radials about half the size of the first, convex, hexagonal. Third radials heptagonal, smaller than the second, axillary, and bear upon the upper sloping sides single secondary radials. Secondary radials hexagonal and bear upon the upper sloping sides single tertiary radials, that bear the free arms. Twenty arm openings to the vault. The tertiary radials unite and cut off the connection of the regular interradials with the plates of the vault. Our specimens do not show whether or not they unite over the azygous area.

Regular interradials five, the first rather smaller than a second radial; it is followed by two smaller plates, and these by two still smaller ones; all of them are regularly convex, except some of them, near the margin, show slight indentations. First azygous plate as large as a first radial; it is followed by two plates in the second range, three in the third range, and four in the fourth range. Above the fourth range the structure can not be determnied, but I think there are one or two small plates, and the tertiary radials cut off the union of the plates with those of the vault. At least, what is preserved indicate such to be the case. Vault highly convex and covered with moderately convex plates. The proboscis is unknown.

This species is on the line which separates Actinocrinus from Batocrinus. It agrees with the latter in surrounding the regular interradial areas with radial plates, but it agrees with Actinocrinus in having an hexagonal plate for the second primary radial, and in having only two plates instead of three in the second range in the azygous area. There is no described species for which it can be mistaken.

Found by R. A. Blair, in the Burlington Group, at Sedalia, Missouri, and now in my collection.

ACTINOCRINUS BRITTSI, N. SP.

Plate VI, fig. 1, *showing plates, but broken off at the lower end; fig.* 2, *vault of same specimen; fig.* 3, *side view of cast; fig.* 4, *vault of same specimen.*

Calyx turbinate, depressed in the interradial areas between the arms, plates rather thin and beautifully ornamented with round ridges radiating from a small central tubercle on each plate; sutures very indistinct; the cast terminates in an obtuse point at the basal extremity.

Basals only moderately large and forming a subconical cup. First primary radials of the average size, three hexagonal and two heptagonal, about as high as wide. Second radials only a little smaller than the first, hexagonal, about as high as wide. Third radials a little smaller than the second, as wide or wider than high; some of them are heptagonal and others octagonal; when the intersecondary radial reaches the third radial it is octagonal, otherwise it is heptagonal; it is axillary and bears upon the upper sloping sides a single secondary radial, which is axillary and bears upon each of its upper sloping sides a single tertiary radial, which bears the free arms. There are twenty arm openings to the vault.

Regular interradials ten or more, depending on where you separate them from the vault plates. The first is rather smaller than either primary radial; in the next range there are two smaller plates, and in the third range two still smaller that separate the third primary radials; in the fourth range two quite small plates separate the secondary radials, and there are three or four small plates above these which separate the tertiary radials and unite with the plates of the vault There are two or three intersecondary radials following each other and uniting with the plates of the vault; in some cases the first one truncates the third primary radial, as shown in Figure 3, but in other cases it is cut off by the union of the secondary radials. The azygous area is only a little larger than the regular areas and contains only a few more plates. The first one is in line with the first radials and somewhat smaller; it is followed by two plates of about the same size as the second radials, and these by three in the third range, and three in the fourth range that separate the third primary radials; above this the area is contracted and there are only two small plates in each range until they graduate into the plates of the vault. The vault is flattened over the radial areas and depressed in the interradial spaces. It is covered by numerous small polygonal plates. Those at the commencement of each interradial depression are larger than the others and more convex. The proboscis is subcentral and quite small.

Found by R. A. Blair and F. A. Sampson, in the Burlington Group, at Sedalia, Mo., and now in the collection of both and in mine. The specimen illustrated in Figures 3 and 4 belongs to Mr. Sampson. The specific name is in honor of Dr. J. H. Britts, of Clinton, Mo.

ERETMOCRINUS PRÆGRAVIS, N. SP.

Plate 6, fig. 5, azygous view; fig. 6, basal view.

This is a ponderous, top-heavy, irregular, spinous species. The calyx is short, subquadrate in outline, the depression of the azygous interradius about equaling the projection of the arm bases opposite thereto. It is more than twice as wide as high, measuring to the arm openings. The plates are produced in wedge-shaped or transverse spines; sutures distinct, but not beveled.

Basals three times as wide as high and each bears two flattened spines. The column is large and the plates extend only slightly beyond it. First radials more than one-half wider than high, three hexagonal and two heptagonal. Second radials short and quadrangular in three of the radial series, but none appears to exist in the radial series opposite to the azygous area or in the series on the left of it. Third radials short, pentagonal, axillary, and bear upon each upper sloping side one or more secondary radials, except in the left lateral radial series, which is peculiar and may be described as follows: The first primary radial bears two second primary radials, these are each followed by a third primary radial, which is convex on its upper face and bears a plate having two spines, and which may be composed of two plates anchylosed together; these are each followed by two series of secondary radials; there are two plates in two of these series and three in the other two series which bear arms and give us four (or two) arm openings to the vault. This arrangement may be regarded as abnormal, but if so it will be seen that the calyx is properly developed in this part so that it does not appear to have resulted from an injury. In the right lateral series there are two secondary radials supporting, on the upper sloping sides, two tertiary radials which bear arms giving us four (or two) arms in this series. The inner two openings, however, in both series, are much smaller than the outer two and the plates are small, indicating great inequality in the arms. The radial series opposite the azygous side is constructed in the same way except a small plate in the position of an intersecondary plate acts as a support to the two small plates that bear the small openings. The radial series on each side of the azygous area are each one-half larger than the series described. The secondary series most distant from the area is like those described, but those adjoining the area have only a single secondary plate, and it is followed by a tertiary series that has two arm holes, in the same manner as above described. There are, therefore, six arms in each of these series. I have now described these arm openings as they seem to me to be placed, but, nevertheless, if there is any other way to account for the small openings than to refer them to the ambulacral system, then the anchylosed plates would be single and the minute plates would be intersecondary radials through which these small pores would penetrate. This would give us only twelve arms for the species instead of twenty-four I have never seen plates in the condition of these, in any other specimen, nor have I ever seen such small ambulacral openings, if such they be, or such pores, if that is what they are, in any other specimen. Looking at the specimen from below there appears to be only twelve ambulacral series, and no indications of these small pores representing ambulacral passages, but there is a tubercle below each one of the small pores that indicates a distinct plate and they are separated by a small plate, and a small plate intervenes on each side separating them from the large ambulacral passages. If they are pores and not ambulacral passages, then we have intersecondary radial areas filled with small plates commencing with the first secondary radial, while the regular interradial areas are surrounded by the radial series and cut off from the vault plates, by the union of the second secondary radial plates.

There is only one interradial plate in each regular area, but they are not of uniform size or shape; one has seven sides, another has eight, another nine, and the other ten sides. In the azygous area the first plate is in line with the first radials and rather larger than any of them. It is followed by three plates in the second range, and two in the third range that unite with the plates of the vault. The vault is enormously developed, twice as high as the calyx, and covered with polygonal plates, which are, externally, simple cones. The proboscis is subcentral, large and curved back a little from the azygous sides.

This is a remarkable species, so different from all others that no comparison is necessary with any of them. In the essential construction of the body it is a Batocrinus, but on account of the extraordinary development of the vault it is referred to Eretmocrinus, as that is the only character by which an Eretmocrinus is to be distinguished, if this is one, because the other character, usually relied upon—that is, an expanded base—this species does not possess.

Found in the Keokuk Group, in Washington County, Indiana, and now in the collection of Prof. A. C. Benedict.

BATOCRINUS BLAIRI, N. SP

Plate 6, fig. 7, summit view; fig. 8, azygous view; fig. 9, view opposite the azygous side, one-half the length of the basals is broken off; fig. 10, basal view of another specimen to show basals not eroded.

Calyx bowl-shaped, very rapidly expanding from the third primary radial, so as to direct the arms nearly at right angles to the axis of the body, leaving a sinus at the interradial spaces; wider than high; plates convex; sutures distinct.

Basals more than twice as wide as high, thick, truncated below, so as to give a basal diameter more than twice as great as the diameter of the column; column occupying a hemispherical pit. The plates bear a transverse angular ridge, which adds to their thickness and gives the base an hexagonal outline. First radials one-half wider than high, upper faces arcuate for the reception of the second radials. Second radials quadrangular, from two to three times as wide as high, differing in the different series. Third radials pentagonal, short, and about the size of the second radials, axillary, and each bearing two wide, short, secondary radials. The second secondary radial is axillary and bears two small tertiary plates that bear the free arms. There are twenty arm openings to the vault.

Each regular interradial area has one large interradial plate, that is followed by two small plates that separate the secondary radials and connect with the plates of the vault. The azygous area contains six plates. The first one is in line with the first radials and is the largest plate in the calyx; it is followed by three plates, the middle one of which extends high between the arms and is separated therefrom by a single plate on each side of the upper end of it. These three plates connect with the plates of the vault; vault moderately convex and covered with rather large, polygonal, convex plates; interradial space slightly depressed; proboscis large and central—it is broken off in our specimen, as shown in the illustration.

This species is distinguished by its general form from all others, beside no other described species has such an azygous area. The middle plate in the second range is peculiarly elongated.

Found by R. A. Blair and F. A Sampson, in the Burlington Group, at Sedalia, Missouri. The specimens represented by figures 7, 8 and 9 belong to Mr. Sampson, the other is in my collection. The specific name is in honor of one of the collectors.

ACTINOCRINUS FOSSATUS, N. SP.

Plate VI, fig. 11, *azygous view; fig.* 12, *side view.*

Calyx obconoidal, about as high as wide, deeply sculptured; sharp, central, angular node on each plate; angles sunken, and a sharp angular ridge from each node to the node on each adjoining plate making the ornamentation stellate.

Basals short, constricted above, projecting below the end of the column and expanding to a thin edge, beveled at the sutures and notched in the middle of each plate so as to give the base an hexagonal stellate outline; columnar cavity rather shallow. First radials wider than long, three hexagonal and two heptagonal, widening from the base to the lateral angles. Second radials hexagonal, wider than high, and about two-thirds as large as the first. Third radials a little larger than the second, some pentagonal, others hexagonal, axillary and support on each upper sloping side a single secondary radial. Secondary radials, axillary and support on each upper sloping side a tertiary radial. Tertiary radials axillary and support on each upper sloping side a small quaternary radial, which bears the free arms. There are forty ambulacral openings to the vault. All of the interradial areas are surrounded by the radial plates, and none of them reach near the vault plates. There are five plates in each regular interradial area, the first one large, followed by two smaller ones, and these by two in line, the upper one extending up between the tertiary radials, but not separating the quaternary plates. First azygous plate in line with the first radials and somewhat smaller, it is followed by two in the second range of about the same size as the first. There are three in the third range, and two small ones above, but they do not pass to the top of the tertiary radials. Vault very convex and elevated at the arm bases, the capacity is about equal to that of the calyx. It is covered with rather large polygonal plates, each of which terminates in a long spine. Proboscis central.

This species has some resemblance to *Actinocrinus hurdianus*, which has only twenty arms, but I do not know of any forty-armed species with which to compare it.

Found by R. A. Blair, in the Burlington Group, at Sedalia, Missouri, and now in my collection.

BLAIROCRINUS ARROSUS, N. SP

Plate VII, figs. 1 *and* 2, *basal views of two specimens; figs.* 3 *and* 4, *summit views of the same two specimens; fig.* 5, *side view, a little inclined, to show the plates surrounding the orifice.*

Calyx a little convex and having a subpentagonal outline at the top, a little depressed between the arm bases; plates very deeply sculptured; radial ridges rounded; interradial areas slightly depressed; arm openings directed horizontally; height of calyx and vault together only a little more than half the width; sutures indistinct.

Basals three, forming a flat hexagonal disc, extending only a little beyond the column; column round. First primary radials a little wider than high, three hexagonal and two heptagonal, central tubercle broad, and radiating ridges rounded. Second radials quadrangular, one half wider than high, radial ridge very coarse and transverse ridge very small. Third radials large, central tubercles broad and flattened on top; plates pentagonal, axillary and bearing on each upper side a single secondary radial. Secondary radials axillary and bear on each upper sloping side a single tertiary radial, which bear the free arms. There are twenty arm openings to the vault.

Interradial areas subovate in outline, apparently excavated. Regular interradials three, one rather large plate followed by two that separate the secondary and tertiary radials. The first azygous plate is in line with the first radials and somewhat smaller; it is followed by two plates nearly as large and these by two smaller ones, that separate the tertiary radials. Vault gently rising from the ambulacral openings and having very little more convexity than the calyx, indeed, a side view of the calyx and vault is that of an ordinary convex lens. It is covered with large tumid plates. The orifice is near the azygous side surrounded by six rather large elevated plates. The elevation of these plates surrounding the orifice is shown in figure 5.

This species is different in outline from *B. trijugis;* it is not elevated above the arm openings as that species is, and it has altogether a different vault.

Found by R. A. Blair and F. A. Sampson, in the Chouteau limestone, at Sedalia, Missouri, and now in their collections and in mine. The two specimens illustrated are from the collection of Mr. Sampson.

BLAIROCRINUS BULLATUS, N. SP.

Plate VII, fig. 6, *side view; fig.* 7, *basal view.*

Calyx very low, saucer-shaped, height one-fifth the width; plates deeply sculptured; radial ridges coarse, broadly rounded and having a broad node at the center of each plate; interradial areas excavated; outline subpentagonal and depressed between the radial series; ambulacral openings directed horizontally; sutures indistinct.

Basals three, forming a thin almost flat hexagonal disc, nearly covered by a round column. First primary radials a little wider than high, three hexagonal and two heptagonal, central tubercle broad and lateral radiating ridges well defined. Second radials quadrangular, one-half wider than high, radial ridge large and central node prominent, transverse ridge obscure. Third radials very little larger than the second, pentagonal, axillary, and bearing on each upper sloping side a single secondary radial. Secondary radials axillary and bear upon each upper sloping side a single tertiary radial, which bear the free arms. There are twenty ambulacral openings to the vault, directed horizontally.

Interradial areas subovate in outline, apparently excavated. Regular interradials three, one large plate having a central tubercle and two small ones. The indistinct sutures and anchylosis of the plates in the interradial areas of all the species, in this genus, make it difficult to determine the number and outline of these plates. The first azygous plate is in line with the first radials and much smaller; it is followed by two much smaller plates and these by two still smaller. The vault is elevated by upright plates between the ambulacral orifices and also in the interradial areas. Above these plates the vault is very convex and stands nearly upright on the azygous side. It is covered with polygonal, large, tumid and spinous plates. The most prominent spines are over the radial areas. The vault terminates in a short proboscis almost straight above the azygous area.

This species is much like *B. trijugis*, in all its parts, except the vault and proboscis. It is true I have not distinguished as many interradial plates nor as many azygous plates, but that may be due to the anchylosis in the interradial areas. I have examined thirty or forty specimens, in this genus, and have not seen a single specimen in which the interradial plates could be satisfactorily determined, except in the single one that is the type of *B. trijugis*. The vault in this species is different in form, more convex, and covered with more tumid plates than it is in *B. trijugis*; the proboscis is differently located and differently constructed. These differences are so marked that there is no trouble in separating the two species.

Found by R. A. Blair and F. A. Sampson and by myself, in the Chouteau limestone, at Sedalia; Missouri. The specimen illustrated is in my collection.

AGARICOCRINUS GERMANUS, N. SP.

Plate VII, fig. 8, *view of the vault; fig.* 9, *azygous side view; fig.* 10, *basal view.*

This is a small species, at least the specimens examined are small. The calyx is nearly flat, a circular depression having a defined rim indicates the place for the attachment of the column, the radial areas are a little rounded and the interradial areas are slightly concave. The surface is granular.

The basals are small and extend but little beyond the cicatrix for the column. The first radials are nearly as long as wide; they curve into the basal depression abruptly from a low angular ridge about the middle of the plates, which marks the limit of the basal depression. Second radials quadrangular, about two and a half times as wide as long. Third radials of unequal size, short, some much wider than others, pentgonal, and support upon the outer sloping sides the secondary radials. There are ten openings to the vault and consequently ten arms; the radial series differ somewhat in size and hence there may be a difference in the size of the arms.

Regular interradial areas narrow and occupied by a single plate. The first azygous plate is in line with the first radials and of about the same size; it is followed by three plates, the middle one of which curves over and unites with the plates of the vault. Vault low, the convexity is not more than the thickness of the plates. Between and above the ambulacral orifices in each radial series there is a large tumid plate as shown in figure 8; the other vault plates are only slightly convex. The interradial spaces are a little concave and filled with the smaller plates. The subcentral orifice is comparatively large. The central plate is very little larger than those surrounding it.

This species is related to *A. sampsoni*. We can not compare the vault or the arms to show the differences. This is a smaller species than that one. The radial series in that species are uniform in size; in this species the radial series opposite the azygous side is larger than either of the others, and viewed from the base the right lateral series is larger than the one on the left. In that species the first radial series are gently rounded into the basal cavity, in this an angular rim defines the basal depression. The second radial plate in that species is shorter than it is in this one. It is shorter, in fact, though it is a larger species. In that species the arms are deep, in this, judging from the appearance at the base, they are shallow.

Found by R. A. Blair in the Chouteau limestone at Sedalia, Missouri, and now in my collection.

AGARICOCRINUS CHOUTEAUENSIS, N. SP.

Plate VII, fig. 11, *summit view; fig.* 12, *lateral view; fig.* 13, *basal view with part of the column.*

This is a medium sized species. The calyx has a rather deep central concavity, which includes nearly the whole of the first radials and is sharply defined. The radial series are broadly rounded and interradial spaces more narrowly depressed; radial series very unequal, surface granular, column round.

Basals form a pentagonal disc a little larger than the end of the column. First radials abruptly and almost wholly depressed into the basal cavity, nearly as long as wide. Second radials quadrangular, very unequal in size. Third radials pentagonal, very unequal in size and support on the upper sloping sides the secondary radials. A single secondary plate supports the regular interlocking series of the arm plates. There are ten openings to the vault and consequently ten arms in this species. The plates are thick and, therefore, show the arms are deep.

Regular interradial areas narrow and occupied by a single plate. The first azygous plate is in line with the first radials, but it is much longer and extends as far as the superior lateral angles of the third radials; it is followed in direct line with four more elongated plates that reach the azygous orifice; the other two azygous plates are elongated and give width to the azygous area. The vault is conical and terminates in a large conical plate, on the azygous side of which there is a small anal orifice. The plates are convex and polygonal. A small pointed plate separates the ambulacral orifices in each series.

This species is so different from *A. germanus* that no comparison with it is necessary. It is distinguished from *A. sampsoni* by the abrupt basal cavity, the azygous area, and by the great inequality of the radial series.

Found by R. A. Blair, in the Chouteau limestone, at Sedalia, Missouri, and now in my collection.

FAMILY CYATHOCRINIDÆ.

Cyathocrinus meekanus, Shumard.

In 1855, Shumard described *Poteriocrinus meekanus* in the Geological Survey of Missouri, page 188, from a single specimen, found at Mount Vernon, in Moniteau County, among loose debris at the foot of the bluffs, composed of both Chouteau and Encrinital limestone, and subsequent authors have generally referred it to the Burlington Group. R. A. Blair and F. A. Sampson have collected a large number of specimens belonging to this species, in the Chouteau limestone, in Pettis County, Missouri, and hence it does not belong to the Burlington Group, as no crinoid was ever known to pass from one Group of rocks to another. It is a Cyathocrinus and should be known as Cyathocrinus meekanus, from the Chouteau limestone.

Cyathocrinus gorbyi, n. sp.

Plate V, fig. 6, azygous view; fig. 7, side view; fig. 8, basal view.

Calyx low, nearly twice as wide as high, subpentagonal in outline, basal plates depressed and subradials prominent, making the greatest diameter of the calyx through the subradials, below the level of the basal disc; contracted toward the summit; plates sculptured; sutures distinct.

Basal plates form a flat pentagonal disc, with slightly concave sides, and having a diameter a little more than one and a half times the diameter of the column; they are depressed so as to be on a level with the middle of the subradials. Subradials convex, in the form of a five-sided pyramid, with the apex of each at the lowest part of the calyx. Each of the five faces of a plate are directed to an angle with the adjoining plates, and the angles of the pyramid extend from the apex to the middle of each of the five adjacent sides. The radials are smaller than the subradials, wider than high, subpyramidal, with a face on each directed toward each of the three angles formed with the subradials, and the angles of the pyramid extend from the apex to the middle of the two sides of the adjacent subradials, which produces an angular ridge from the apex of each subradial to the apex of each adjacent first radial. Articulating facet for the second radial in the form of a half circle occcupying one-half the width of a plate and having a prominent outer rim. The facet is directed outward at an angle of forty-five degrees. The superior faces of the first radials on each side of the articulating facets slope a little to the sutures for the reception of the interradial vault plates. Azygous plate a little smaller than a first radial, stands upright, and extends higher than the radials. It is truncated above and has upper lateral sides, so that it is succeeded by three plates. It is also subpyramidal and has an angular ridge extending from the apex to the subradial below, where it meets a corresponding angular ridge from the apex of the subradial.

This is a peculiar species, quite distinct from all heretofore described.

Found in the Keokuk Group, at Gosport, Ind., and now in the collection of Prof. A. C. Benedict, at Indianapolis. The specific name is in honor of the State Geologist.

FAMILY POTERIOCRINIDÆ.

Scaphiocrinus lyoni, n. sp.

Plate V, fig. 25, azygous plates are shown on the left.

Calyx short, bowl-shaped or subcylindrical, deeply sunken below, one-half wider than high; plates convex, finely granular; sutures distinct.

Basals sunken in the columnar cavity and not visible in our specimen. Subradials large, the lower margin curving into the basal depression, and below the middle part curving abruptly upward and extending half the height of the calyx; they are longer than wide and quite convex in the central part. First radials wider than high, truncated the entire width above, and separated from the brachial by a gaping suture, longitudinally convex and slightly constricted in the middle. Brachials longer than wide, axillary, constricted on the sides so as to form an angular ridge in the center. Arms ten, no division, composed of a single series of plates, laterally constricted, the first ones longer than those above, and alternately projecting at the upper ends for the attachment of the pinnules. Pinnules coarse and composed of long joints.

First azygous plate large, pentagonal, rests obliquely between the upper sloping sides of two subradials and the under sloping side of the radial on the right, abuts one side against the second azygous plate, and supports the third azygous plate on the upper slightly sloping side. Second azygous plate smaller and truncates a subradial. Third plate extends above the top of the calyx, and fourth and following plates arranged as in other species of this genus. Column pentagonal and composed of thicker and thinner pieces.

Found in the Keokuk Group, three miles east of Crawfordsville, Ind., and now in the collection of Prof. A. C. Benedict.

Scaphiocrinus maniformis, n. sp.

Plate V, fig. 26, lateral view.

Calyx low, saucer shaped, moderately sunken below, more than twice as wide as high, plates convex, sutures distinct, not beveled.

Basals sunken in the columnar cavity and not visible in our specimen. Subradials moderately large, the lower margin curving into the basal depression and below the middle part curving abruptly upward and extending nearly half the height of the calyx; they are as long as wide and very tumid. Radials one-half wider than high, truncated the entire width above and separated from the brachial by a gaping suture, longitudinally convex and slightly constricted in the middle. Brachials longer than wide, constricted and rounded in the middle. Arms ten, no division, composed of a single series of very long round plates, alternately projecting at the upper end for the attachment of the pinnules. Pinnules coarse and composed of long joints. Azygous side not seen in our specimen. Column round and composed of rather long plates.

Found in the Keokuk Group in Washington County, Indiana, and now in the collection of Prof. A. C. Benedict

Barycrinus stellifer, n. sp

Plate VIII, fig. 6, azygous view; fig. 7, opposite view; fig. 8, basal view; fig. 9 interior of the calyx, all natural size.

This is a moderately robust species. Calyx unsymmetrical, wider than high, sutures distinct, but not beveled, and have no depressions at the angles, plates very thick, remarkably convex and spinous.

The basals form a pentagonal disc twice as wide as the diameter of the column, the angles of the pentagon extend up moderately between the inferior sides of the subradials. Subradials large, three hexagonal and the two adjoining the azygous area heptagonal. The convexity of each is in the form of a four-sided pyramid having the apex on a horizontal plane with the basal disc, one of the pyramidal sides of each extends from the apex of a subradial plate to one of the sides of the pentagonal disc, producing a five-rayed star, as seen from below with the column in the center and the apex of each subradial at one of the points of the star. One of the sides of the pyramid is on the upper side of the plate and the other two are on the lateral sides, each side of the pyramid is somewhat concave, which makes its pyramidal surface more distinct and more clearly defines the pentagonal star below. The first radials are large, wider than high, the two lateral ones of equal size; the others of unequal size and each a little smaller than the lateral ones; all of them are heptagonal with a longitudinal sub-angular elevation in the upper central part, bifurcating and extending to the sides of the adjoining subradials; on most of these angular ridges there is a prominent tubercle. The upper face of each plate is concave for the reception of the second radial and the facet occupies nearly two-thirds of the width of a plate; the superior lateral sides are slightly concave for the reception of the interradials or vault plates. The second radial or first brachial is preserved in one of the rays of our specimen; it is quite thin and unites laterally with the interradials, as shown by the continuation of the concave facets.

The azygous area is occupied with three plates. The first two are pentagonal, rest upon the upper sloping sides of the subradials, below the under sloping sides of the first radials, the one on the right being the longer, each bears a central ridge directed from a first radial to the center of the subradial below, and each bears a prominent central tubercle. The third azygous plate rests between the other two and separates the first radials and bears a tubercle.

The summit of the calyx with arms and vault removed shows the remarkably thick plates and the pentalobate shape of the interior. I do not know of any species with which it is necessary to compare this one to make the definition clearer as I think it can not be mistaken for any other one

Found by A. C. Benedict in the Keokuk Group in Harrison County, Indiana, and now in his collection.

FAMILY MELOCRINIDÆ.

MELOCRINUS ÆQUALIS, N. SP.

Plate V, fig. 11, *view of two interradial areas, with the middle arm broken off close to the body, the outline of the basal plates is from another specimen; fig.* 12, *another interradial area on the same specimen.*

Species small. Calyx obpyramidal, with the upper part strongly pentagonal, and having deeply sunken interradial areas; all the plates of the calyx, vault and proboscis tumid; sutures deep and radiately sculptured, within the beveled spaces, by a single ridge to each side of a plate, especially on the larger plates of the calyx. Arms directed nearly horizontally.

Basals four, equal, longer than wide, expanding very little, tumid, sutures deep. Primary radials three by five, the first one rather wider than a basal and of about the same length, two heptagonal and probably two more where the lower side abuts on two basals, the other one hexagonal. Second radials about the size of the first, hexagonal. Third radials a little smaller; they are octagonal and directed outward, at an angle of about forty-five degrees; the lower side of each rests on the upper side of a second radial, the inferior lateral, lateral, and superior lateral sides abut interradials, and the superior sloping sides support small arm plates, both of which form part of the covering for a single ambulacral orifice, which, at this place, is completely surrounded by five plates, viz: The two just mentioned on the lower part of the orifice, an interradial on each side and one vault plate on top. There are only five ambulacral orifices to the vault.

The interradial areas are alike, at least I have not been able to distinguish an azygous area in either of our specimens. The first interradial is nearly as large as a second radial, hexagonal, and rests between the upper lateral sides of the first radials, laterally between the second radials and supports upon the upper sloping sides two interradials. These are succeeded in the third range by three plates, situated between the arms, and these are followed by plates that graduate, without interruption, into the plates of the proboscis. The vault is almost wholly taken up with a central proboscis; indeed, it might be described as consisting of a proboscis with a slightly expanded base, the rays of which cover the commencement of the arm furrows. The proboscis is broken off in our specimens, as shown by the illustrations, but it, evidently, had considerable length. The column is unknown.

This is a marked species, distinct from any heretofore described, in its basal plates, equal sunken interradial areas, central proboscis, and tumid plates. *M. obconicus*, found in the Niagara Group, has no near relation to it, for the vault in that species is slightly convex, covered with small plates, no proboscis, but having a small orifice at the summit above a wide azygous area; short basal plates; evenly expanded obpyramidal calyx, with flattened interradial areas, and having sculptured plates. *A. obpyramidalis* has a subcentral small probiscis, secondary plates, ten ambulacral orifices, and is otherwise far removed from the species under consideration.

Found in the Niagara Group, at St. Paul, Indiana, and now in the State Museum, at Indianapolis.

GAZACRINIDÆ, N. FAM.

In this family there are five basals, no subradials, three by five primary radials, one or more secondary radials, arms composed of a single series of plates, interradial areas almost alike, vault sustained by a specialized frame work.

GAZACRINUS, N. GEN.

(*Ety. gaza*, treasury; *krinon*, lily.)

Calyx obconoidal, basals five, one truncated by the azygous plate, primary radials three by five, secondary radials two by ten, arms composed of a single series of flattened plates, one plate in each radial area, vault sustained by a specialized frame work with ambulacral canals connecting the arms with a central orifice. Type, *Gazacrinus inornatus*.

GAZACRINUS INORNATUS, N. SP

Plate V, figs. 9, 10, 15 *and* 16, *views of different specimens;* 9 *and* 10 *show some of the arm plates, and the second and third radials are anchylosed; fig.* 16, *is an azygous view; fig.* 17, *shows the internal structure of the vault, the outer plates being removed.*

Calyx bowl-shaped or somewhat obconoidal and truncated below; there is an undefined constriction in the middle part of the basal plates, and another below the arms; diameter a little more than the height; plates convex, smooth; sutures not very distinct, and some of them anchylosed.

Basal plates longer than wide, lateral sides very slightly diverging and the upper sides steep, except one, which is truncated by the azygous plate; they form the frustum of a cone with angular notches at the larger end and a deep columnar cavity at the other. First radials much larger than the second and third together, about one-half wider than high, the two adjoining the azygous area hexagonal and the other three heptagonal. Second radials very short, quadrangular. Third radials short, wide, pentagonal, axillary, and bear on each upper sloping side two short secondary radials which support the arms. There are ten arms. They are composed of long plates, flattened laterally on the outside, and furrowed on the inside, and appear to be compact when closed. The edges of the plates, so far as observed, are transversely serrated, on the inside, half the depth of the plates, a peculiarity I have never seen in any other crinoidal plate. There are three longitudinal furrows on the inside of each radial series, shown at the top of the secondary radials; this gives fifteen furrows at the top of the secondary radials, one in the middle of each plate, and the other at the suture, which is another peculiarity entirely new to me.

The secondary radials unite at the top of the calyx, cutting off the interradial areas. There is a single, large interradial in each regular area, resting between the upper sloping sides of the first radials and between the second and third radials and the under, short, sloping sides of the first secondary radials. The azygous plate is a little larger than the other interradials, and it truncates the top of one of the basal plates.

We have attempted to give some idea of the lower part of the frame work of the vault in figure 17. There is a central orifice; from this a triangular plate having a furrow on each side extends to each interradial series, and these furrows connect with the longitudinal furrows, in the secondary radials, at the top of the calyx above mentioned. Between these triangular plates the furrow in the suture above mentioned is surrounded with a plate and converted into a circular passage directed inward, higher than the furrows in the triangular plates above described. Between each of the points of the triangular plates surrounding the central orifice there is a small, furrowed plate. Between these small plates and the circular passage, higher than the furrows above mentioned, the plates are absent in our specimen. The covering of this frame work is not preserved in any of our specimens.

Found in the Niagara Group, at St. Paul, Indiana, and now in the State Museum at Indianapolis.

FAMILY GLYPTASTERIDÆ.

CYPHOCRINUS, N. GEN.

(*Ety. kuphos*, bowed down; *krinon*, lily.)

Calyx obconoidal or obpyramidal as high as the first interradials, then rapidly expands and curves downward until the periphery and ambulacral orifices are directed below a horizontal line. Basals five, forming a pentagonal disc. Subradials five, hexagonal, except one which is truncated by the first azygous plate; it is heptagonal. Primary radials three by five, three of the first ones heptagonal and the other two hexagonal; second radials quadrangular; third radials pentagonal and bear on the upper sloping sides secondary radials. Regular interradials numerous, the first one large and resting between the short upper sloping sides of the first radials, it is followed in the second range by two plates and by three plates in succeeding ranges until they unite with the plates of the vault. Intersecondary radials present. First azygous plate large, truncates a subradial, and is followed by three or four plates in each succeeding range until they unite with the plates of the vault. Vault convex and covered with more or less numerous, plane, convex or spinous plates. A large spinous plate occupies the center of the vault and the anal orifice without any prominence is on the azygous side of it. Type, Cyphocrinus gorbyi.

Cyphocrinus gorbyi, n. sp.

Plate VII, fig. 14, *showing vault, central spinous plate and anal orifice slightly to one side of a direct line to the center of the azygous area; fig.* 15, *side view, part of the central vault spine is broken off; fig.* 16, *basal view.*

Calyx obpyramidal as high as the first interradials, then rapidly expands and curves downward until the periphery and ambulacral orifices are directed below a horizonal line. The radial series are angular and the interradial areas concave, sutures moderately distinct.

Basals small, forming a pentagonal disc only a little larger than the diameter of the column, which is pierced by a small, pentagonal, columnar canal. Subradials not large, hexagonal, except one, which is truncated by the first azygous plate; it is heptagonal and the larger subradial. First primary radials nearly twice as large as the subradials, one-half or nearly twice as wide as high, upper face more or less arcuate, the one on each side of the azygous area hexagonal, the other three heptagonal. Second radials short, twice as wide as high, quadrangular. Third radials very little larger than the second, pentagonal, axillary, and bear on each of the upper sloping sides five secondary radials, the last two of which are somewhat cuneate and the last one bears the free arms. Arms ten composed of a double series of interlocking plates and doubtless curved up over the vault, but they are not preserved in our specimens. Each of the ten ambulacral openings is divided transversely by a plate in the middle, the lower channel curves down on the inside of the secondary plates and the other is provided with a furrow that curves upward under the vault plates, the two in each radial series soon coming together and then continuing until the five come together at the central part of the vault.

There are nine regular interradials in each area, the first one large; it is followed by two plates in the second range, three in the third range and three in the fourth range, that unite with the plates of the vault. There are eleven plates in the azygous interradial area. The first one truncates a subradial; it is followed by three plates in the second range, three plates in the third range and four plates in the fourth range, that unite at the periphery with the plates of the vault. There are six plates in each intersecondary radial area; one in the first range, followed by two in the second range and three in the third range, that unite at the periphery with the plates of the vault. The vault is convex, having a height equal to the height of the calyx; it rises rapidly over the ambulacral orifices, or radial areas, and is concave over the interradial and intersecondary radial spaces. There are three prominent spinous plates over each radial series; one over each ambulacral passage under the vault and one over the junction of the two passages belonging to each radial series; there is a large plate bearing a very large spine in the center of the vault; there is a slight swelling on the vault from this spinous plate down the azygous side; the anal orifice is, without any prominence, on this swelling on the azygous side of the spinous plate; it is subelliptical in outline on the specimen figured, and surrounded with nine plates. The plates in the interradial and intersecondary radial areas are plane and not spinous.

Found in the Niagara Group, at St. Paul, Indiana, and now in the State Museum, at Indianapolis. The specific name is in honor of Prof. S. S. Gorby.

FAMILY ICHTHYOCRINIDÆ.

ICHTHYOCRINUS GREENII, N. SP.

Plate VIII, fig. 3, *lateral view, natural size, column and part of the arms eroded.*

Body, with arms folded, somewhat pear-shaped. Calyx obpyramidal, truncated below; surface without ornamentation.

Basals three; short. Subradials one-half or nearly one-half wider than high, three hexagonal, two pentagonal. Primary radials, four in each series; they gradually widen without a corresponding increase in length, and, as will be seen in the illustration, they are not of the same size in the different series, and hence, instead of a straight suture between the series and quadrangular and pentagonal plates, we have a zigzag suture between the series and hexagonal and heptagonal plates by reason of the slight truncation at the angles. Secondary radials, four in each series; they are about the same length as those in the first series, but they are not quite as wide and do not increase in width as rapidly, and they do not abut laterally so as to produce quadrangular and pentagonal plates, but interlock more or less, and thus truncate the angles of the plates. Tertiary radials, five in each series; they are much smaller than the secondary radials, and, like the primary and secondary radials, do not regularly abut laterally so as to produce quadrangular and pentagonal plates, but more or less interlock and truncate the angles, thus increasing the number of sides, as shown in the illustration. There are nine plates in the fourth series, but they are less than one-third as large as they are in the third series, because they are contracting toward the summit of the body. The plates in the fifth series are still smaller and more numerous and seem to bring their small ends together and infold them at the summit of the body.

There are no interradials. The column is composed of very thin plates, so far as preserved in our specimen It is, probably, round, but our specimen is somewhat injured, so as to leave some doubt whether it is round or pentagonal. The small plates shown at the superior end of our specimen, where the arms are broken away, look as if they belonged to pinnules, and I can not otherwise account for them, though I believe no one has heretofore observed pinnules in this genus.

This species is so different from those heretofore described that no comparison is necessary.

Found by G. K. Greene in the Keokuk Group, at Muldrough Hill, Kentucky, and now in his collection. Mr. Greene has been for many years an ardent collector and worker in fossils, especially in the vicinity of Louisville, and we have remembered him in the specific name of this beautiful crinoid.

CLASS BRACHIOPODA.

ORDER LYOPOMATA.

FAMILY LINGULIDÆ.

Lingula parrishi, n. sp.

Plate VIII, fig. 2, cast having the lateral and front margins broken away; plate IX, fig. 1, a better preserved specimen having less of the lateral and front margins broken off, and preserving part of the external shell.

Shell very large. Both of our specimens are inequilateral, having the umbonal ridge directed to one side of a median line, without showing any evidence of compression that could produce this character. The general form of the shell is subovate, compressed, front broadly rounded, sides more abruptly rounded to the frontal margin and gently curving to the beaks. Valves subequally convex; most prominent over the umbo, and flattened toward the margin.

Surface of both valves marked by fine, distinct, concentric striæ, and wide, shallow, concentric undulations. The beak of the best preserved valve in each of our specimens is acutely pointed, extends a little beyond the cardinal area and is distinctly separated from the beak of the other valve, and the concentric striæ are continued almost to the tip of it. The substance of the shell is rather thick and consists of an inner hard shelly layer and an outer less dense phosphatic layer.

No evidence of the peduncle is preserved in either specimen, and not a sign of a muscular scar can be seen, notwithstanding the apparent preservation of the cast, and the partially eroded shell in the other specimen where the scars of Lingula belong. There are no radiating lines on either the shell or the cast.

This species is so distinct from all others that have been defined that no comparison is necessary with any of them. I do not believe it is a true Lingula; but, notwithstanding the apparent inequality of the sides, in the absence of any knowledge of the muscular scars, it is referred provisionally to that genus on account of its general form, and the structure and composition of the shell itself.

Found in the Upper Coal Measures, in what is known as layer 85, at Kansas City, Missouri, and now in my collection. The specific name is in honor of W. J. Parrish, a prominent naturalist of that city.

LINGULA SEDALIENSIS, N. SP.

Plate IX, fig. 2, dorsal valve, slightly broken at the beak and at the frontal margin, natural size.

Shell rather below medium size, compressed, ovoid-subtrigonal in outline, a little longer than wide, the greatest breadth being near the anterior margin; front broadly rounded and rounding abruptly into the antero-lateral margins; sides converging in almost straight lines to a sharply pointed beak. Beaks acute, convex; umbones more gently convex, and valves flattened toward the front and antero-lateral margins.

Surface ornamented by distant, fine, concentric, elevated lines, free from wrinkles, and separated by flattened interspaces about three times their own width. These lines and interspaces arise anterior to the beak from the converging sides, as shown in the illustration. There are no radiating striæ. Though several specimens have been examined no traces of the muscular scars have been detected.

The general outline of the shell is much like that of *Lingula nebraskensis*, but it will be distinguished from that and all other species having a subovate or ovoid-subtrigonal outline, by the fine, distant, concentric, not lamellose or irregular, striæ, and by the manner in which they arise from the anterior part of the converging sides, and by the smooth interspaces.

Found by R. A. Blair, in the Chouteau limestone, at Sedalia, Missouri, and now in my collection.

LINGULA GORBYI, N. SP.

Plate IX, fig. 3, a large fragmentary specimen ; fig. 4, a smaller, nearly perfect specimen, having only a small piece broken from the left side near the beak, natural size.

Shell below medium size, compressed, subelliptical in outline, slightly narrower toward the beaks than at the front, sides regularly curving, front rather broadly rounded. Beaks subacute, not extending beyond the cardinal area; umbones more prominent and regularly convex, while the shell is flattened and terminates in sharp lateral and front margins. Muscular scars not observed.

Surface covered with very fine, close, concentric lines, free from wrinkles, and sometimes showing a few undefined concentric undulations, but they can not be distinguished on half the specimens examined. No radiating striæ.

This species will be distinguished from those having a similar subelliptical outline by the finer and more regular concentric striæ, and by the umbones rising higher than the beaks, while the beaks do not project beyond the cardinal area.

Found by R A Blair, in the Chouteau limestone, near Sedalia, Missouri, and now in my collection. The specific name is in honor of Prof. S. S. Gorby, State Geologist of Indiana.

LINGULA VANHORNII, S. A. MILLER

In 1875 in Vol. 2 of the Cincinnati Quarterly Journal of Science, page 2, I described and illustrated Lingula vanhornii which I collected in the upper part of the Hudson River Group, at Versailles, Indiana. The figure, which is a wood cut, was used on page 351 in North American Geology and Palæontology. The specimen is almost perfect. It shows both valves, each of which is slightly exfoliated and discloses part of the muscular impressions. It is the only specimen belonging to the species that I have ever seen. In 1889, Mr. Ulrich described a related species from Covington, Kentucky, under the name of Lingula proctori, which has been frequently confounded with it and which I have seen labeled in different collections Lingula vanhornii. Lingula proctori occurs in rocks 500 to 600 feet lower, geologically, than those in which the type of Lingula vanhornii was discovered and about fifty miles distant. I will not here attempt to point out the distinctions between the two species, though the specimens of L. proctori, which have fallen under my observation, are much smaller than L. vanhornii and, as figured and described by Mr. Ulrich, there is greater inequality between the valves.

I loaned to Mr Charles Schuchert, who was working on Brachiopoda for the New York Survey, the type of Lingula vanhornii. I did not lend the specimen to the State Geologist, but I lent it to Mr. Schuchert to be used in the preparation of Vol. VIII of the New York Palæontology, if it should be of service to him in that regard, and, of course, no credit was to be given for it.

I now find in Vol. VIII, plate I, fig. 4, the valve of a small undescribed and unknown species illustrated as Lingula vanhornii, and comments in the text based upon it as if it were that species. It has no resemblance to Lingula vanhornii in size, shape or muscular impressions, nor is it reported to have been found in the same range of rocks. Why such erroneous statements are made in scientific matters is quite beyond my comprehension.

FAMILY CRANIIDÆ.

CRANIA BLAIRI, N. SP.

Plate IX, figs. 5 *and* 6, *dorsal views of two specimens, the margins of both are imperfect.*

Shell above medium size or rather large, subcircular, depressed conical or having a height not exceeding one-fourth the diameter. Apex subcentral, obtusely pointed, inclined slightly toward the posterior part of the shell.

Surface ornamented by elevated, radiating striæ, that increase in number by intercalation, without bifurcation. They become coarser, more distant and sometimes irregular toward the margin. The apex is smooth in the older specimens, but probably on young shells the striæ reached quite to the tip. Ventral valve and muscular impressions unknown.

This species is more like *Crania crenistriata*, from the Hamilton Group of New York, than any other described species. It is, however, a larger shell, and has the apex farther removed from the center, and appears to be less conical, and to bear rather coarser striæ that are not crenated. The latter difference alone is enough to distinguish it.

Found by R. A. Blair, in the Chouteau limestone, near Sedalia, Missouri, and now in my collection. The specific name is in honor of the collector.

CRANIA GREENII, N. SP.

Plate IX, fig. 7, *dorsal valve, the outer margin is not all preserved;* a, *posterior part of the shell.*

Shell large, subcircular, broadly convex, depressed posterior to the beak, height about one-third the diameter. Apex subcentral, obtuse.

Surface bears a few concentric, imbricating lines of growth, and is marked by irregular transverse striæ, some of which are deflected on the anterior side of the shell, and also by faint radiating lines that somewhat sculpture the surface, especially toward the margin. Lower valve and muscular impressions unknown.

The shells of this genus are often influenced or governed, in the forms they assume, by the surface of the foreign objects to which they adhere; and even the dorsal valves not unfrequently bear the wrinkles, lines, dots or ornamentation of the bodies to which they are attached. The transverse striæ above mentioned may represent the surface of the object to which this shell attached, though our specimen does not indicate such to have been the case. The specimen was found on a rock and not adhering to any other organism. In any event, the obtuse apex, posterior depression, and radiating lines will distinguish it from *Crania hamiltoniæ*, which otherwise it would seem most to resemble.

Found by G. K. Greene, in the Upper Helderberg Group, at the Falls of the Ohio, and now in his collection. The specific name is in honor of the collector.

ORDER ARTHROPOMATA.

FAMILY RHYNCHONELLIDÆ.

RHYNCHONELLA COLLETTI, N. SP..

Plate IX, fig. 8, *ventral view; fig.* 9, *cardinal view, natural size.*

Shell depressed, subcircular, transverse diameter fully equal to and often greater than the distance from the point of the beak to the front margin, while the convexity is less than half the length or breadth of the shell. The furrows are deep and the plications coarse when compared with other shells of the same size.

Ventral valve shallow, most prominent on the umbo, which forms a sort of mesial ridge, each side of which is flattened toward the lateral margins. Beak straight and slightly truncated at the end. A furrow arises near the beak and gradually deepens and widens in passing over the umbo. The ridge on each side of this furrow is deflected to the antero-lateral margin of the shell; it bifurcates, and the inner branch again bifurcates, and these plications pass into a deep sinus in front, that extends almost as high as any part of the mesial elevation on the dorsal valve; sometimes a central plication arises in the sinus at about the middle or anterior third of the shell and bifurcates as it curves upward toward the mesial ridge of the dorsal valve. There are, therefore, in the sinus, at the front where they terminate, between the antero-lateral plications, from six to eight folds. Three or four plications arise on each side of the umbonal ridge and curve to the lateral margins; they bifurcate, so there are about eight folds on each side behind the antero-lateral plication. The increase of plications is by bifurcation and not intercalation, except the single fold, in some cases, in the depth of the upturned sinus. There are, therefore, from twenty-four to twenty-six folds at the margin of this shell. No concentric striæ are preserved, except a few imbricating lines of growth near the margin.

Dorsal valve shallow. Beak obtuse and slightly inflected beneath the beak of the opposite valve. Two strong plications arise at the beak, which are deflected to the antero-lateral margins of the shell, and at the umbo, in the furrow, an intercalated plication arises, which soon bifurcates and extends, with little or no convexity, to the front, where it meets the upturned sinus of the opposite valve; intercalated plications arise on each side of this central one, some of which bifurcate before reaching the upturned lateral sides of the sinus of the other valve. There are from six to eight folds between the antero-lateral plications, most of which are intercalations. The strong plications rising at the beak, and deflected to the antero-lateral margins, bifurcate outwardly toward the lateral margins, and about three plications arise on each side near the beak, which are directed laterally and bifurcate before reaching the margin of the shell, so there are about eight folds behind the antero-lateral one, which makes the same number that ornament the opposite valve. No concentric lines are shown in our specimens, except imbricating lines of growth near the margin.

This is a very marked species, resembling somewhat *Rhynchonella whitiana*, but more depressed and having more plications on the mesial fold, and in the sinus and on the sides, all of which arise in a different manner

Collected in the Niagara Group, at Wabash, Indiana, and now in the collection of A. C. Benedict The specific name is in honor of the veteran geologist, John Collett, of Indianapolis

RHYNCHONELLA KOKOMOENSIS, N. SP.

Plate IX, fig. 22, ventral view; fig. 23, front view; fig. 24, dorsal view.

Shell rather below medium size and transversely subspheroidal in form. Two specimens give the following measurements: breadth, .48 inch; length, .40 inch; convexity, .36 inch; breadth, .44 inch; length, .38 inch; convexity, .36 inch. The furrows are shallow in front, where the folds appear as if shaved off, and near the beaks the shell becomes almost smooth, leaving the folds most conspicuous a little anterior to the middle of the valves.

Ventral valve deep, most prominent in the central area, from which it slopes in all directions. Beak pointed and closely incurved over the umbo of the opposite valve. Sinus not distinguishable posterior to about the middle of the valve, from which point forward it is flat, wide and includes within the depression five plications which curve up nearly as high as the mesial elevation on the dorsal valve. There are ten plications on each side of the mesial sinus, making twenty-five on this valve, none of which result from bifurcation.

Dorsal valve deep, most prominent at the anterior third of the mesial fold from which it rounds off laterally and posteriorly, but, arching slightly toward the front, it terminates abruptly. Beak pointed and incurved beneath the beak of the ventral valve. A distinct furrow extends from the beak to the front, on each side of which three plications form a flat mesial fold elevated toward the front above the lateral plications. There are nine plications on each side of the mesial fold, which makes the same number that ornament the opposite valve. No concentric lines are distinguishable on our specimens.

This is a marked species distinguished by its general form, mesial furrow on the dorsal valve and the number of plications in the mesial fold and sinus, from all other described species.

Found at Kokomo, Indiana, in the Waterlime Group, by Prof. A. C. Benedict and now in his collection.

FAMILY TEREBRATULIDÆ.

Terebratula occidentalis, n. sp.

Plate IX, fig. 10, dorsal view; fig. 11, ventral view; fig. 12, profile view of a smaller specimen; fig. 13, cardinal view of same.

Shell small, broadest near the middle, brachial valve most convex; front slightly truncated and having a short shallow sinus, more developed in some specimens than in others.

Ventral valve most convex in the umbonal region, rounded to the sides, a little flattened toward the front and usually marked with a shallow mesial depression. Beak prolonged beyond the beak of the opposite valve and truncated with a foramen of moderate size. Umbonal slopes rounded.

Dorsal valve most convex in the umbonal region, regularly curving to the sides and flattened toward the front.

Surface marked with concentric lines of growth. Shell structure beautifully punctate. The internal part has not been seen and hence, possibly, the species may belong to Cryptonella.

Found by R. A. Blair, in the Chouteau limestone, at Sedalia, Missouri, and now in my collection.

FAMILY ATHYRIDÆ.

ATHYRIS OTTERVILLENSIS, N. SP.

Plate IX, fig. 14, *cardinal view; fig.* 15, *ventral view.*

Shell small, subquadrate in outline, width greater than height, greatest width above the middle; cardinal extremities rounded; truncated in front where there is a slight mesial depression in both valves. Ventral valve rather more convex than the dorsal and most convex in the umbonal region, regularly sloping to the sides and having a wide shallow mesial depression in front. The beak projects a little beyond the beak of the dorsal valve. Dorsal valve most convex in the umbonal region, regularly sloping to the sides and flattened toward the front and having a wide shallow mesial depression. Surface of the shell nearly smooth and showing a few, distant, obscure, concentric lines of growth. The substance of the shell is minutely punctate. The internal structure is unknown.

Found by R. A. Blair, in Devonian rocks, which I regard as of the age of the Hamilton Group, three miles from Otterville, and seventeen miles west of Sedalia, Missouri, and now in my collection.

ATHYRIS BRITTSI, N. SP.

Plate IX, fig. 16, *dorsal view; fig.* 17, *ventral view; fig.* 18, *cardinal view.*

Shell subcircular in outline, moderately convex, rounded at the cardinal extremities and slightly truncated in front.

Ventral valve a little less convex than the dorsal, most prominent in the umbonal region, regularly sloping to the sides and flattened toward the front or very slightly sinuous. Beak prolonged a little beyond the beak of the opposite valve and truncated by a small foramen.

Dorsal valve most convex in the middle part, from which it slopes nearly equally in all directions. Beak very slightly incurved beneath the beak of the opposite valve. Surface marked with concentric imbricating lines of growth.

This species is very much like *Athyris spiriferoides*, and may by some be regarded as a varietal form. It is distinguished, however, by the greater equality of the valves, more pointed and smaller beak of the ventral valve, which is less curved and has a much smaller foramen, and by the absence of the marked and prominent mesial elevation and sinus that characterize that species. These differences seem to warrant a distinct name, though the concentric imbricating surface lines are alike in the two species.

Found by R. A. Blair, in Devonian rocks, which I regard as of the age of the Hamilton Group, three miles from Otterville and seventeen miles west of Sedalia, Missouri, and now in my collection. The specific name is in honor of Dr. J. H. Britts, a geologist and one of the most distinguished naturalists of Missouri.

FAMILY ATRYPIDÆ.

Atrypa missouriensis, n. sp.

Plate IX, fig. 19, *ventral view; fig.* 20, *dorsal view; fig.* 21, *profile view.*

Shell small, subcircular, rather longer than wide, valves very moderately and nearly equally convex, cardinal extremities rounded.

Ventral valve most convex in the umbonal region, which is rather sharply rounded transversely, from which elevation the shell gently slopes to the front and the antero-lateral sides. Beak projects a little beyond the beak of the opposipe valve, but is not incurved over it.

Dorsal valve rather more evenly convex than the ventral, without any defined mesial elevation, the greatest convexity being in the central part, from which it slopes nearly equally in all directions. Beak very small and extending slightly beyond the cardinal line, but not incurved.

Surface marked by numerous very fine radiating striæ that are crossed by a few concentric lamellose lines of growth.

This species is related to *Atrypa impressa* and *A. reticularis*, but the valves are more equally convex; there is no defined mesial fold or sinus, and the beaks are less incurved.

Found by R. A. Blair, three miles from Otterville and seventeen miles west of Sedalia, Missouri, in Devonian rocks, which I regard as of the age of the Hamilton Group, and now in my collection.

FAMILY NUCLEOSPIRIDÆ.

Retzia triangularis, n. sp.

Plate IX, fig. 25, *dorsal view; fig.* 26, *profile view.*

Shell small, subtriangular, longer than wide, greatest width at the anterior third, posterior lateral sides nearly straight and diverging from the beak, making the posterior part of tbe shell laterally cuneiform, while the valves converge toward the front, making it cuneiform; valves very moderately and nearly equally convex.

Ventral valve most convex in the umbonal region, where it is narrowly rounded transversely, and from which elevation it gently slopes to the front. Beak long, straight, pointed and truncated with a small foramen.

Dorsal valve most convex in the umbonal region, where it is broadly rounded transversely, or slightly flattened centrally, and from which elevation it gently slopes to the front. Beak straight and obtusely pointed.

Surface marked with from fourteen to eighteen sharply angular plications, with intervening furrows of the same width. None of the plications bifurcate, and the increase is solely by implantation. No concentric lines visible on any of our specimens.

Found by R. A. Blair, in the Chouteau limestone, at Sedalia, Missouri, and now in my collection.

RETZIA PLICATA, N. SP.

Plate IX, fig. 29, ventral view; fig. 30, cardinal view; fig. 31, an interior showing part of the coils, some of them extending to the front margin.

Shell small, subcircular in outline, cardinal extremities rounded; valves about equally convex and nearly uniformly rounded in all directions. Beak of the ventral valve slightly incurved over the beak of the other valve and truncated with a rather large foramen Surface marked with ten or twelve angular plications, which arise at the beak and increase in size toward the anterior and lateral sides. There is no increase by bifurcation or implantation. The intervening furrows are angular and about the same size as the plications. The older specimens show a few coarse, concentric, imbricating lines of growth near the front margin, but none are visible elsewhere.

Found by R. A. Blair, in the Chouteau limestone, at Sedalia, Missouri, and now in my collection.

RETZIA CIRCULARIS, N. SP.

Plate IX, fig. 32, ventral view; fig. 33, dorsal view; fig. 34, profile view.

Shell very small, subcircular in outline, cardinal extremities rounded; valves about equally convex and nearly uniformly rounded in all directions. The shell is smaller and the convexity much less than in *R. plicata* above described. Beak of the ventral valve small, pointed and incurved over on the beak of the other valve, and truncated with a small foramen. Surface marked with about sixteen rounded and subangular plications, which arise at the beak and increase in size toward the anterior and lateral sides. There is no increase by bifurcation or implantation. The intervening spaces are about the size of the plications. No concentric lines have been observed. The general form and the character of the plications will distinguish it from *R triangularis*, and the number of plications, as well as the form, will distinguish it from *R. plicata*.

Found by R. A. Blair, in the Chouteau limestone, at Sedalia, Missouri, and now in my collection.

CLASS PTEROPODA.

FAMILY HYOLITHIDÆ.

Hyolithes lanceolatus, n. sp.

Plate IX, fig. 35, side view; fig. 36, transverse section.

Shell elongate, lanceolate, obtusely pointed, transverse section narrowly subovate, one side rather more convex than the other. All the specimens examined have one lateral side sharp and the other rounded, and as this occurs both in the casts and in specimens having the shell preserved I think it is not the result of compression. Aperture not preserved in any of the specimens collected. Where the shell is preserved it is thin, solid, has a purple color and is apparently the same in composition as the shells of *Conularia* found in different groups of rocks. There is no ornamentation of the surface. The specimen figured has the shell on it, but is broken at the point and at the aperture; a cast, however, in my possession indicates that the specimen figured is nearly complete at both ends.

Found by R. A. Blair and by myself in the Chouteau limestone at Sedalia, Missouri, and now in my collection.

FAMILY CONULARIIDÆ.

Conularia intertexta, n. sp.

Plate X, fig. 4, specimen broken and fragmentary, magnified about one and a half diameters; the longitudinal lines in the upper part should be inclined somewhat diagonally.

Shell elongate, very slowly expanding, lateral surfaces apparently nearly flat with a small mesial elevation or ridge, angles rounded and having a longitudinal furrow. Surface covered with numerous closely crowded, transverse, crenate striæ hardly visible to the naked eye, but under an ordinary magnifier appearing as lines of granules separated by extremely slender, linear furrows. The lines do not arch forward even in crossing the small mesial ridge. The granules are alternate so as to throw them in diagonal lines across the lateral sides or in quincunx order. There are about twenty-five lineal furrows in the tenth of an inch, where the lateral surface is nine-twentieths of an inch wide and about twenty-two granules or crenulations in the same distance. The furrows and crenulations are more closely crowded toward the apex than above, and under a magnifying power of ten diameters no crenulations are visible in the furrows. This species is remarkable for the closely crowded minute furrows and crenulated striæ.

Collected by Prof. S. S. Gorby, in the Keokuk Group, at West Point, Indiana.

CLASS GASTROPODA.

ORDER BRANCHIFERA.

FAMILY PATELLIDÆ.

TRYBLIDIUM MADISONENSE, N. SP.

Plate 9, fig 38, side view, natural size.

Shell medium size; apex high and almost straight above the anterior line of the shell; the shell slopes from the apex and arches a little toward the posterior part of the shell, but laterally and in front it descends abruptly to the margin; transverse section ovate; surface marked with fine, close, concentric lines and a few coarser ones, all of which appear to indicate lines of growth, instead of surface ornamentation; internal scars unknown.

The high apex and anterior position of it seem to distinguish this species.

Found by J. F. Hammell, in the Hudson River Group, at Madison, Indiana, and now in his collection.

FAMILY CYCLONEMIDÆ.

HOLOPEA HUBBARDI, N. SP.

Plate IX, fig. 39, front view, showing aperture and height of shell; fig. 40, summit view, showing surface markings.

Shell a little below medium size, depressed conical; width a little more than the height; whorls three, moderately and uniformly ventricose, the last one constituting nearly the entire shell, or four-fifths of it; suture moderately deep; aperture subcircular; umbilicus well defined; surface with close, fine striæ, curving backward and indicating the growth of the shell.

The size, shape of the mouth and umbilicus will distinguish this species from all others that have been defined.

Found by J. F. Hammell and Prof. George C. Hubbard, in the Hudson River Group, at Madison, Indiana, and now in their collections and in mine. The specific name is in honor of Prof. George C. Hubbard, one of the collectors.

FAMILY PLEUROTOMARIIDÆ.

Murchisonia hammelli, n. sp.

Plate IX, fig. 41, *front view, showing aperture somewhat injured; fig.* 42, *posterior view, natural size.*

Species a little below medium size; conoidal; height one-third more than the breadth; volutións four or five; suture very indistinct; umbilicus closed. The body whorl bears two furrows, two sharply angular revolving ridges, and one less angular and fading away toward the mouth. Above the body whorl there are only two angular revolving ridges on each whorl. The aperture is partly formed by the last whorl; the inner lip is thickened, the outer one is thin. The aperture and revolving angular ridges will distinguish this species.

Found by J. F. Hammell and Prof. Geo. C. Hubbard, in the Hudson River Group, at Madison, Indiana. The specific name is in honor of one of the collectors.

CLASS CEPHALOPODA.

FAMILY ORTHOCERATIDÆ.

Orthoceras cribrosum, Geinitz.

This species was described by Dr. H. B. Geinitz, in 1866, in "Carbon formation und Dyas in Nebraska," p. 4, plate I, figs. 5 and 5*b*, from the Upper Coal Measures, division 6 of the Nebraska City Section. A free translation of his definition is as follows:

"This most remarkable fossil is a fragment fifty-eight millimeters in length, five millimeters in diameter at the lower narrow, and thirteen millimeters at the upper broad end, increasing very regularly in size. The form of the shell seems to have been elliptical, but it has been pressed quite flat on one side. The shell is divided into chambers by many concave partitions which lie close together, so that we find on the lower part of it four or five in a length of five millimeters. We can not be certain of the position of the siphuncle, notwithstanding a transverse section has been made, but probably a small elliptical siphuncle laid near the margin.

"The layer on the outside surface of this fossil is very peculiar. It appears to be punctured by innumerable round pits, seive-like, of equal size and without regular order. This has somewhat the appearance of certain encrusting corals and might readily be taken for such a covering, which seems to us unlikely, however, from the regular appearance of the fossil. This punctured layer appears only on the outside surface, under which is the real mother of pearl shell."

Prof. F. B. Meek, in 1872, in the report on the Palæontology of Eastern Nebraska, reproduced the illustration of Geinitz, slightly reduced in size, on plate XI, figs. 18*a*, 18*b*, and said on page 234:

"This is another form I have not seen from the Nebraska rocks, but it is common in the Upper Coal Measures of Illinois, and also found in the same position in Iowa, Missouri, etc., and in the Lower Coal Measures of West Virginia. It is probably identical with the Upper Coal Measure species, *O. knoxense*, of McChesney, or some of the forms described, but not yet figured, by Professor Swallow, from the same horizon, unless the peculiar surface marking illustrated by Professor Geinitz is really the natural surface ornamentation of the shell. It is far more probable, however, that the pitting seen on Professor Geinitz's specimen is due to some accidental cause, such a style of marking being very unusual in this genus.

"In the Illinois specimens I have seen, these markings are nearly always on one side only, or more numerous and more strongly defined on one side than the other, while in other specimens differing in no other respect, I could see no traces of them. From these facts I am inclined to think they were produced by some minute parasites or boring animals, possibly on dead shells, as they were lying with one side exposed on the bottom of the sea."

More than one-third the length of the specimen illustrated by Dr. Geinitz consists of the lower part of the body chamber, and, judging from the illustration, there are nine or ten chambers in a length equaling the diameter of the shell as it approaches the body chamber. I have a fragment of an Orthoceras from the Upper Coal Measures, at Turner Station, near Kansas City, which I refer to Geinitz's species. It preserves no part of the body chamber. It has a length of 1.59 inches (40.4 mm.), a diameter at the larger end of .33 inch (8.33 mm.) and .15 inch (3.8 mm.) at the smaller end, tapers very regularly and gradually, and consists of very thin concavo-convex chambers enclosed in a shell that is covered with irregularly distributed round pits that do not pass through it. I see no reason to doubt that my specimen is an *Orthoceras cribrosum*, except that it is round instead of elliptical, in transverse section, and the small round siphuncle is absolutely in the center. As Geinitz's specimen was evidently compressed and did not preserve the siphuncle, I think his definition may be corrected in these respects and then it will include my specimen. I have little doubt that "the peculiar surface marking illustrated by Prof. Geinitz is really the natural surface ornamentation of the shell," because th surface of the shell is clearly distinguishable in my specimen between the pits, and the pits are as manifestly sunken in the substance of the shell;

there is no encrusting broyzoum or coralline deposit; the pits are not pores, they do not pass through the shell; they are not confined to one side of the shell, but occur all around it; they have no resemblance to the work of any boring animals known to me, because they do not pass through the outer shell and none of them occur in the septa or partitions that separate the chambers. The species is distinct from *Orthoceras knoxense* of McChesney, if upon no other ground than that of the surface punctures or ornamentation; but the chambers are longer in proportion to the diameter in *Orthoceras knoxense*, where the septa are distant from each other about one-third the diameter in the type species, and fragments of larger specimens from other localities referred to the same species have septa varying in distance from each other from one-sixth to one-fourth their diameter and showing the chambers increase more in diameter than in length with age. In addition to all this, McChesney had specimens from Danville, Springfield, Peoria and Hall's Mill, in Knox County, Illinois, and he said "the surface is destitute of ornamentation and sometimes polished." Prof. Meek had not seen a specimen of *Orthoceras cribrosum* and the description he has given of parasitic injuries or borings he had seen on *Orthoceras knoxense* has no application to the surface ornamentation or pits on my specimen from Turner's Station, and, as I believe, no application to Geinitz's specimen from Nebraska City. There is no doubt that Prof. Meek had seen exactly what he says he had on Illinois specimens, because he never enlarged upon his observation, and I have as little doubt about his having correctly interpreted what he had seen, but I am equally as confident he had never seen a specimen of *Orthoceras cribrosum*. Another observation is pertinent here, to wit: *Orthoceras cribrosum* is found in the Carboniferous basin west of Missouri, and *Orthoceras knoxense* is found in the Illinois and Indiana basin, which is filled with a different geological deposit. The same species sometimes occur in the two basins, but generally they are distinct. It will be an interesting discovery to find any species of Orthoceras in the Indiana or Illinois Coal Measures, having such a pitted shell as occurs on *Orthoceras cribrosum*. I have a Nautilus also from Turner Station that possesses the same kind of pitted surface to the shell, and I can see no reason to suppose the pits have been the work of boring animals.

ORTHOCERAS COLLETTI, N. SP.

Plate X, fig. 1, *natural size.*

Shell large, among species from the Coal Measures, long, slowly and gradually enlarging from below upward. The diameter increases in our specimen from an inch to an inch and three-eighths in a distance of four inches. Transverse section circular; septa deeply concave, the concavity exceeding the distance between the septa, which are distant from each other nearly one-fourth the diameter of the shell; along one side there is a small, narrow, longitudinal ridge extending the full length of the septate portion of the shell, a character which I have never observed in species of this genus, except on *O. fosteri* and the very closely allied *O. duseri*, from the Hudson River Group. Our specimen shows two inches of the body chamber without reaching the aperture; surface apparently smooth; siphuncle unknown, but supposed to be eccentric on the side bearing the longitudinal ridge.

This species is quite different in form from those which have been described from rocks of the same age, and it is unnecessary to compare it with Silurian species with which it may bear closer resemblance.

Found by Sid. J. Hare, in rocks belonging to the Upper Coal Measures, at Kansas City, Missouri, and now in my collection. The specific name is in honor of Prof. John Collett, late State Geologist of Indiana.

ORTHOCERAS GORBYI, N. SP.

Plate X, fig. 2, dorso-lateral view, natural size.

Shell about medium size, among species from the Hudson River Group, very long, slowly and gradually enlarging from below upward, and increasing in diameter only .04 of an inch in an inch in length; transverse section subcircular; septa very moderately concave, closely arranged, thirteen of them occurring in a distance equal to the diameter of the shell, where the diameter is 1.1 inches; surface marked by broad furrows or undulations that cross the shell at an angle of twenty or twenty-three degrees from the ventral to the dorsal side. The two specimens examined are casts, but one of them bears a few fine longitudinal lines that indicate the surface of the shell was so marked; body chamber and siphuncle unknown.

This species will be distinguished by its elongate form, close septa and inclined undulations.

Found by A. C. Benedict, in the Hudson River Group, in Franklin County, Indiana, and now in his collection. The species is named in honor of the State Geologist.

ORTHOCERAS FRANKLINENSE, N. SP.

Plate X, fig. 3, side view, natural size.

Shell about medium size among shells from the Niagara Group, elongate, gradually enlarging, increasing in diameter .07 of an inch in an inch in length; transverse section circular; septa very deeply concave and crossing the shell obliquely, with the inclination toward the siphuncular or ventral side; they are distant from each other one-seventh the diameter of the shell where the diameter is 1.02 inches. Our specimen is partially silicified, and what appears to represent the shell is a stippled silicified coating with well defined furrows following the lines of the septa. I have no idea these furrows existed on the surface of the original shell, nevertheless such might have been the case, as they are very peculiar; siphuncle eccentric situated a little nearer to the center than to the margin; body chamber unknown.

This species is distinguished by the deeply concave septa and by their inclination to the longitudinal axis of the shell.

Found in the Niagara Group, in Franklin County, Indiana, and now in the collection of A. C. Benedict.

FAMILY CYRTOCERATIDÆ.

Cyrtoceras thompsoni, n. sp.

Plate X, fig. 7, dorsal view, natural size; fig. 8, lateral view.

Shell medium size, rather rapidly increasing in size and slightly but regularly curved; transverse diameter one-fifth greater than the dorsoventral; broadly rounded on the dorsal and ventral sides and more narrowly rounded on the lateral sides; transverse section elliptical.

Septa very slightly arched, almost transverse in the young shell and distant from each other in the younger shell about one-tenth the transverse diameter, but nearer the body chamber in maturer shells about one-twelfth the transverse diameter; siphuncle very small and close to the outer margin. Outer shell thin and smooth or marked by fine transverse lines of growth, of which there is some evidence on the specimen described.

Our specimen is from the middle part of the shell and shows no part of the body chamber. Part of the outer shell is quite well preserved. It will be distinguished from other species by the transverse elliptical section, close septa and gentle curvature.

Found in the Hudson River Group, at Longwood, Fayette County, Indiana, and now in the collection of A. C. Benedict. The specific name is in honor of Prof. Maurice Thompson, late State Geologist of Indiana.

Cyrtoceras howardi, n. sp.

Plate XII, fig. 1, lateral view of nine chambers, including the body chamber, natural size.

Shell rather large, long, moderately increasing in size, and regularly and gently curved, including the body chamber; dorsoventral diameter one-third more than the transverse diameter; broadly rounded laterally and more abruptly rounded on the dorsal and ventral sides; transverse section subelliptical; septa highly arched and curved strongly forward on the dorsal or outer margin, distant from each other on the sides about one-fourth the transverse diameter, but more distant on the outer margin and less on the inner side of the curvature; body chamber slightly constricted on the sides behind the aperture; siphuncle small and close to the outer margin.

Our specimen is a cast. I know of no species so nearly related to it that a comparison is necessary to distinguish it, or to throw any light on the definition.

Found by Dr. F. M. Howard in the Niagara Group, at St. Paul, Indiana, and now in the State Museum at Indianapolis. All the fossils described and figured in this report from the vicinity of St. Paul, Indiana, were found by Dr. Frank M. Howard and his brother, Dr. Warren Howard. This species is named in their honor.

FAMILY GOMPHOCERATIDÆ.

POTERIOCERAS MISSOURIENSE, N. SP.

Plate XI, fig. 6, dorsal view, natural size; part of the shell at a.

Shell large, straight, subfusiform, obconoidal from the apex to about the line of the lower third of the body chamber, or about three-fourths of the length of the shell, and then gently curving to the contracted mouth; the body chamber has a length about equal to the length of the septate portion; transverse section circular or subcircular; greatest diameter about the line of the lower third of the body chamber.

Both of my specimens are bulged, or a little more tumid in the region of the lower part of the body chamber on one side than on the other, which, I believe, is the normal character of the shell, and which interferes with the otherwise horizontal position of the septa and gives to them an inclination or obliquity toward the tumid side. The tumid side I regard as the ventral side, and the straighter side, which is illustrated, the dorsal side. The specimens are casts, except a small part of the shell is preserved on one specimen, as shown in the illustration at *a*, or at least what appears to be part of the shell.

It is very evident this species does not belong to Gomphoceras, and it bears the indications of possessing a simple aperture, as in Poterioceras. It is possible, however, that a better specimen might show a mouth or aperture which would distinguish it from that genus. Siphuncle not observed.

Found by R. A. Blair in the Chouteau limestone, near Sedalia, Missouri, and now in my collection.

FAMILY NAUTILIDÆ.

STREPTODISCUS, N. GEN.

Meek & Worthen described the genus Trematodiscus, in 1861, in the Proceedings of the Academy of Natural Sciences of Philadelphia, on page 147, but the name Trematodiscus was preoccupied in 1860. In 1883 Hyatt proposed to substitute Trematoceras for Trematodiscus, because the latter was preoccupied by Haeckel and also by Eichwald, but he was also unfortunate in selecting a name, for Trematoceras was preoccupied by Whitfield in 1882, among the Cephalopoda. I now propose for Meek & Worthen's Trematodiscus, the generic name Streptodiscus, from *streptos*, twisted; *diskos*, quoit; adopting Meek & Worthen's definition, and that of Meek, in vol. IX, page 491, of Hayden's Survey, with his type, Nautilus stygialis of DeKonninck.

STREPTODISCUS INDIANENSIS, N. SP.

Plate XI, fig. 1, *lateral view, natural size.*

Shell large, discoidal, slowly enlarging, exposing each whorl and perforated; umbilicus very broad, showing all the inner whorls and perforated in the center; volutions few, probably very little more than two, gradually increasing in size, coming in contact without embracing; transverse diameter a little less than the dorso-ventral diameter; volutions obtusely angular on the dorsal, ventral and lateral sides; transverse section subquadrangular, the longer sides directed toward the inner whorls.

Septa moderately concave, distant about one-third the dorso-ventral diameter and curve slightly forward in crossing the outer angle of the volutions; body chamber, as shown in our specimen, deeply notched on each side, and having a length to the notch of about two inches, the length on the outer angle of the whorl exceeding three inches.

Surface marked by wide, shallow, longitudinal furrows, which are most distinct on the inner lateral sides of the volutions, and these are crossed by numerous close, elevated, transverse lines that curve backward in crossing the outer angle of the whorls.

This species is distinguished by its large size, relative proportions, distant septa and transverse section.

Found in the Keokuk Group, at West Point, Ind., and now in the collection of Prof. S. S. Gorby.

NAUTILUS TODDI, N. SP.

Plate XI, fig. 2, lateral view, natural size, showing two radiating furrows; figs. 3 and 4, dorsal views, each showing a radiating furrow.

Shell very small, globose; slowly expanding and consisting of more than two whorls (probably three or more). Umbilicus deep, funnel shaped, not disclosing the inner whorls. Volutions widely and deeply embracing; angular at the margin of the umbilicus and broadly rounded dorsally; transverse diameter twice as great as the dorso-ventral diameter; transverse section semicircular, except the concave furrow for the reception of the inner whorl.

Septa close, about sixteen in a distance equal to the transverse diameter of the volution. Two concave furrows radiate from the umbilicus and curve slightly forward in passing around the dorsum. One of our specimens shows three of these furrows. Sides delicately corrugated at the margin of the umbilicus, otherwise the surface is smooth. Part of our specimens are black, hard, and look as if polished, others are coated with iron pyrites. Body chamber and siphuncle unknown.

This species will be distinguished by its small size, short septa, form of the umbilicus, transverse section and smooth surface. Probably it is not a true Nautilus, but for want of more complete specimens it is referred to that genus. I have in my collection some small specimens of Nautilus from Perrysville, Indiana, and also from Danville, Illinois, that I think are somewhat near the species described, but my specimens are not good enough to define, though they are proportionally shorter in the transverse section of the whorls and distinct from this species in the surface ornamentation.

Found in the Upper Coal Measures at the Rosedale coal shaft, in Wyandotte County, Kansas, and now in my collection. The specific name is in honor of D. H. Todd, an active collector and prominent geologist of Kansas City, Missouri.

METACOCERAS CAVATIFORME, HYATT.

Plate XI, fig. 5, lateral view, natural size; fig. 7, dorsal view.

Shell medium size. Umbilicus wide, deep, showing nearly all of each whorl and perforated. Volutions about three, increasing rather rapidly in size, moderately embracing, transversely subelliptical in the beginning, but becoming more and more subquadrate toward the aperture, with the growth of the shell; transverse diameter, in the early growth of the shell, twice as great as the dorso-ventral, but becoming, in mature shells, toward the aperture, less than one-half greater, greatest transverse diameter at the margin of the umbilicus, which is obtusely angular, the shell abruptly rounding into the umbilicus and being flattened on the sides and sloping toward the dorso-lateral margin; the greatest convexity of the whorls is from the margin of the umbilicus to the next inner whorl. A row of nodes around each dorso-lateral margin become more and more conspicuous with the growth of the shell; there are about seven nodes to eight septa. The dorsum is slightly convex and the ventrum correspondingly concave. (Hyatt reverses the use of these words.)

Septa moderately concave, appearing on the surface as arching gently backward on the sides and then forward on the dorso-lateral margins and backward on the dorsum; these sigmoidal flèxures on the surface have no resemblance to saddles and lobes, but result from the subquadrate; transverse outline of the volutions; if the volutions were round, the septa would show the usual straight outline of ordinary septa in Nautiloid shells. Septa separated in the early growth of the shell about one-fourth the transverse diameter, but toward the aperture in mature shells becoming less than one-fifth the transverse diameter. Siphuncle small, round and near the dorsal side. Surface apparently smooth.

This species is congeneric with *Nautilus planorbiformis* and *N. sangamonensis* of Meek & Worthen, and as nearly related to the former as to the latter, though in that species the siphuncle is central, the younger shell rounded and the septa proportionally more distinct, and the whorls more numerous and more slowly enlarging than in this species, and of course differing in the transverse section. The species can not be confounded with each other on specific characters.

Meek suggested that his two species with such forms as *N. occidentalis* of Swallow should probably form a distinct subgenus of *Nautilus*, but he did not propose a name for the subgenus. He regarded *N. quadrangulus* of McChesney (he misspelled it *quadrangularis* in Pal. Up. Mo. and I did the same in North American Geol. and Pal., p. 444, probably both typographical errors), as a synonym for *N. occidentalis* and *N. nodocarinatus* as a mere variety of it. He also regarded *N. biserialis* of Hall as a synonym for *N. occidentalis*.

Hyatt, however, founded his genus *Tainoceras* on McChesney's species *N. quadrangulus*, and ascribed to it characters quite different from those belonging to *N. planorbiformis* and to this species. Hyatt also founded his genus *Metacoceras* on *N. sangamonensis*, which species was founded on a single specimen, consisting of about half of one volution, and, so far as I am informed, the only specimen of the species then known. His definition of *Metacoceras* is as follows:

"Metacoceras, nobis, includes Silurian and Carboniferous species, with broad ventral, lateral and dorsal lobes, but no annular lobes; siphon near the ventrum or central; whorls quadrate; sides with one row of nodes along the external border; umbilical shoulders, smooth but gibbous. The type has this part of the whorls elevated into a ridge. The forms are evidently transitions from the genus Plectoceras to Mojsvaroceras. Type Meta. (Discus) sangamonense, M. et W., Geol. Sur. Ill., vol. II, page 29." (Proc. Bost. Soc. Nat. Hist., vol. XXII, p. 268.)

It is quite incomprehensible why he should say the genus "includes Silurian and Carboniferous species" when he actually founded the genus upon the description of a single coal measure fragment and failed to mention any other species that might by any possibility be related to it. He says there are "lateral and dorsal lobes," but there are no such characters, because the septa are regularly arched. The external apparent flexures are wholly due to the subquadrangular shape of the volutions, and any round volution of a Nautiloid shell, if carved to a like subquadrate outline, will show the same kind of apparent flexures of the septa on the external surface. In short, what he said of the proposed genus is either erroneous or is too general to amount to the definition of a single generic character; and yet, if Meek had suggested a generic name after defining the species, it would have been adopted without hesitation and *N. planorbiformis* would have been the type. Under all the circumstances I think it is best to retain the name *Metacoceras*, with *M. sangamonense* as the type, rather than add a synonym to the list of generic names, though it is very doubtful whether Hyatt's definition brings it within the rules of nomenclature. The genus, so far as known, is confined to the Upper Coal Measures.

Found in the Upper Coal Measures, at Kansas City, Mo., and now in my collection.

The above description was written and illustrations drawn before I received a copy of the second annual report of the Geological Survey of Texas, 1891, wherein Hyatt describes the species under the name of Metacoceras cavatiformis, the ending of the specific name doubtless a typographical error, and also describes M. dubium, M. hayi and M. inconspicuum. He gave four figures of M. cavatiforme and his description is so different in method from mine that I quote the whole of it as follows:

"The flat sides in *M. cavatiformis* incline outwards very slightly, the umbilical shoulders are rounded, and the abdomen narrower than the dorsum; there is a row of elongated nodes along either edge of the abdomen, and the central zone of the abdomen is depressed; there are slight swellings or crests on either side of the central depressed zone along the abdomen of the casts examined, but these did not have tubercles.

"The whorls differ markedly from other species of this genus, and, in fact, it resembles *T. cavatum* closely in general aspect. It differs from this, however, in the proportionally narrower abdomen, and the umbilical shoulders are also narrower and more abrupt. The great differences are, of course, in the absence of abdominal tubercles, and in the sutures, the peculiar broad abdominal saddles of *T. cavatum* being absent. There is a shallow abdominal lobe on the impressed zone of the dorsum; the involution does not extend beyond the lateral lines of nodes; the living chamber is probably not much over one-fourth of a volution in length, judging from the length of that in the original specimen in my collection, which has the chamber complete on the venter; the siphuncle is situated above the center. There is also a specimen in Prof. Newberry's collection, at Columbia College, New York, from Kansas City, Missouri, with an entire living chamber which is even slightly shorter than one-fourth of a volution in length.

"The young, as shown above in the figure of a specimen (figs. 30, 31) from Dr. Newberry's collection, reported to have come from Miami County, Illinois, is of an entirely different appearance from the later stages, with an almost round whorl, sutures nearly straight, or with only a slight abdominal saddle; shell smooth, and umbilical perforation large, showing that they were true Cyrtoceratites throughout the first whorl, which was not completed until the shell had reached a considerable size. The amount of involution of the younger whorls by the living chamber is exaggerated in the side view of this specimen (fig. 31), and is better indicated in the front view of the same. The resemblance of the young whorl in outline to that of the genus Temnocheilus can be readily seen in the last figure, in which the front view of the first part of the second whorl is shown. On this second whorl a single row of tubercles appears on either side, and these complete the resemblance to Temnocheilus."

I do not know what he refers to by "T. cavatum," but suppose he refers to a fossil he described in the same paper under the name of *Tainoceras cavatum.*

Solenochilus blairi, n. sp.

Plate XII, fig. 2, lateral view, natural size, except the body chamber appears contracted toward the aperture, because less than half the circumference is preserved at that place.

Shell very large, especially the body chamber, gradually expanding, and consisting of between two and three whorls; umbilicus deep, perforated; volutions in contact, but not embracing; broadly rounded on the sides and more abruptly rounded dorsally and ventrally; transverse diameter about one-fourth less than the dorso-ventral diameter; the inner side of the whorls being more abruptly rounded than the outer side, a transverse section is subovate rather than subelliptical; septa distant, on the outside of the whorls, full half the transverse diameter and more than one-third the dorso-ventral diameter; body chamber very large, long, consisting of half a volution and constituting more than three-fourths of the shell. The artist in drawing the body chamber followed the specimen, but less than half the circumference being preserved toward the aperture; the illustration does not show the increase in size as the aperture is approached. Our specimen is a cast; the whorls are well preserved, but none of the shell; the siphuncle is exposed at the middle of the outer margin of the whorls, and evidently came in contact with the shell; it is small and round.

Found by R. A. Blair, in whose honor the specific name is proposed, at Pin Hook Bridge, six miles from Sedalia, Missouri, in the middle part of the Chouteau limestone, and now in my collection.

FAMILY GONIATITIDÆ.

GONIATITES GREENII, N. SP.

Plate X, fig. 5, two dorsal views; fig. 6, lateral view, all magnified three diameters.

Shell minute, discoid, volutions more than four, very slender and hardly embracing, dorsum round. Transverse section of a volution nearly elliptical. Umbilicus wide, shallow, showing the entire width of each volution. Siphuncle very small and near the inside of each whorl. Our specimen reveals only the septate portion and probably that is incomplete, and hence the body chamber and aperture are unknown.

The septa are moderately close and very deeply sinuous. They are beautifully undulated and have some resemblance in a lateral view to those in *G. hyas*, but the undulations are more graceful. There are three lobes and three saddles on each side, all of them are linguiform, being regularly rounded at the ends, and the superior ones being longer than the inferior ones or those nearer the umbilicus. The dorsal lobe is dart-shaped and acutely pointed and resembles the dorsal lobe in *G. rotatorius* and *G. ixion*. All other lobes and saddles are linguiform.

This is a handsome little species quite distinct in the undulations of the septa and the general form and shape of the volutions from all hitherto described.

Found by G. K. Greene, in the Knobstone Group, near New Albany, Indiana, and now in his collection.

CLASS LAMMELLIBRANCHIATA.

ORDER ASIPHONIDA.

FAMILY MODIOLOPSIDÆ.

MODIOLOPSIS DYCHII, N. SP.

Plate VIII, fig. 4, cardinal view; fig. 5, left valve, natural size.

Shell medium or below medium size, narrowly and obliquely elongate-ovate or obliquely subelliptical in outline; widest at the posterior end of the hinge; posterior extremity cuneate; length more than twice the height; inflated on the sides; Modiola-like in dorso-ventral section. Valves strongly convex, the convexity constituting a subangular ridge from the beaks to the postero-basal extremity. Basal margin arcuate, sides above contracted, greatest concavity near the middle. Anterior end produced, nasute, angular, gently curving to the basal margin. Hinge-line straight, oblique, less than half the length of the shell. Beaks anterior, extending beyond the hinge line, appressed, pointed, angular. Umbonal region prominent, subangular in front, gradually swelling and becoming gibbous in the middle and curving to the posterior basal extremity of the shell. Posterior margin from the end of the hinge broadly rounded and produced in a subacute point near the basal margin. A shallow undefined depression is directed from the umbones to the middle part of the contracted basal margin. Shell thin and surface marked with fine concentric striæ and stronger sublamellose lines of growth.

This species is distinguished by its oblique hinge line, oblique subelliptical outline, contracted and sinuous basal margin, small appressed angular beaks, subangular and gibbous umbonal region, and alation at the posterior end of the hinge line. There is no described species with which it is liable to be confounded.

Found in the upper part of the Hudson River Group, at Lebanon, Ohio, by Dr. D. T. D. Dyche, a well-known collector and student of palæontology, in whose honor I have proposed the specific name.

CLASS CRUSTACEA.

ORDER PHYLLOCARIDA.

FAMILY PINACARIDÆ.

MESOTHYRA GURLEYI, N. SP.

Plate IX, fig. 37, post abdomen, natural size.

This species is founded on the cast of a post-abdomen, which is on an arenaceous slab. Caudal plate subquadrangular in outline, highly convex and somewhat flattened above. It is produced in a long, sharply pointed telson, which bears an angular axial ridge strongly marked for one-third the length behind the caudal plate. The lateral spines are a little longer than the telson, but they are broad and flattened or lanceolate, on the dorsal side, and longitudinally furrowed. The caudal plate is about .3 inch in length; the telson about 1.2, and the lateral spines about equal to the length of the caudal plate and telson or about one and a half inches.

The cast is so different from the described species, that no comparison with any of them is necessary. There can be little doubt that it belongs to the genus Mesothyra, though occurring in rocks higher than that genus has heretofore been known.

Found in the Kinderhook Group, at Le Grand, Iowa, and now in the collection of Wm. F. E. Gurley, of Danville, Illinois, in whose honor I have proposed the specific name.

MACROCARIS, N. GEN.

(*Ety. makros, long; karis, shrimp.*)

Carapace bivalve, united dorsally with a strong ligament. Valves long, narrow and ornamented with anastomosing striæ. They are pointed on the dorsal side in front and on the ventral side at the posterior end, while in the middle part the dorsal and ventral sides are subparallel. Abdomen consisting of twelve or more segments, which very slowly taper from the fourth or fifth to the post-abdomen. Post-abdomen consisting of a short, expanding plate with a central ridge or line of division.

The genus *Strigocaris* is known only from the carapace valves and the posterior ends are subtruncated from the ventral side to the dorsal side, while in this genus the posterior ends of the valves are subtruncated from the dorsal to the ventral side. There is no other genus with which it is necessary to make any comparison. Type M. gorbyi.

MACROCARIS GORBYI, N. SP.

Plate IX, fig. 43, interior of carapace valves and four abdominal segments; fig. 44 four and part of another abdominal segment and the post abdomen slightly broken at the end; fig. 45, eight abdominal segments and the post-abdomen; fig. 46, a tooth found in the same rocks that may possibly belong to the internal masticatory apparatus.

Carapace valves narrow, thick, elongate, length about three and a third times the height, moderately convex; anterior end acutely pointed at the dorsal side and obliquely rounded into the ventral margin, which is subparallel with the dorsal to the end of the valves; posterior end obliquely rounded backward from the dorsal ligament and terminating in a point at the posterior ventral extremity. Surface marked from the anterior to the posterior end with numerous more or less anastomosing fine striæ. Length of our specimen from the antero-dorsal extremity to the postero-ventral extremity, 1.35 inches; height, .4 inch. The dorsal side is nearly straight, possibly slightly arched.

The abdomen is composed of at least twelve somites, if the specimens illustrated belong to the same species, of which there can be but little doubt. The specimen illustrated showing the carapace valves has four somites, which I suppose to belong to an anterior enlargement of the abdomen, from the organic matter at the sides of the segments. The first and fourth segments are longer than the other two. Fig. 45 shows a specimen with eight segments of nearly equal length and which very gradually taper to the post-abdomen, which consists of a short expanding plate with a central ridge. The matrix in which the specimen occurs is a claystone, and the outline given in the figure represents rock different from the rest of the stone. It appears as if the animal had been buried in mud and animal matter had produced a semiclaystone before fossilization took place, which is preserved, to some extent, after passing through the process of fossilization. The post-abdomen is turned a little on the side which makes it appear a little narrower than it really is. The central ridge is very distinct. The post-abdomen shown in figure 44 has the outer test destroyed so it does not show the central ridge. Figure 46 is a conodont that I suppose belonged to the masticatory apparatus of a crustacean. Associated with it on the same slab are other forms different from the one figured which I suppose belonged to the same apparatus. I have not given this fossil a name, because I think too many names have been given to such forms, about which, so little is known.

Found by Prof. S. S. Gorby, in the Keokuk Group, at West Point, Indiana, and now in his collection. The specific name is in honor ot the collector.

INDEX TO PLATES.

PLATE I.

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RECEPTACULITES ELRODI, N. SP. 257

Fig. 1, lateral view; Fig. 2, summit view; Fig. 3, view of the tumid side; natural size.

CYSTIPHYLLUM GREENII, N. SP. 258

Fig. 4, a piece from the middle part of a specimen showing lateral expansions, cone within cone and vesicular structure, and rudimentary septa at the lower end; natural size.

AMPLEXUS CINCTUTUS, N. SP. 259

Fig. 5, point of attachment upward, natural size; Fig. 6, another specimen, natural size, base downward.

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Fig. 7, natural size.

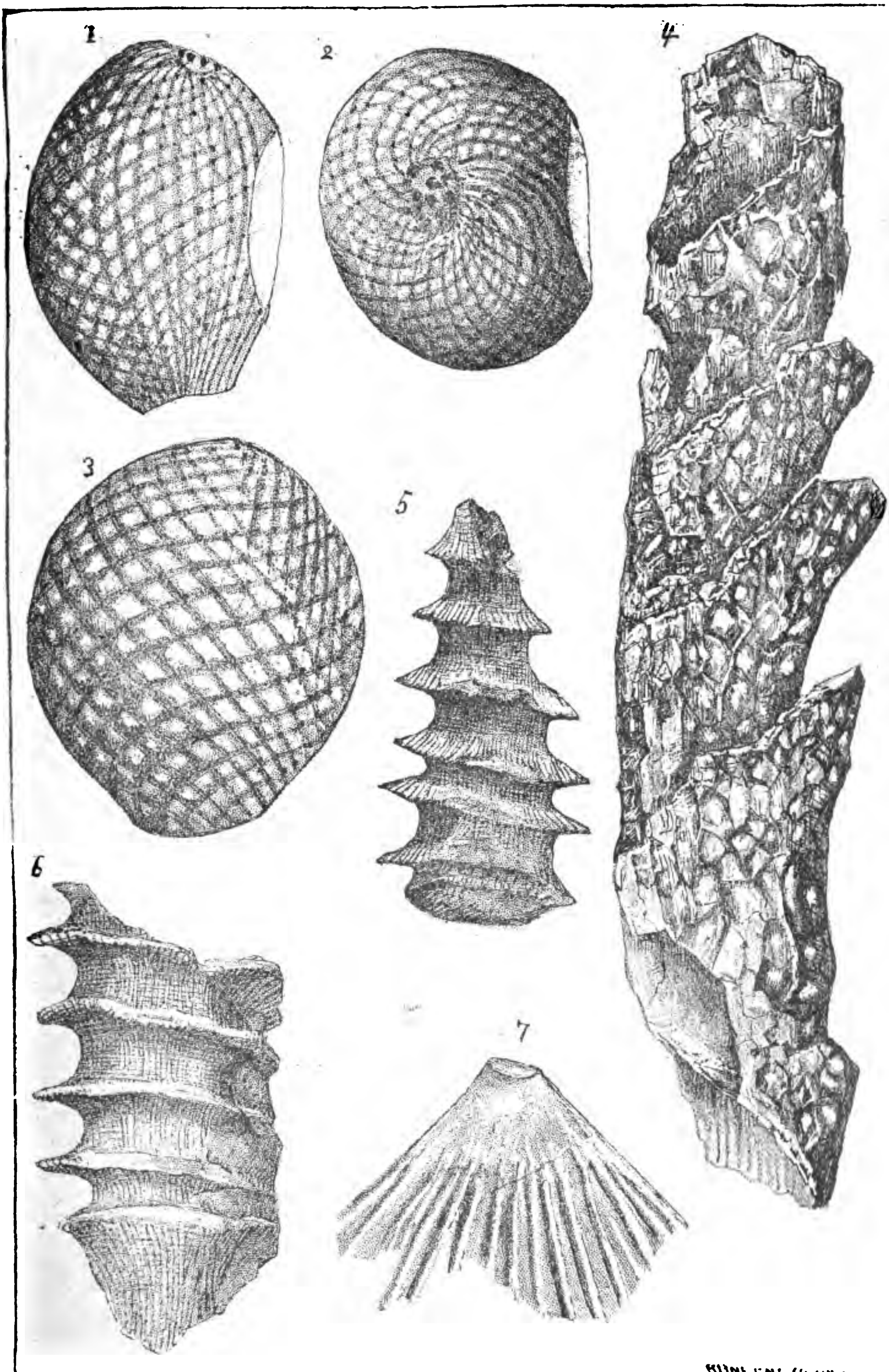
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PLATE II.

PAGE.

HOLOCYSTITES AMPLUS, N. SP. 262

Fig. 1, dorso-lateral view, natural size; base broken off and specimen injured on the antero-lateral side.

AETHOCYSTITES SCULPTUS, N. SP. 264

Fig. 2, side view, natural size.

STRIBALOCYSTITES GORBYI, N. SP. 265

Figs. 3, 4 and 5, lateral, summit and basal views; Figs. 6, 7 and 8, azygous, summit and basal views of a smaller specimen.

AGELACRINUS BLAIRI, N. SP. 266

Fig. 9, magnified two diameters.

STEPHANOCRINUS CORNETTI, N. SP. 266

Fig. 10 shows the length of a specimen, but it is much eroded and broken away; Fig. 11, summit of another specimen; Fig. 12 shows the surface ornamentation, but it is broken at both ends.

PLATYCRINUS CADUCUS, S. NP. 267

Fig. 13, natural size.

PLATYCRINUS CHOUTEAUENSIS, N. SP. 268

Fig. 14, basal view; Fig. 15, first radial magnified two diameters.

PLATYCRINUS COLLETTI, N. SP. 268

Fig. 16, basal view, natural size; Fig. 17, first radial magnified two diameters.

RHODOCRINUS BENEDICTI, N. SP. 269

Fig. 18, lateral view; Fig. 19, summit view; Fig. 20, basal view, natural size.

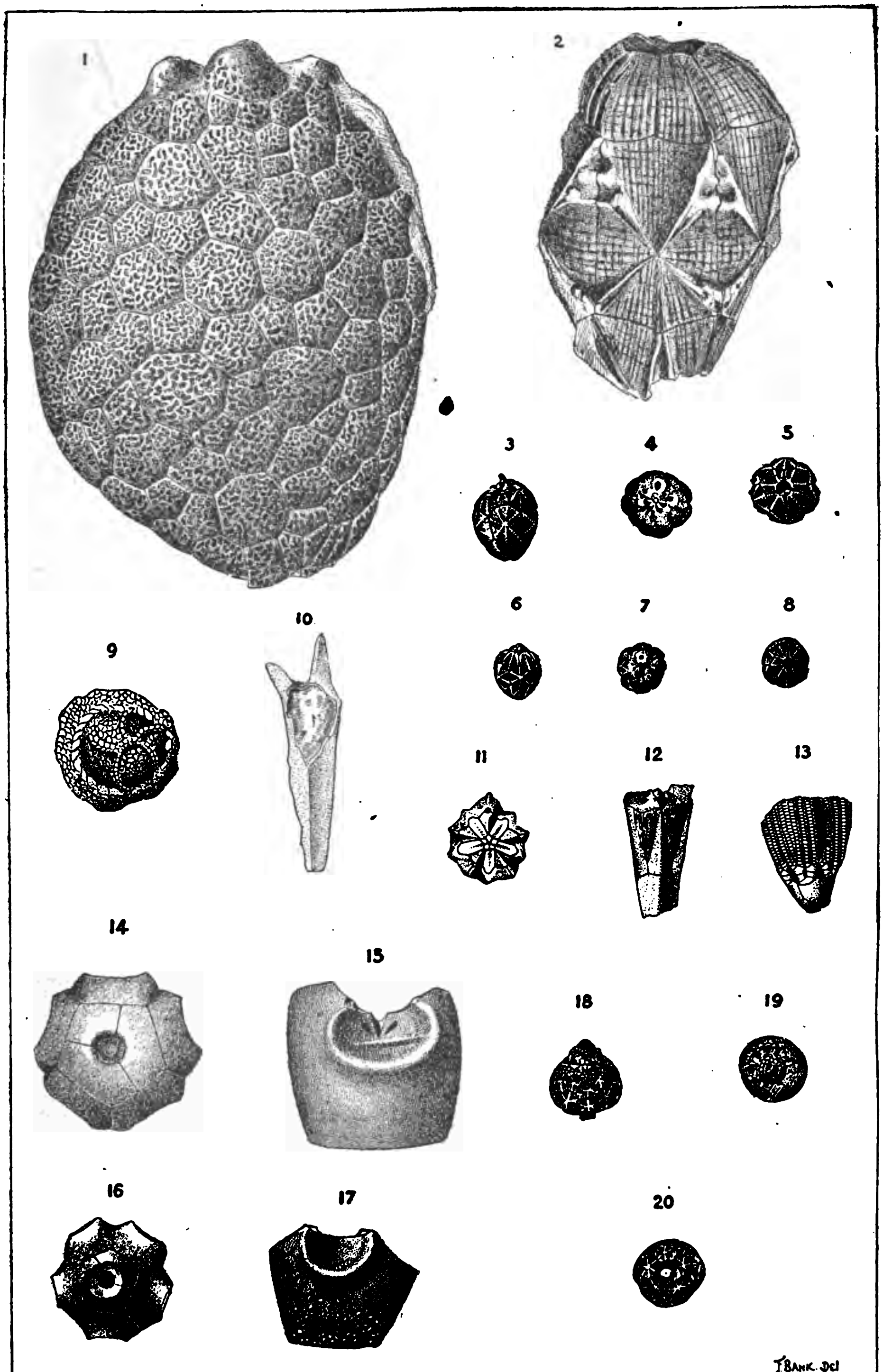
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PLATE III.

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ACTINOCRINUS SEDALIENSIS, N. SP. 270

Fig. 1, azygous side view of a calyx somewhat injured in the middle part; Fig. 2, cast of the azygous side of another specimen; Fig. 3, cast of the vault of the same specimen, only part of the outlines of the plates can be distinguished.

DORYCRINUS ELEGANS, N. SP. 271

Fig. 4, azygous view of calyx; Fig. 5, summit view of calyx.

BATOCRINUS DIVALIS, N. SP. 276

Fig. 6, azygous side of calyx and vault, showing part of two radial series; Fig. 7, showing calyx and arms; specimen somewhat crushed, and the sutures of a few plates destroyed; natural size.

AGARICOCRINUS SAMPSONI, N. SP. 274

Fig. 8, natural size; the specimen is on a slab in high relief.

ACTINOCRINUS (?) CHOUTEAUENSIS, N. SP. 272

Fig. 9, azygous view; Fig. 10, summit view; Fig. 11, basal view, all natural size.

AGARICOCRINUS BLAIRI, N. SP. 275

Fig. 12, summit view; Fig. 13, lateral view of calyx; Fig. 14, basal view of calyx, all natural size.

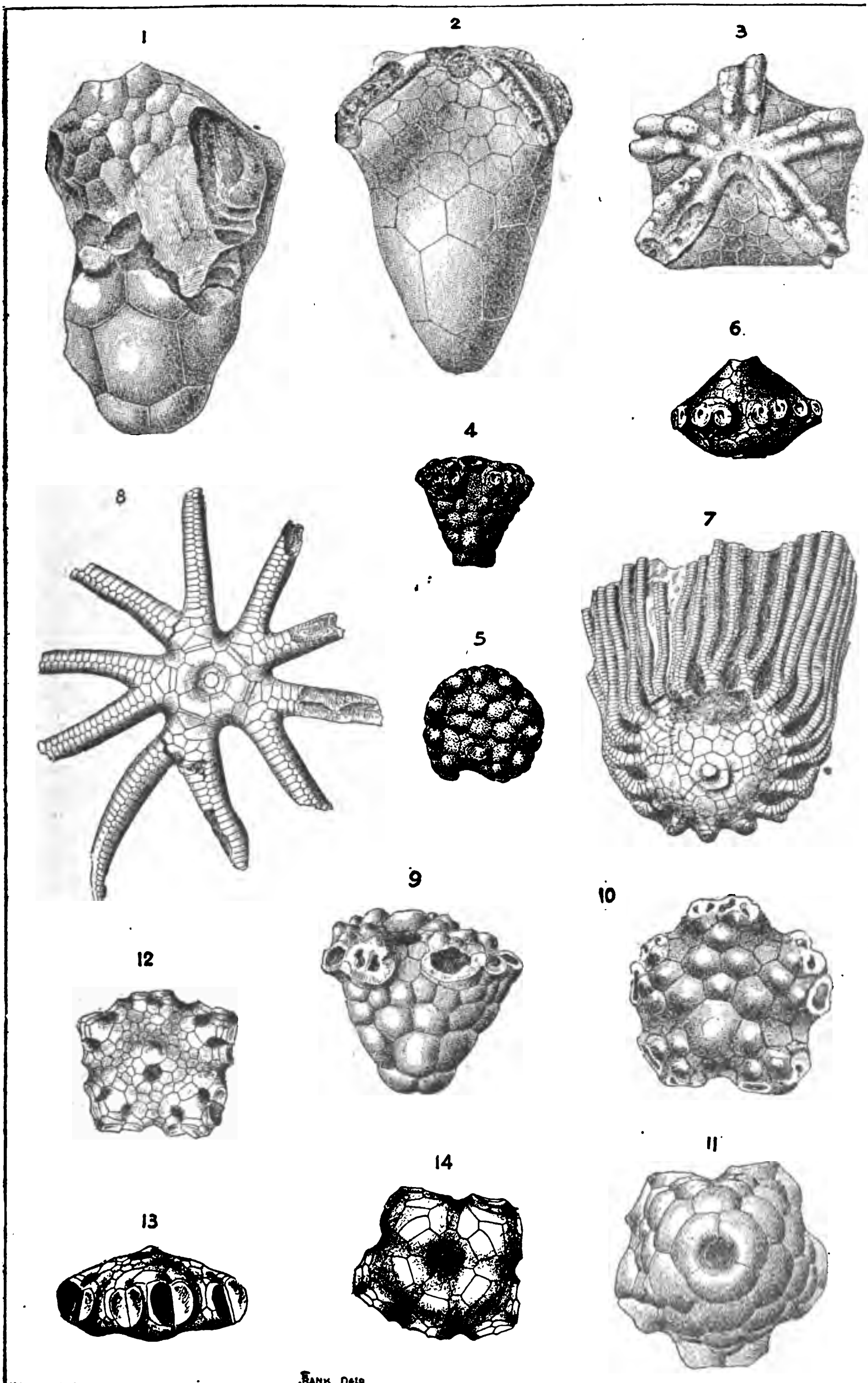
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PLATE IV.

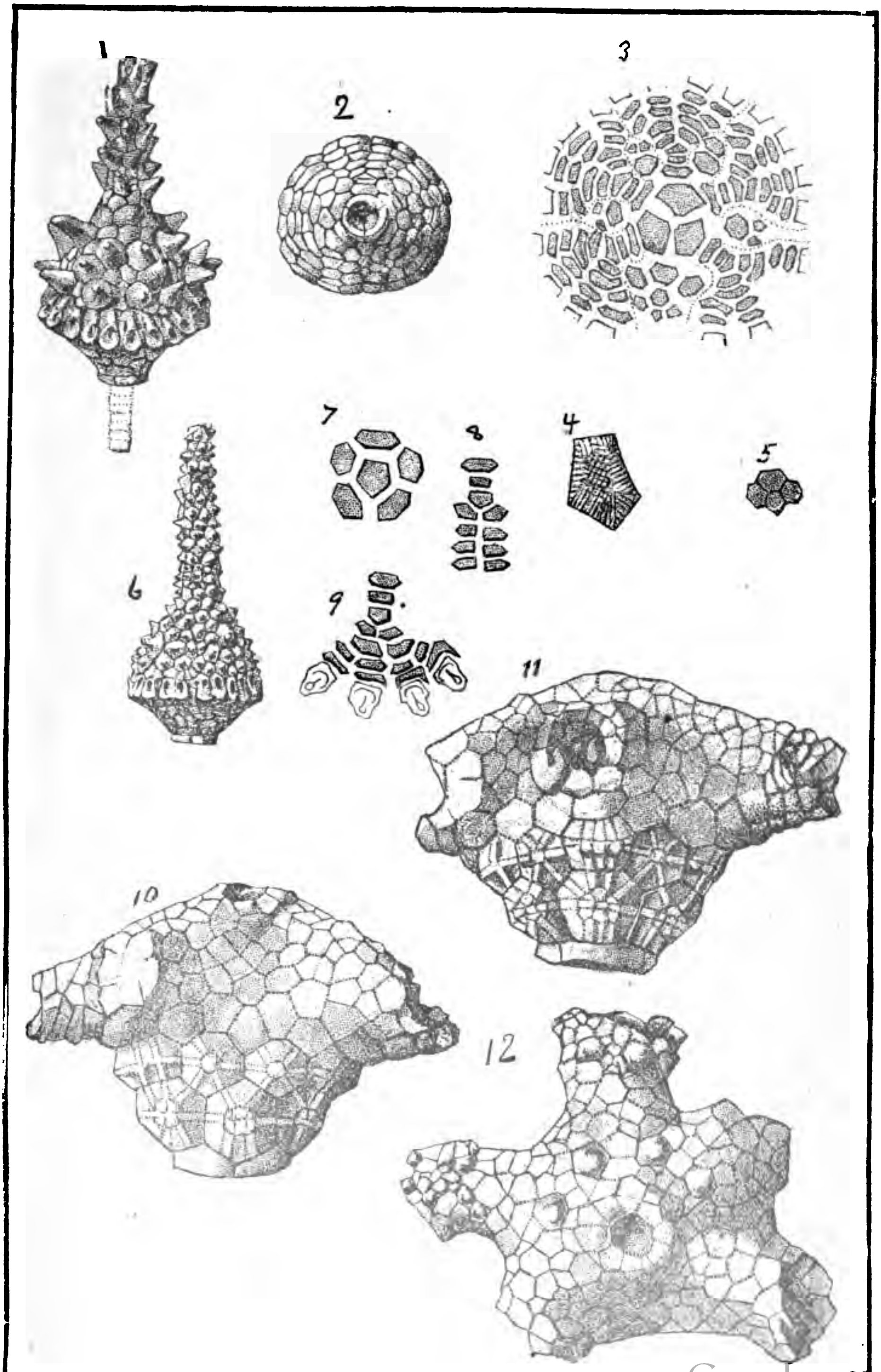
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PLATE V.

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SACCOCRINUS BENEDICTI, N. SP. 283

Fig. 1, a large specimen; Fig. 2, azygous side of a medium sized specimen.

SACCOCRINUS HOWARDI, N. SP. 284

Fig. 3, side view; Fig. 4, azygous view; Fig. 5, summit view.

CYATHOCRINUS GORBYI, N. SP. 298

Fig. 6, azygous view; Fig. 7, side view; Fig. 8, basal view.

GAZACRINUS INORNATUS, N. SP. 303

Figs. 9, 10, 15 and 16, views of different specimens; Figs. 9 and 10 show some of the arm plates and the second and third radials are anchylosed; Fig. 16 is an azygous view; Fig. 17 shows the internal structure of the vault, the outer plates being removed.

MELOCRINUS ÆQUALIS, N. SP. 302

Fig. 11, view of two interradial areas, with the middle arm broken off close to the body, the outline of the basal plates is from another specimen; Fig. 12, another interradial area on the same specimen.

CYLICOCRINUS CANALICULATUS, N. SP. 285

Fig. 13, side view; Fig. 14, azygous view.

BATOCRINUS COMPARILIS, N. SP. 286

Fig. 18, side view, Fig. 19, azygous view; Fig. 20, summit view with the proboscis broken off.

BATOCRINUS BRITTSI, N. SP. 287

Fig. 21, side view; Fig. 22, azygous view; Fig. 23, summit view.

BATOCRINUS DECREPITUS, N. SP. 288

Fig. 24; side view showing the proboscis extending beyond the arms.

SCAPHIOCRINUS LYONI, N. SP. 299

Fig. 25, azygous plates are shown on the left.

SCAPHIOCRINUS MANIFORMIS, N. SP. 300

Fig. 26, lateral view.

ACTINOCRINUS BLAIRI, N. SP. 289

Fig. 27, side view of calyx and part of the vault; Fig. 28, part of the azygous side of another specimen showing slight sculpturing toward the sutures; Fig. 29, basal view of same.

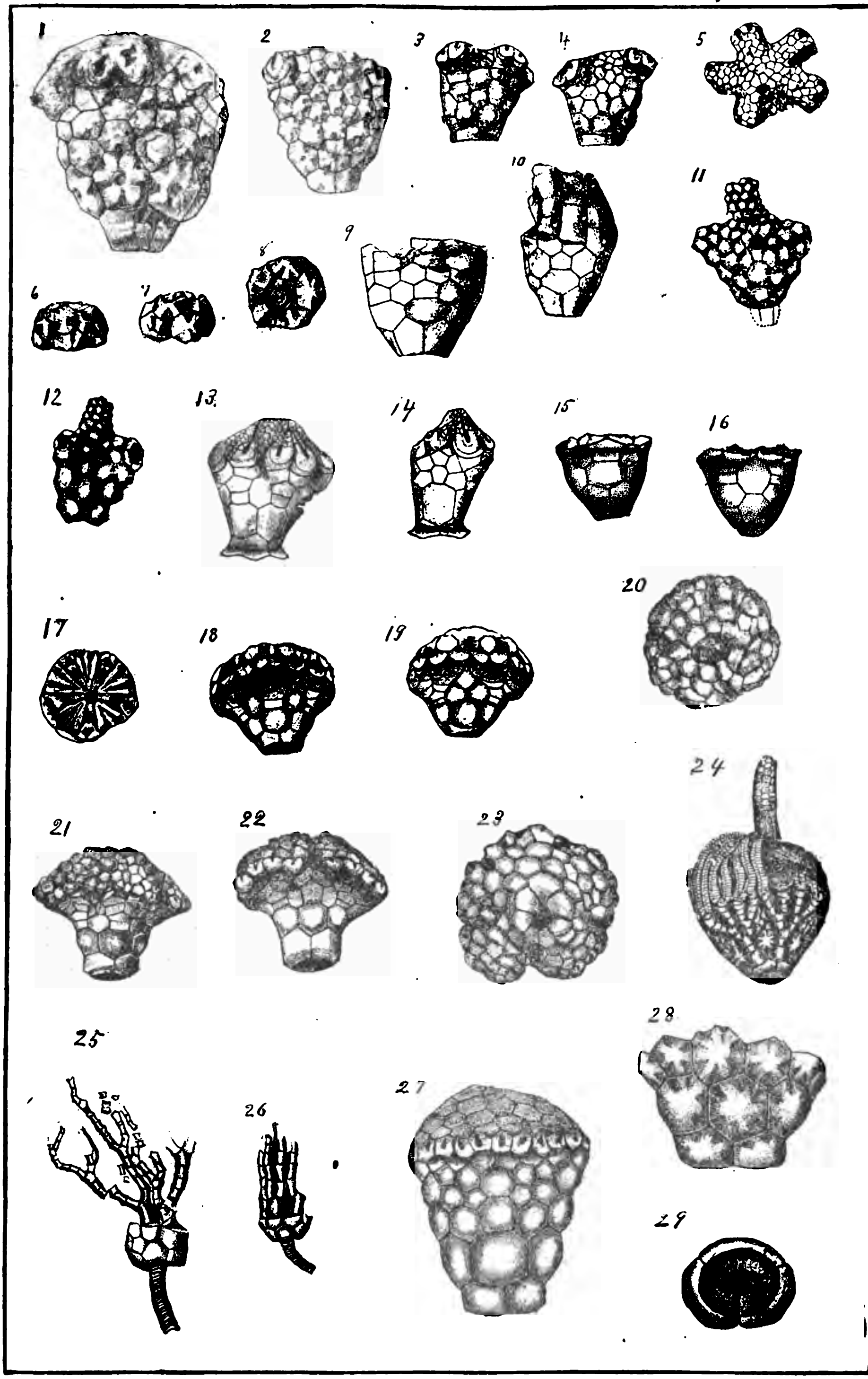
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PLATE VI.

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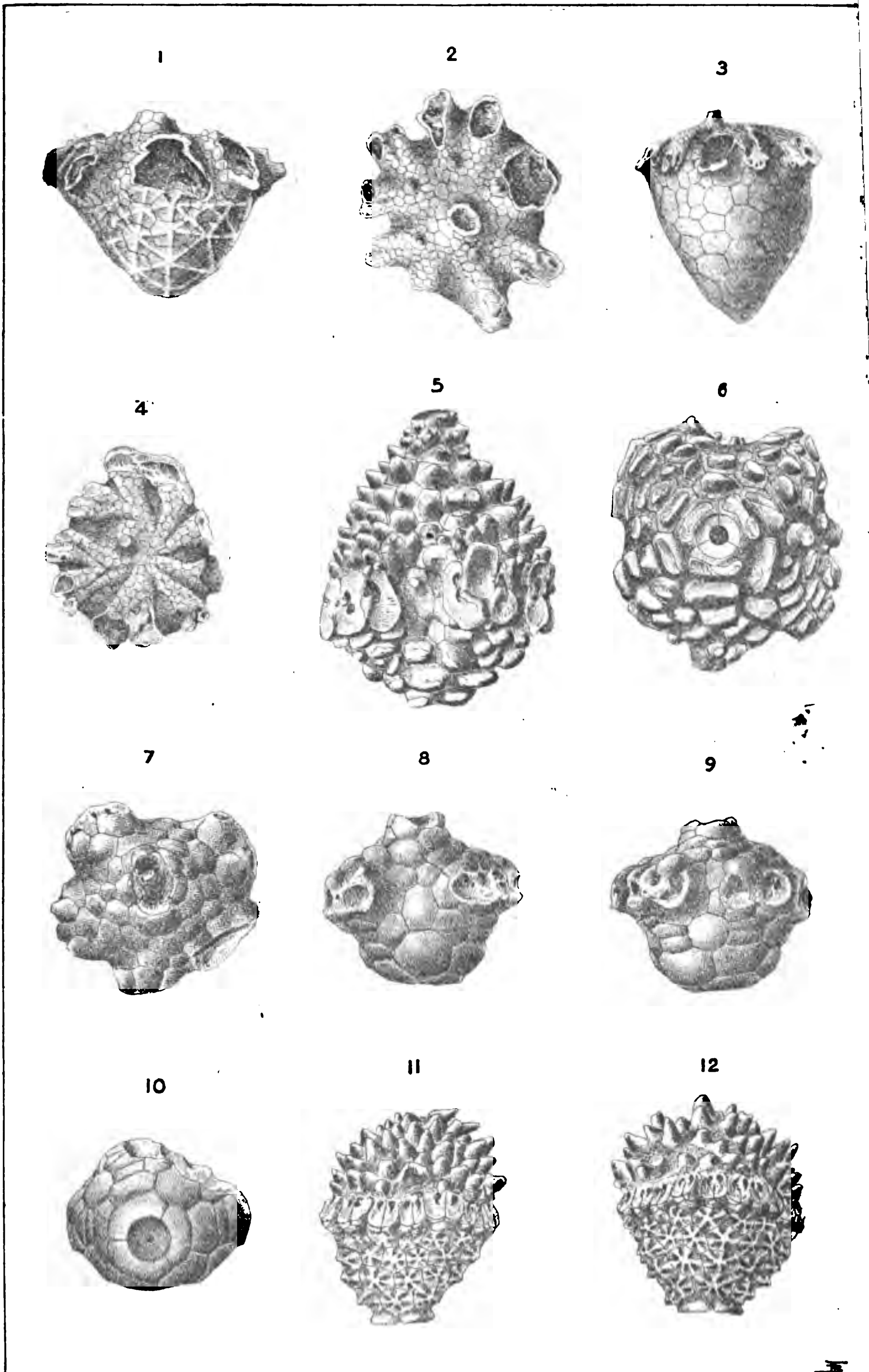
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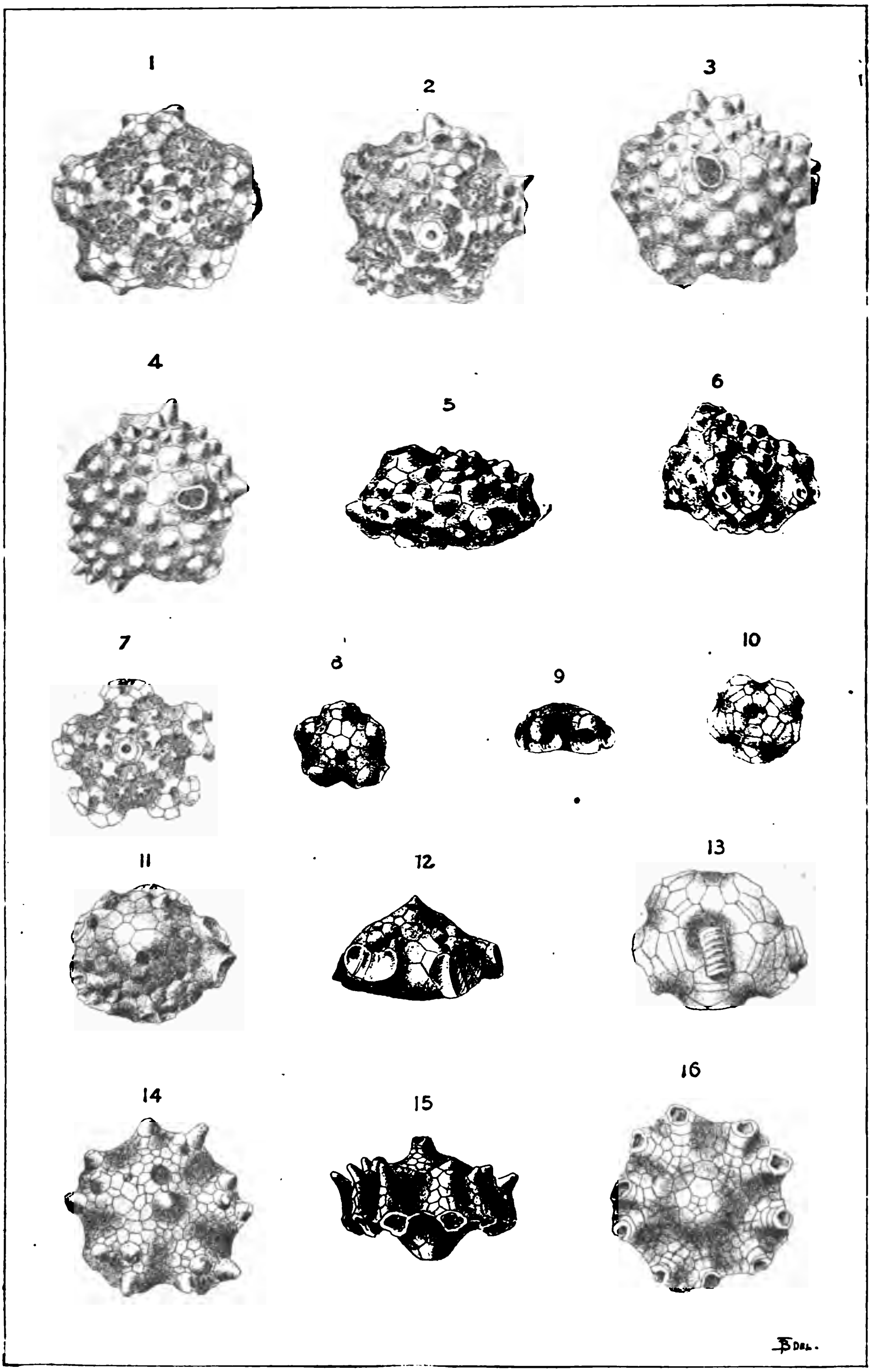
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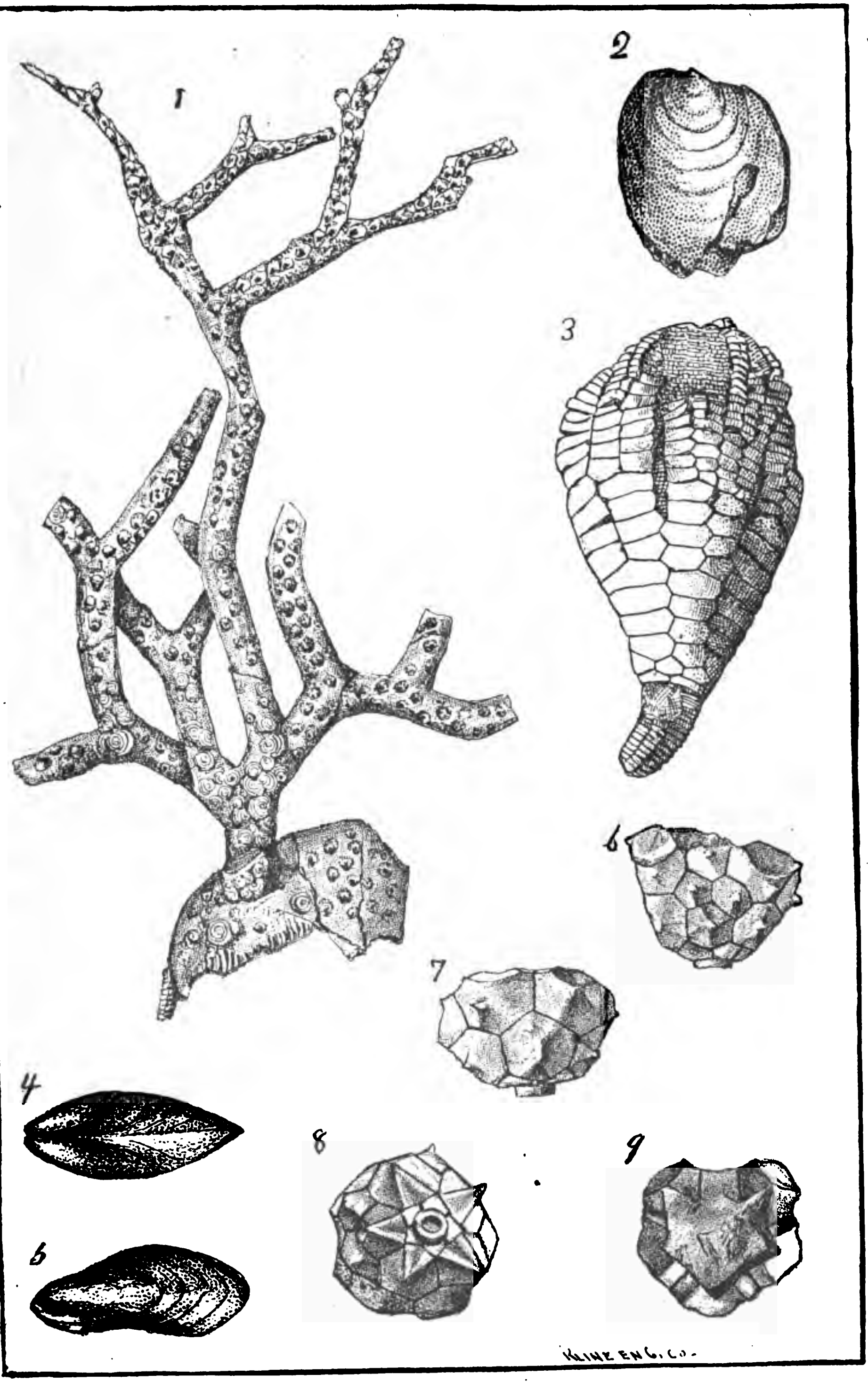
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PLATE IX.

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LINGULA PARRISHI, N. SP. 307

Fig. 1, a well-preserved specimen having only a little of the lateral and front margins broken off, and preserving part of the external shell.

LINGULA SEDALIENSIS, N. SP. 308

Fig. 2, dorsal valve, slightly broken at the beak and at the frontal margin, natural size.

LINGULA GORBYI, N. SP. 309

Fig. 3, a large fragmentary specimen; Fig. 4, a smaller, nearly perfect specimen, having only a small piece broken from the left side near the beak; natural size.

CRANIA BLAIRI, N. SP. 310

Figs. 5 and 6, dorsal views of two specimens; the margins of both are imperfect.

CRANIA GREENII, N. SP. 310

Fig. 7, dorsal valve; the outer margin is not all preserved; *a*, posterior part of the shell.

RHYNCHONELLA COLLETTI, N. SP. 311

Fig. 8, ventral view; Fig. 9, cardinal view, natural size.

TEREBRATULA OCCIDENTALIS, N. SP. 313

Fig. 10, dorsal view; Fig. 11, ventral view; Fig. 12, profile view of a smaller specimen; Fig. 13, cardinal view of same.

ATHYRIS OTTERVILLENSIS, N. SP. 314

Fig. 14, cardinal view; Fig. 15, ventral view.

ATHYRIS BRITTSI, N. SP. 314

Fig. 16, dorsal view; Fig. 17, ventral view; Fig. 18, cardinal view.

ATRYPA MISSOURIENSIS, N. SP. 315

Fig. 19, ventral view; Fig. 20, dorsal view; Fig. 21, profile view.

RHYNCHONELLA KOKOMOENSIS, N. SP. 312

Fig. 22, ventral view; Fig. 23, front view; Fig. 24, dorsal view.

RETZIA TRIANGULARIS, N. SP. 315

Fig. 25, dorsal view; Fig. 26, profile view.

MICROCYCLUS BLAIRI, N. SP. 261

Fig. 27, a large specimen; Fig. 28, a smaller one.

RETZIA PLICATA, N. SP. 316

Fig. 29, ventral view; Fig. 30, cardinal view; Fig. 31, an interior, showing part of the coils, some of them extending to the front margin.

RETZIA CIRCULARIS, N. SP. 316

Fig. 32, ventral view. Fig. 33, dorsal view; Fig. 34, profile view.

HYOLITHES LANCEOLATUS, N. SP. 317

Fig. 35, side view; Fig. 36, transverse section.

MESOTHYRA GURLEYI, N. SP. 331

Fig. 37, post-abdomen, natural size.

TRYBLIDIUM MADISONENSE, N. SP. 318

Fig. 38, side view, natural size.

HOLOPEA HUBBARDI, N. SP. 318

Fig. 39, front view, showing aperture and height of shell; Fig. 40, summit view, showing surface markings.

MURCHISONIA HAMMELLI, N. SP. 319

Fig. 41, front view, showing aperture somewhat injured; Fig. 42, pesterior view, natural size.

MACROCARIS GORBYI, N. SP. 332

Fig. 43, interior of carapace valves and four abdominal segments; Fig. 44, four and part of another abdominal segment and the post-abdomen slightly broken at the end; Fig. 45, eight abdominal segments and the post-abdomen; Fig. 46, a tooth found in the same rocks that may possibly belong to the internal masticatory apparatus.

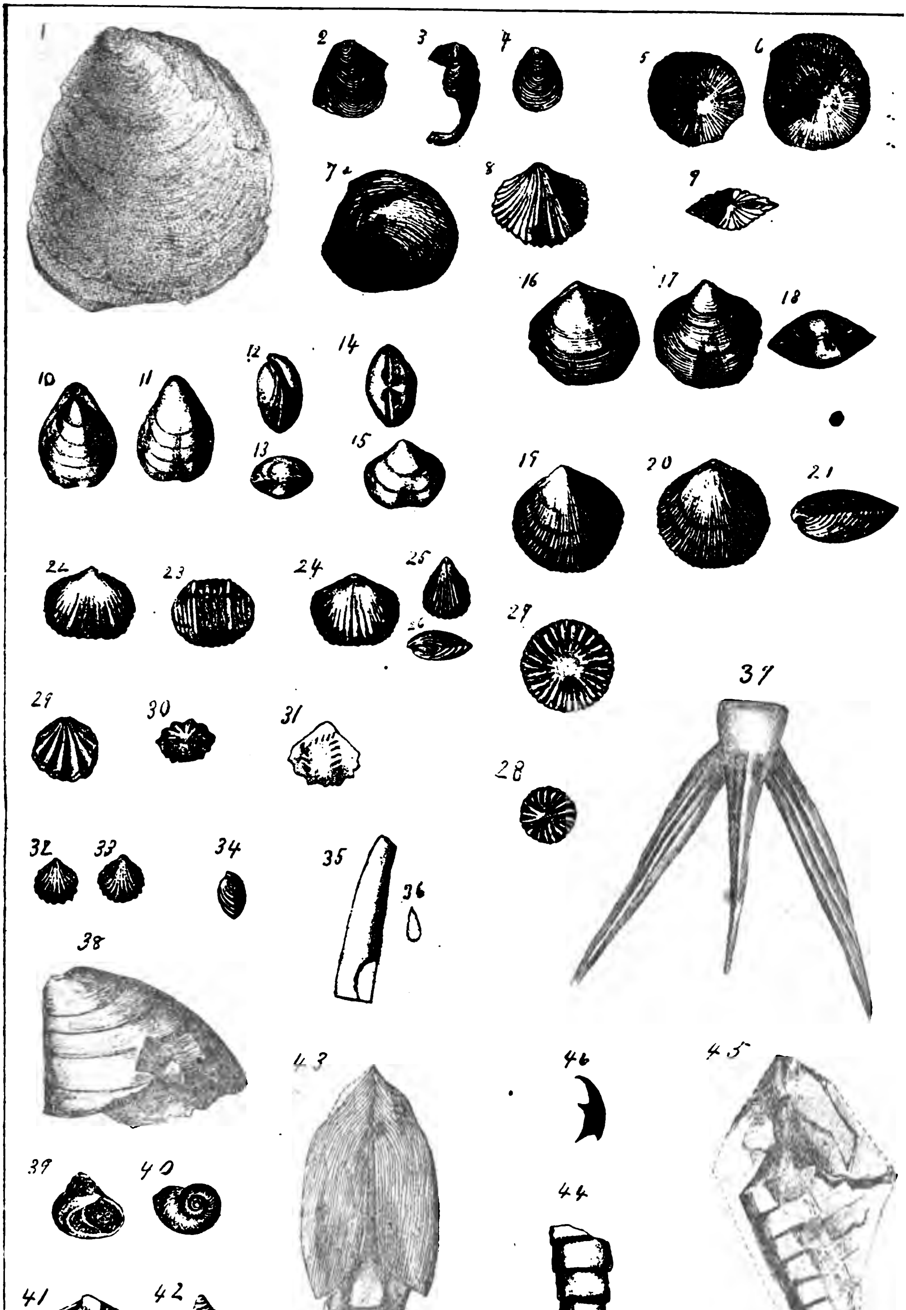
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PLATE X.

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ORTHOCERAS COLLETTI, N. SP. 321

Fig. 1, natural size.

ORTHOCERAS GORBYI, N. SP. 322

Fig. 2, dorso-lateral view, natural size.

ORTHOCERAS FRANKLINENSE, N. SP. 322

Fig. 3, side view, natural size.

CONULARIA INTERTEXTA, N. SP. 317

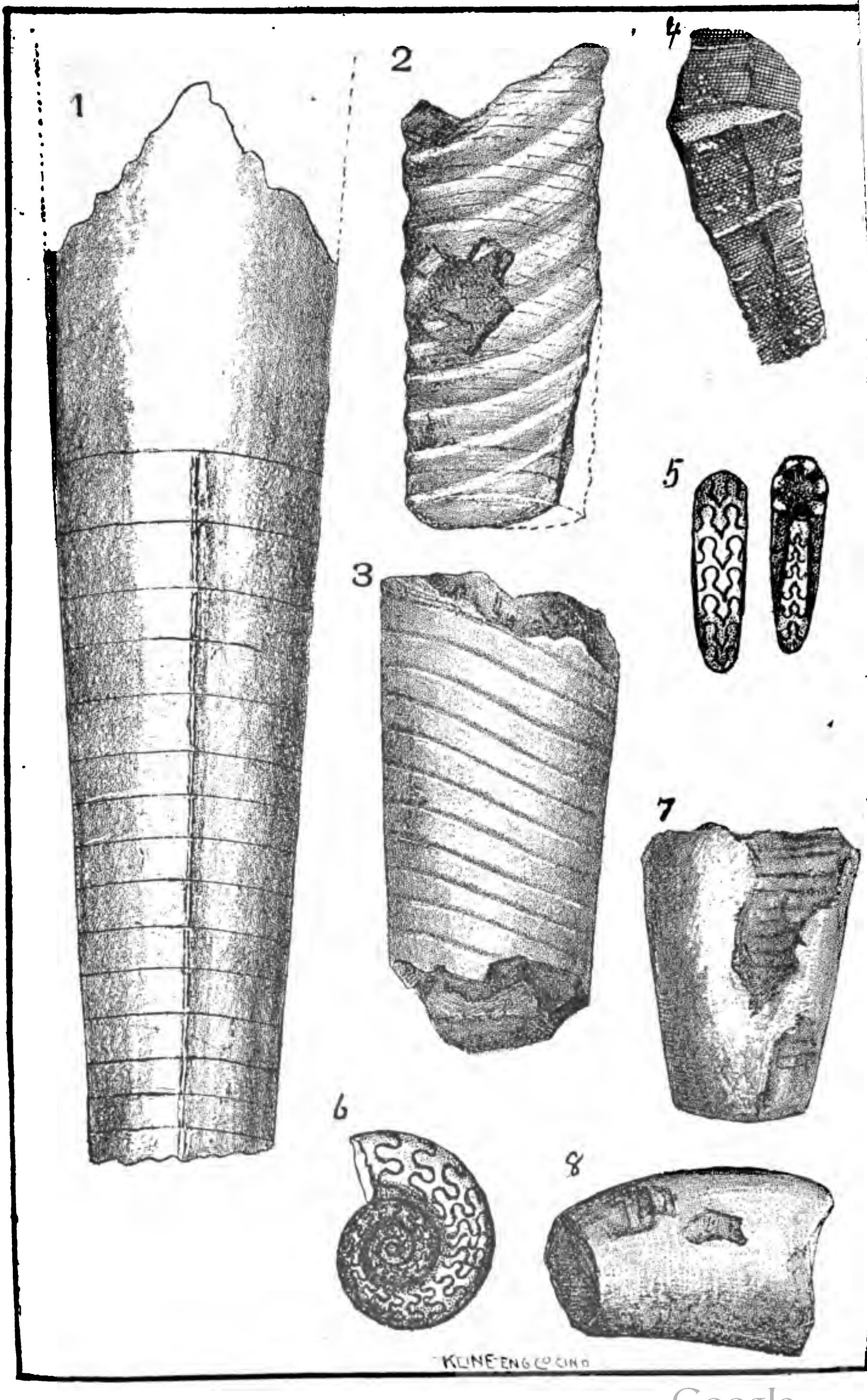
Fig. 4, specimen broken and fragmentary, magnified about one and a half diameters; the longitudinal lines, in the upper part, should be inclined somewhat diagonally.

GONIATITES GREENII, N. SP. 330

Fig. 5, two dorsal views; Fig. 6, lateral view, all magnified three diameters.

CYRTOCERAS THOMPSONI, N. SP. 323

Fig. 7, dorsal view; Fig. 8, lateral view.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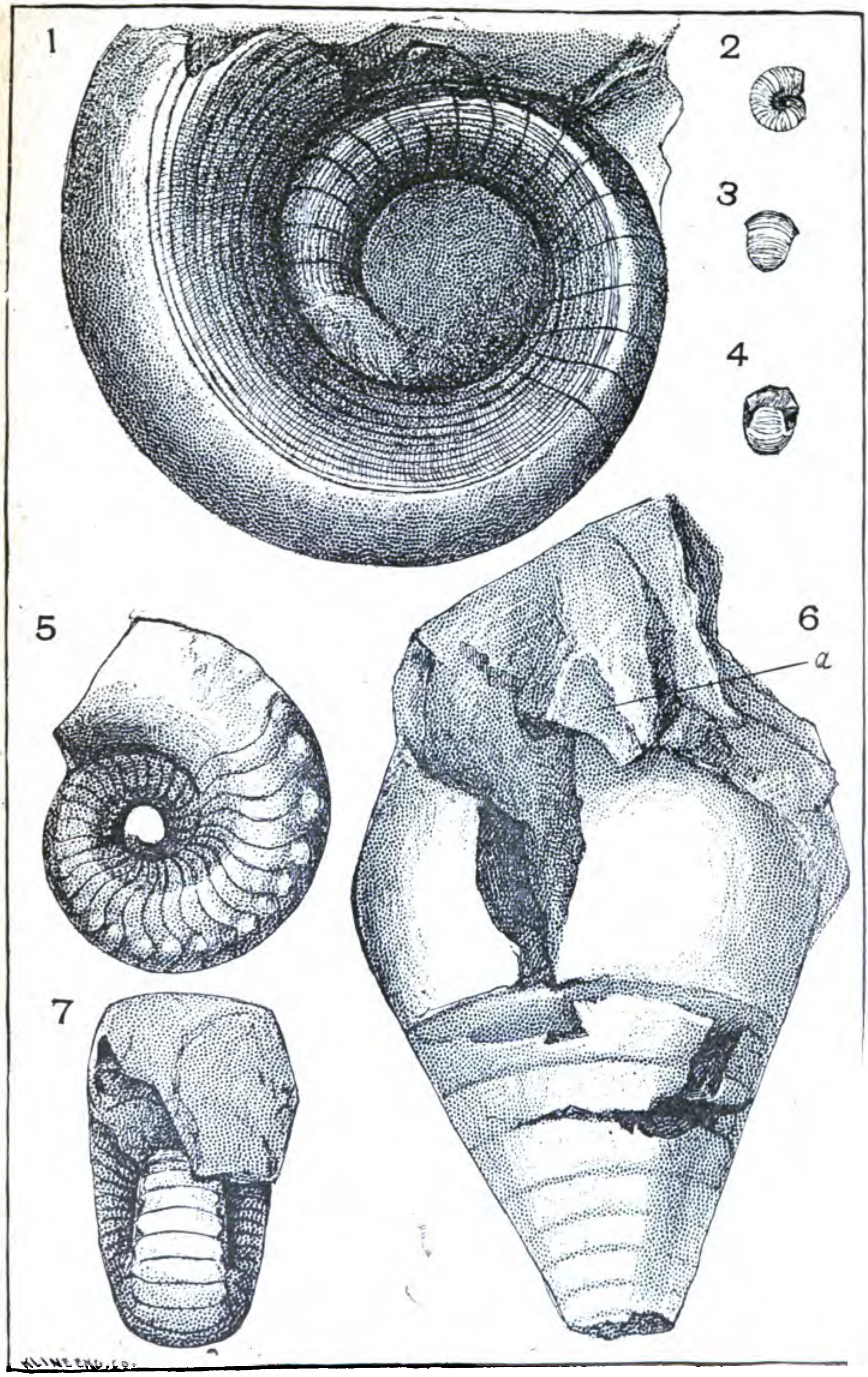
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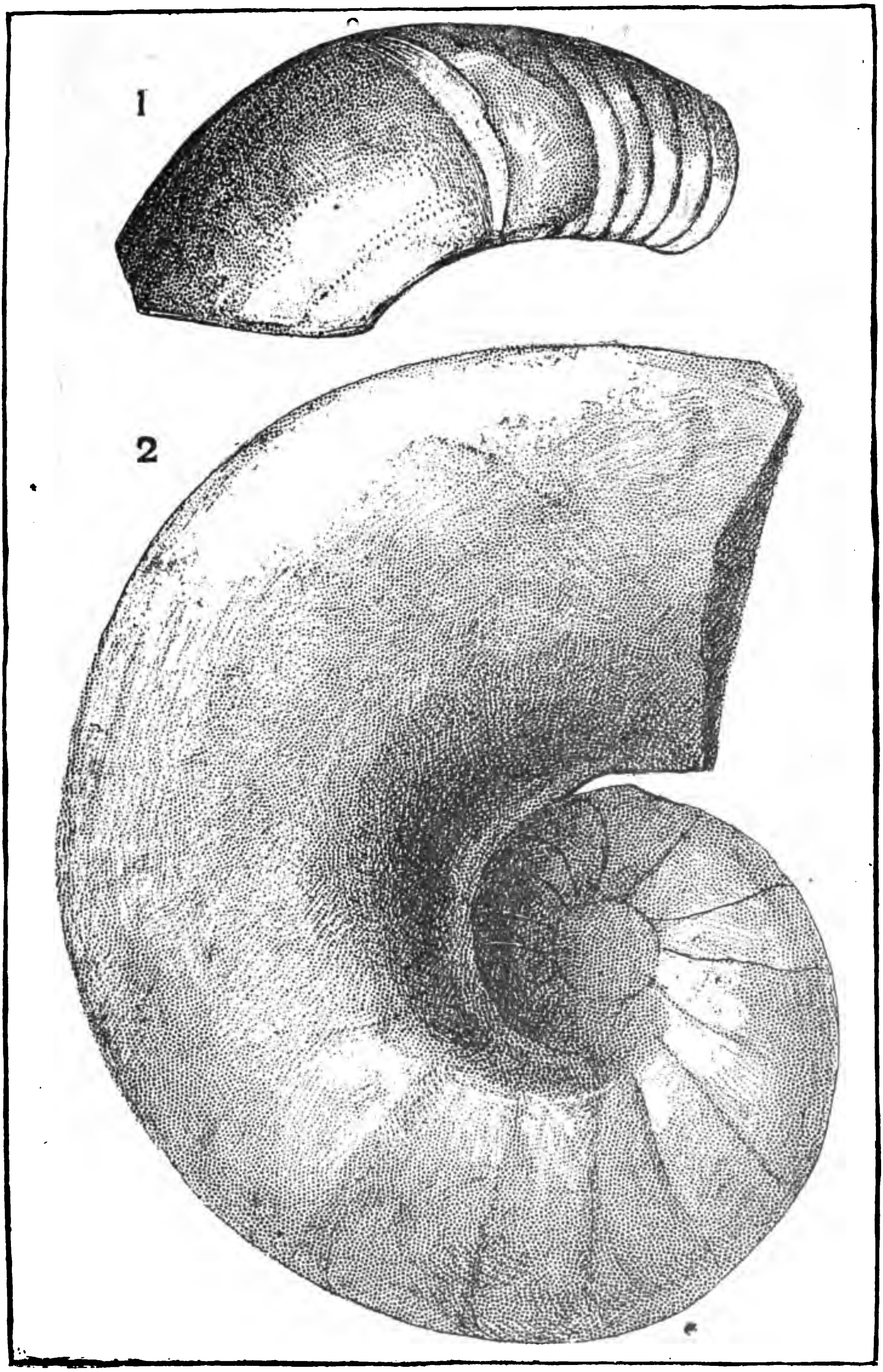
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