GEOLOGY

OF

GIBSON COUNTY.

BY JOHN COLLETT.

Gibson county contains four hundred and fifty square miles, and is bounded on the north by Knox and Pike, east by Pike and Warrick, south by Warrick Vanderburg and Posey, and west by the State of Illinois. The Wabash and White rivers form its western and northern boundaries, and the Patoka traverses the county from east to west through the northern parts. These rivers with Pigeon and Black creeks, and their numerous branches, afford drainage and ample supplies of water for stock and other purposes. The surface in the western parts is level or agreeably undulating; about one-half is bottom land and a small portion sand barrens. East of the center and along the eastern and northeastern boundary are elevated plateaus pierced by deep valleys, and covered with excellent timber. The soil is generally alluvial loam and is everywhere fertile. The surface configuration and features are so exactly similar to those of Knox county that discussion under the head of Alluvium, Boulder Drift, and Loess, would be a mere repetition of matters already canvassed in my report on that

county, to which I refer. The only exception will be mentioned, viz:

In the geology of Pike county it is remarked that from the terminus of the conglomerate spur which pierces that county like a promontory from the east, a ridge of yellow loam sets in and continues westward forming the present, as it probably formed the ancient line of demarkation between the waters of Patoka and White rivers. This ridge was clothed with a magnificent growth of oak, poplar and other valuable timber, and, from the quality of its soil, was formed at a time when the head waters of the two rivers were rapidly cutting their channels in the sub-carboniferous limestones to east—constituting a rich calcareous loam. This ridge with like characteristics as to soil and timber is found to be continued from northeast to southwest across Gibson county, constituting a broad belt of the finest agricultural lands in the world about Princeton, Owensville, etc. Outliers of this *Poplar* soil are seen even west of the Wabash, at and southwest of Mt. Carmel, which indicate the wayward course of the river currents then flowing through a broad lake-like sheet of water at an elevation from one hundred and twenty to one hundred and fifty feet above their present channels. The persistence of this ridge clear across, and silting up the previously excavated chasm of the Wabash Valley, will explain the recent existence of a Lacustral sheet of water in Knox county, and the occurrence there of a sub-tropical *fauna* and *flora*, remnants of which linger to this day.*

* *The survival of a sub-tropical flora and fauna*, indicating the existence, at a comparative recent period, of a *member of the "central post glacial lake" and climate is for the first time mentioned* in my report on geology of Knox county. A probable cause is here noted. The extinction of the life of this age has been gradual, long in action, and is still continued. Our mound builders were familiar with tropical life. Their tombs furnish spirited figures wrought in stone of the *Toucan*, *Manatee*, *Puma*, etc., seemingly drawn from life. Within the last thirty years the larger forests of hackberry trees have perished; and within the same time the thousand flocks of Paroquets, whose bright plumage flashing through our forests and odd habits of hibernation were an attractive study to naturalists, have passed away.

The original growth of timber on the uplands consisted of oak and poplar—yards in diameter and rods in length—maple, beech, hickory, ash, gum, etc.; of the river bottoms, walnut, sycamore, cottonwood, papaw, elms, honey locust, cypress, white gum, catalpa, coffeenut and vines. The stations on the railway are among the heaviest lumber marts in the State. Large forests will continue to supply this trade, although one-half are already despoiled, giving place to well appointed farms and comfortable or luxurious homes. The knolls and hill-top uplands in the spring are plumed with bouquets, brilliant with red white and purple promises of fruitage; in autumn the valleys are oderous with the fragrance of ripening orchards.

PALEOZOIC GEOLOGY.

The surface deposits deeply cover the rocks. But few exposures exist, consequently my examinations were limited to a period of twelve days, and the time principally occupied in traveling from one isolated outcrop to another. Fair opportunities for studying the formations were secured along the eastern boundary and just across the line in Pike county. Results gathered from such stations, give the following exhibit, viz:

CONNECTED SECTION OF GIBSON COUNTY.

1.	Soil—Alluvial and Lacustral loams	20 ft. 00 in. to 80 ft. 00 in.
2.	Merom Rock, soft yellow and red sandstone.....	10 ft. 00 in. to 30 ft. 00 in.
3.	Merom Rock, soft heavy bedded sandstone.....	5 ft. 00 in. to 10 ft. 00 in.
4.	Merom Rock, soft massive quarry stone	8 ft. 00 in. to 20 ft. 00 in.
5.	Pyritous shale	00 in. to 5 ft. 00 in.
6.	Irregular coal, in pockets.....	6 in. to 00 ft. 00 in.
7.	Fire clay.....	00 in. to 5 in.
8.	Gray shale.....	5 ft. 00 in. to 10 ft. 00 in.
9.	Flaggy and Quarry sandstone.....	25 ft. 00 in. to 55 ft. 00 in.
10.	Gray silicious shale	31 ft. 00 in.
11.	Shale, with ironstone nodules.....	2 ft. 00 in. to 00 ft. 6 in.
12.	Bituminous limestone—Fossils...	4 ft. 00 in. to 1 ft. 00 in.
13.	Calcareous shale—clod—Fossils.....	3 ft. 00 in. to 1 ft. 4 in.
14.	Black sheety slate, full of *Discina*, *Lingula*, and *Cardinia*.....	3 ft. 00 in. to 4 ft. 00 in.
15.	Pyritous coal.....	4 in. to 00 ft. 00 in.
16.	Rash coal.....	1 ft. 00 in. to 6 in.

17.	Fire clay.....	4 ft. 00 in. to	6 ft. 00 in.
18.	Shaly flags and sandrock	8 ft. 00 in. to	16 ft. 00 in.
19.	Hard blue argillaceous limestone.....	15 ft. 00 in. to	8 ft. 00 in.
20.	Place of rash coal...		
21.	Fire clay.....		5 ft. 00 in.
22.	Clay shale, with calcareous nodules, changing at west to limestone	5 ft. 00 in. to	20 ft. 00 in.
23.	Shale and soapstone	25 ft. 00 in· to	2 ft. 00 in.
24.	Black clod–soft slate	2 ft. 00 to	5 in.
25.	*Coal N*.....	3 ft. 00 in to	2 ft. 6 in.
26.	Fire clay.....		3 ft. 00 in.
27.	Yellow sandstone and shales, changing at Wabash to limestone	40 ft. 00 in. to	80 ft. 00 in.
28.	*Coal M*, fat caking..	1 ft. 00 in. to	4 ft. 00 in.
29.	Fire clay.....		3 ft. 6 in.
30.	Argillaceous shales and sandstone, changing at the west to limestone	60 ft. 00 in. to	115 ft. 00 in.
31.	*Coal L*, white ash—free burning.....	2 ft. 00 in. to	9 ft. 00 in.
32.	Fire clay.....		4 ft. 6 in.
33.	Sandstone and limestone.....	41 ft. 00 in. to	55 ft. 00 in.
34.	*Coal K*.....	2 ft. 00 in. to	4 ft. 6 in.
35.	Fire clay.....		4 ft. 2 in.
			591 ft. 00 in.

Merom Rock.—This sandstone Nos. 2, 3 and 4, of the connected section is found with good exposures along the county line in Township No. 1, ranges 9 and 10. To the south, ascending with the dip, it is soon thinned by ancient denuding forces and is only just caught in the top of the higher ridges and pyramidal hills, as Kennedy Knob near Somerville, and at Snake Knob in Warrick near the extreme southeastern corner of the county. From these points dipping to the west it passes from view beneath heavy deposits of Lancustral and fluviatile loam, until we approach the creek and river valleys, when we find that it has been almost entirely removed by the profound erosive force which was exerted by rushing masses of water at the close of the Boulder drift. Beyond the center of the valley of the Wabash, the dip is reversed, and in Illinois this rock again becomes persistent, where more ferruginous it presented an obdurate bulwark against which the waters of that flood beat in vain. Similar outlying beds are seen at the "Upper" and "Lower Hills" in township 3, S. R. 13, and at "Skelton's Cliff," T. 2, S. R. 12, which rise like artificial pyramids more than one hundred feet above the surrounding bottoms plain. These rocks generally present, in a direction facing the center of the dip, a boldly escarped or overhanging wall, which, tunneled gashed and scarred, records the story of the aqueous conflict, and fully explains the manner in which the valley was excavated. Mouldings and horizontal grooves high up in the sides of the cliff, indicate points where the surface of the lake-like river remained stationary for some time and lashed its waves against the rock islets.

Sections taken at all the outcrops in this county and along the Illinois shore prove by identity of material, stratification and mode of deposit, that these are parts of a single rock which once extended from Merom, the place where first noted, continuously along the Wabash, filling full the valley through which that river has its course; the well cut faces of the stone wherever exposed show that currents of water excavated and removed this belt of sand rock

twelve to fifteen miles wide and nearly one hundred feet thick, on a line more than one hundred miles long. Except at narrow places, bars, etc., the current was evidently sluggish; had only force sufficient to sort out and carry away the finer sands and clays, leaving the *coarser sands* and pebbles to constitute the "Sand Barrens" in the lower end of the county and thence southward. The *Argillaceous* or *Bituminous Limestones* Nos. 12 and 19 are in good force along the eastern line of the county. At Buena Vista they are found well up on the sides of the river bluffs, thence south, depressed for a short distance to the bottom of the ravines, they soon rise against the dip and are only caught in the top of the highest hills as at Hargrave's hill east of Dongola, Kennedy Knob, McGregor Hill, Snake Knob, etc., near the southeast corner of the county. Going west they dip with or faster than the surface deposits, at the rate of about twenty feet to the mile, and at the middle of the Wabash river valley, pass from view below low water mark; but beyond the synclinal axis they again rise to view on the Illinois side.

In the eastern part of the county these limestones are at several points compact and pure enough to burn for lime, and are only separated by a parting of clay a few inches or feet thick. Going west the stone first becomes highly bituminous and the parting is increased, until in the center and western parts, the limestones generally pass into a calcareous clod full of beautifully preserved fossils; the space between is widened up with flaggy sandstone to thirty or forty feet; and each limestone is underlaid by a thin coal or carbonaceous deposit.

The Rash Coals number sixteen and twenty can scarcely be said to have existence in the eastern parts of the county. Generally a mere trace of carbonaceous matter is found over their more persistent fire clays. These are the surface coals at Hazelton, Patoka, Princeton, Owensville, etc., and although sometimes attaining a thickness of one foot, are no where of workable thickness in this State. The flaggy

sandstones number eighteen, are locally heavy bedded and at such stations furnish quarry stone of fair to good quality.

Coal N is a very irregular and inconstant seam. It was identified at a few stations in the southeast part of the county, where it is worked by McGregor and others. The product is a rich gaseous coal, burning with much flame to a white ash.

The sandstone number twenty-seven, superimposes coal M rather persistently, and at many localities presents quarry beds from twelve to twenty feet thick. The stone comes from the quarry soft and light colored, but darkens and hardens on exposure to the air. It has been used with advantage, for foundations piers and hammered masonry. Good exposures are seen near Oakland city.

Coal M.—This seam outcrops and is worked at the foot of McGregor Hill, T. 3, S. R. 8, and is met in wells and on the hillsides north, south and west of Oakland, ranging from two to four and averaging three feet thick. On the northeast boundary it can only be met in deep shafts. The product is a red ash, fat, caking coal.

Coal L.—The mammoth seam of Indiana is grandly developed along and within one to three miles of the eastern boundary, as was noted in Geology of Pike county 1872. It approaches the surface and probably was struck in the town well at Oakland. This seam ranges from three to eleven, averaging over five feet in thickness at the localities mentioned, offering a prime article of white ash, free burning coal suitable for household, locomotive and rolling mill use.

Coal K.—This seam is not visible *in* the county, but is well developed in Pike, from two to four miles east of the common boundary between the two counties, ranging from three to five, and averaging four and a half feet thick. The product is a strong, good grate and steam coal, which burns to a red ash, indicating the presence of some pyrite.

Thus it will be seen that the three great reliable seams of caking coal outcrop at or near the eastern boundary of the county. Thence dipping to the west, they may easily be

won by shafting in the eastern and central areas at a depth ranging from a few feet to one hundred or two hundred feet. In a country of forests where wood is an encumbering annoyance, costing time and money to remove or destroy, coal is not worked—with a small local demand for smiths fires and far away from railways or other lines of transportation, cannot be profitably worked. A ledge of quarry stone or a bank of gravel useful for ordinary purposes is more valuable. This accounts for the fact that little or no coal has been mined or even seen.

According to theories heretofore received these coals dipping far beneath the surface, ought to be found as well in the western parts, accompanied by the companion strata seen at the Pike county outcrops. But bores put down at Princeton, Mt. Carmel and Owensville since my visit (during the autumn of 1873), show, as will be seen under head of local details, 1st, that, the spaces between the seams are widened; 2nd, that the argillaceous and shaly beds are replaced with massive beds of limestone; 3d, that the coals themselves become thin, in a majority of cases too thin to work; and 4th, that the bottom seam K, verging toward non-existence as it approaches the center of the basin, is merely represented by a carbonaceous "clod." These facts and developements, only brought to light within the past few months, show a predominance of limestone unsuspected and unknown before, and indicate a purity of water, necessary for the existence of the marine fauna and corals which make up limestone, but not favorable for the accumulation of thick beds of coal; and explains the reason why the lower coals are not met in deep bores farther west. I have long been satisfied that the marginal coals did not underrun the central areas of extensive basins, but without a consecutive line of bores from the margin to the center no exact law as to the mode of their occurence could be deduced. These bores and other facts heretofore observed although not in sufficient number to establish a positive law, seem to indicate the following generalization; 1st, that the coal seams of the Illinois—Indiana basin, are

only developed in a belt paralell with the margin of the basin; 2nd, that the lowest seam, first to begin among the conglomeratic sandstones at the eastern rim, after attaining a width of twenty five or thirty miles ceases to exist; 3rd, that each succeeding coal commences a few miles still farther within the basin, and after developing the usual breadth of twenty to forty miles, necessarily overlapping its predecessor, ceases to exist.

Aecepting this generalization, I would expect to find the upper rash coals, noted as just beginning their existence in this county, to become thicker toward the west and center of the basin, and in local puddles of no very great extent attaining a depth of four or five feet.

To the foregoing discussions of a general nature, local details and sections will be added for home information.

LOCAL DETAILS.

Hazelton, situated on the Evansville and Chicago Railroad, is surrounded by a large body of productive lands It is the market not only for the productions of this area, but also for several fertile townships to the east in Pike county; but the principal business which overshadows all others is the manufacture and preparation of lumber. The first impression felt on stepping from the cars, is that the town is one vast lumber yard. Millions of feet are annually sawed and seasoned for a market that is barely equal to the supply. The timber is brought from the rich uplands on the east side of town, or in huge rafts on White river which flows through its outskirts.

The lower rash coal having a thickness of fourteen inches, was formerly worked (without profit however) in the bed of the river just below town. Covered by full water, it was not visible at the time of my visit, but previously many fossils were found in the limestone clod overlying the coal, including *Bellerophon carbonarius*, *B. Montfortianus*, *B. percarinatus*, *Spirifer cameratus*, *Athyris subtilita*, *Productus longispinus*, *P. semirecticulatus*, *Pleurotomaria tabulata*, *P. spherulata*, a fine *Myalina*, and *Lophophyllum proliferum*. In the river adjoining is found a prodigious mussel, *Unio plicatus*, a valve of which measured nine inches long and six inches wide. One of these was sent by Prof. H. T. Woodman to a skillful polisher of shells in England. The result of this work was magical. The shell was transformed to a mass of silver and pearl, inlaid with black and green mosaics girded about with marginal shadings which reflected every hue of the rainbow.

A bore was put down on Donation one hundred and one, now belonging to Wm. H. Thorn, by Beard, Kerkoff *et. al.*

The following is the common statement of Messrs. Kerkoff and Bridger, who were concerned in the enterprise, and of Mr. Thorn, the owner of the land, to which I prefix a section of the outcrop of the strata which overlie the top of the bore on the same division of land, viz:

HAZELTON SECTION.

(*Donation* 101.)

Soil and slope.....	.....
Shaly sandstone and flagstones.....	10 ft. 00 in.
Yellow sandstone.....	20 ft. 00 in.
Rash coal.....	11 in.
Fire clay.....	2 ft. 02 in.
Shaly limestone.....	9 ft. 00 in.
Slaty coal.....	11 in.
Flaggy sandstone to bore.....	22 ft. 00 in.
	65 ft. 00 in.

HAZELTON BORE.

Soil.....	4 ft. 00 in.	
Sand stone.....	40 ft. 00 in.	
Coal N?.....	1 ft. 00 in.	
Space, sandstone.....	60 ft. 00 in.	
Coal M.....	1 ft. 00 in.	
Space, argillaceous sandstone.....	115 ft. 00 in.	
Coal L.....3 ft. 6 in. to 4 ft. 00 in.		
Sandstone.....	55 ft. 00 in.	280 ft. 00 in.
		345 ft. 00 in.

Another bore was put down to a depth of about three hundred feet, on the high lands east of town. For the following statement signed by Dr. Wm. Sanders, Charles G. Foot and F. Huffman, I am indebted to the kindness of Mr. J. Zimmerman, of Mt. Carmel, viz.:

EAST HAZELTON BORE.

Drift and clay	25 ft. 00 in.
Hard sandstone (lime stone?)	4 ft. 00 in.
Bituminous shale	6 ft. 00 in.
Silicious shale	25 ft. 00 in.
Soft soapstone	10 ft. 00 in.
Sandstone	40 ft. 00 in.
Bituminous shale	6 ft. 00 in.
Coal	06 in.
Fire clay	6 ft. 00 in.
Sandstone	14 ft. 00 in.
Soapstone	20 ft. 00 in.
Bituminous and silicious shale	15 ft. 00 in.
Coal M?	1 ft. 06 in.
Fire clay and strong water vein which caused the well to cave	4 ft. 00 in.
Soapstone	20 ft. 00 in.
Sandstone	70 ft. 00 in.
Soapstone	40 ft. 00 in.
	307 ft. 00 in.

The thin rash coals outcrop, or are found in wells at several places in the neighborhood, and an opening has been made on H. J. Brown's land, N. W. qr. Sec. 31, but at no point do they exceed eighteen inches in thickness.

I do not doubt that coals M and L will yet be found developing a workable thickness at several points in this vicinity, although the present showing is unfavorable and the search will be attended with many disappointments.*

Ascending White river, an extensive quarry of sandstone is seen two and a half miles east of town. The stone is easily obtained and worked, and is useful for foundations and cellar walls.

*It is hardly necessary to repeat in our reports on every county, that coal seams are never persistant over large areas; horse backs, barren or eroded places occur in the best regulated fields, and sometimes predominate. *Verb. sat. sap.*

Buena Vista, situated on White river, was formerly a shipping point for flat boats, before the free highways on the rivers were vacated for cheaper and more reliable railway transportation. Extensive mounds surround the village which will be hereafter mentioned. Outcrops of the rash coals were observed in the vicinity, and the companion limestones develop a thickness of from two to five feet.

The high ridge and table land south of town, has a rocky skeleton, covered with lacustral loams. But above and against the bluffs of loess are extensive bars or beds of fluviatile sand, a continuance of those noted in the geology of Knox, Pike, Dubois and Lawrence counties, some of which attain an elevation of two hundred and thirty-five feet above the present bed of White river. These indicate the high water level of the ancient river. On the sides of the bluff are occasionally found small beds of gravel, containing a few specimens of the harder stones sorted from the glacial drift, surviving on account of the obduracy of material, but notably containing geodes and cherts from the mountain limestone at the headwaters of the river. The last mentioned, mark the bars or low water line, and plainly indicate the former presence of the river at these points.

A short distance west of the large hickory tree noted in geology of Pike county, the following section was taken; station, 235 feet above White river, viz.:

"BIG TREE" SECTION.

(*Sec.* 7, *T.* 1, *S. R.* 9.)

River sand.....	20 ft. 00 in.
Fluviatile drift.....	8 ft. 00 in.
Soft white and yellow sandstone.....	30 ft. 00 in.
Soft laminated sandstone...	22 ft. 00 in.
Quarry sandstone, "Merom rock".....	18 ft. 00 in.
Calcaro-argillaceous shale and limestone.....	10 in. to 3 ft. 00 in.

Black bituminous clod.....		1 ft. 4 in.
Rash coal.....	8 in to	2 in.
Fire clay.....		2 ft. 06 in.
Clay shales.....	6 ft. to	15 ft. 00 in.
Limestone, crinoidal.....	2 ft. to	4 ft. 00 in.
Argillaceous shale.....		5 ft. 00 in.
Black slate.....	3 ft. to	1 ft. 00 in.
Rash coal in branch, report'd		2 ft. 00 in.
		134 ft. 00 in.

Approaching Kirksville we found the little village overwhelmed with affliction. The Asiatic cholera was raging. One entire household, father, mother and children had died. Other families had lost from one to four from their flock. Still, true men and braver women, defying the monster, volunteered to care for the sick, solace the dying and bury the dead. Not willing to admit special dispensations of this kind, I visited the town to inquire whether the calamity should be attributed to natural causes or a providential act. The village is situated upon the eastern bank and partly surrounded by the Patoka, naturally a foul, stinking, rotten river—in summer a solution of decaying vegetable matter, reeking with malarial poison. A dam long maintained, drives the village saw mill, but to intensify the conditions a boom above the dam, not only stopped floating saw logs, but as well the surface current; and the face of the pond was covered with scum and slime, in places thick enough to bear up small animals. Here was a sufficient cause to account for the sallow care-worn, jaundiced faces seen at houses adjoining the pond, inviting the cholera or any other epidemic.

Patoka ought to be drained by the county authorities bordering the whole length of the river, by making cut-offs at the great bends, straightening the channel, and clearing away drift and overhanging timber. The expense would be great; the profits, health, greater.

Near the county line east of Dongola, the limestone accompanying the upper rash coal is well developed. It has been calcined by Mr. Hargrave, near the east line of Sec. 8, Town 2, S. R. 8, furnishing a strong, dark colored lime. At the steam mill in town the following section was noted, viz.:

SECTION AT DONGOLA.

Coarse shelly limestone	10 ft. 00 in.
Rash coal and slate	1 ft. 06 in.
Gray shale, with ferns	1 ft. 08 in.
Slaty coal	1 ft. 00 in.
Fire clay	2 ft. 06 in.
Impure limestone	2 ft. 00 in.
Flaggy sandstone	10 ft. 00 in.
Place of coal M	covered.
Space, reported in a traditionary bore	60 ft. 00 in.
Coal L ?	4 ft. 00 in.
	92 ft. 08 in.

South of the Patoka, powerful erosive forces have swept across the eastern part of the county, leaving isolated knobs and hills, monumental tokens of the ancient surface; but generally excavating the rocks to a depth of fifty to one-hundred and sixty feet, and creating broad valleys or valley plains now waterless or used by insignificant brooks. This epoch is dated back to the time of the glacial river, and the soil to the Lacustral, for we find that on the hill sides an ash gray soil prevails, very sensitive to drought or moisture, the modified or washed residual sands of the latter epoch.

Oakland city is pleasanaly situated in a heavily timbered region at the crossing of the proposed "Straight Line" and the L. and St. L. railways. An air of thrift is observed not common at interior towns. From the cupola of Oakland Institute is enjoyed a view ranging over an area of more than six hundred square miles, embracing Olivet

Church and the highlands dividing the watershed of the Patoka from White river seven miles to north. To the east is spread out the beautiful valley basin of South Patoka, enclosed by the conglomerate peaks and hills, which are just seen in the horizon beyond Winslow and Pikeville in Dubois county twenty-two miles distant; southward are Kennedy Knob, Snake Knob and Pidgeon Summit nine miles away; and to the east Harbison's hill within four miles of Princeton.

In digging the Public well near the center of town, at a depth of thirty feet a coal seam was struck Unfortunately a sufficient vein of water was found, and the thickness of the coal was not ascertained. The rubbish thrown out consisting of soapstone and argillaceous sandstone indicates the shales of coal L., which shows in outcrop a mile and a half eastward. A section there taken is subjoined:

SECTION AT MARTIN'S BANK.

Sec 9, *T.* 2 *R.* 8, *W.* (*Pike Co.*)

Soil and clay.....			18 ft. 00 in.
Black slate.....			1 ft. 00 in.
Soft slate.....			1 ft. 6 in.
Coal M.....			1 ft. 1 in.
Fire clay.....			2 ft. 7 in.
Silicious shales and soapstone			57 ft. 7 in.
Soapstone—fern bed.....		4 ft. to	1 ft. 00 in.
Coal L.....			
Slaty coal.....	4 in.		
Laminated coal	2 ft. 6 in.		
Soft black slate	4 in.		
Good smith coal	1 ft. 6 in.		
Clay parting...	2 in.		
Good coal	2 ft. 6 in.		
Rash coal.....	2 ft. 00 in.		
	— —		9 ft. 2 in.
Fire clay.....			4 ft. 9 in.
			— —
			96 ft. 8 in

A valuable stone quarry occurs west of town on the lands of Luster and Keeler, southwest quarter, Sec. 13, T. 2, S. R. 9, where the following section was obtained:

OAKLAND QUARRY.

Soft sandstone	10 ft.	00 in.
Laminated sandstone	8 ft.	00 in.
Heavy bedded quarry sandstone containing *Sigillaria, Stigmaria, Calamites*, and *Cordaites*	30 ft.	00 in.
Pyritous slate	2 ft.	00 in.
Black slate		4 in.
Coal M	2 ft.	1 in.
Fire clay, to brook	4 ft.	00 in.
	56 ft.	5 in.

This rock has been quarried to some extent and bears a good character for endurance. Coming soft from the bed it changes to a brown color and hardens; it may be obtained in blocks of great size. Other beds of a similar nature are found occurring in the uplands north and south. Coal M? has been worked by C. H. Wirth on the northwest part of the same quarter section, and is a bright, glossy, fat caking coal, which burns with much smoke and flame, leaving a red ash. An outcrop also occurs on Dill's land adjoining in the same section. On G. S. Vanada's, land southwest quarter, Section 14, T. 2, R. 9, the following outcrop occurs:

SECTION AT VANADA'S.

Soft, yellow sandstone containing *Stigmaria, Sigillaria, Calamites, Cordaites*, etc.,	7 ft.	00 in.
Pyritous slate	1 ft.	01 in.
Coal M	1 ft.	09 in.
	9 ft.	10 in.

Continuing west, at A. D. Reavis' farm, a similar outcrop of coal and stone is seen, denoting persistence in the seam and strata.

The surface dips gently to the south from Oakland. In that direction a coal, is found in nearly every well, at a depth of from eighteen to twenty-five feet from the surface, and reported to range in thickness from three and a half to five feet.

COAL IN WELLS SOUTH OF OAKLAND.

Geo. B. Arnold, Sec. 24, T. 2, R. 9, reported... 3 ft. 00 in.
A. Gungel, Sec. 25, T. 2, R. 9, reported..... 5 ft. 00 in.
J. Yeager, Sec, 30, T. 2, R. 9.....
E. L. Robinson, Sec. 30, T. 2, R. 9.....
Ed. Gungel, Sec. 36, T. 2, R. 9.....

Most of these coals are probably L, as the strata rise in that direction, which would bring L nearer to the surface.

At Kennedy Knob, Sec. 35, T. 2, S. R. 9, heavy bands of argillaceous limestone are found near the top of the peak, the companion strata of the rash coals. The coals themselves are absent or not found. The following is the only section attainable:

SECTION ON KENNEDY KNOB.

Sand and Loess.....	30 ft.	00 in.
Hard argillaceous limestone.	5 ft.	00 in.
Place of upper rash coal.....		
Blue fossiliferous limestone.....	10 ft.	00 in.
Place of second rash coal.....		
Covered silicious shale.....	35 ft.	00 in.
Coal N.....		?
Slope to valley plain.....	70 ft.	00 in.
	—	—
	150 ft.	00 in.

An outcrop of the limestone represented in this section, and reported to have a thickness of thirty feet, was not seen. Such developement of a coal measure limestone is extra-

ordinary but not improbable, as a bed of still greater thickness occurs at the same horizon near Marshall, Ills.

McGregor Hill and Snake Knob, near the southeast corner of the county are surviving masses of the former surface rocks, surrounded by valleys of erosion which give them prominence. As at Kennedy Knob, they are capped with the argillaceous limestones accompanying the rash coals, here brought together or separated only by narrow spaces; the rash coals are recognized by their stratigraphic position, their fire clays, and a thin carbonaceous streak. The following section continued along the slope into Pike county, shows the coal and strata which occur in the southeastern part of this county:

SECTION AT M'GREGOR HILL.

(*Section* 9, *T.* 3, *S. R.* 8, *W.*)

Limestone, argillaceous and clinky	6 ft. 00 in.
Clay and shale—place of first rash coal	4 in. to 6 ft. 00 in.
Limestone, compact	3 ft. 00 in.
Shale, with ironstone nodules	4 ft. 00 in.
Place of lower rash coal	
Fire clay	2 ft. 04 in.
Coarse sandstone	8 ft. 00 in.
Silicious shale, bituminous partings	16 ft. 06 in.
Argillaceous shale	8 ft. 00 in.
Black clod—soft slate	2 ft. 00 in.
Coal N—white ash–gaseous	2 ft. 06 in.
Fire clay	3 ft. 00 in.
Silicious shale, and flaggy sandstone	20 ft. 00 in.
Covered space	40 ft. to 20 ft. 00 in.
Coal M	1 ft. to 3 ft. 00 in.
Space, by Barometer	50 ft. to 22 ft. 00 in.

Coal L.....	2 ft. to	4 ft. 06 in.
Space, by Barometer.....	30 ft. to	18 ft. 00 in.
Coal K.....	2 ft. to	5 ft. 00 in.
		163 ft. 10 in.

The argillaceous limerock in the above and Kennedy Knob section, is of great interest as a horizon from which to measure down to the lower coals. Compact and not easily reduced by action of water, it formed at a few stations a bulwark which withstood the ancient currents of erosion. To its protective endurance we owe the existence of the surviving knobs found here and to the south along the divide which separates Ohio and Wabash waters. Going west it dips at the rate of about eighteen feet to the mile, is just caught on the sides and tops of the high hills near Somerville and Buckskin, and descending below the surface is seen in the bed of Muddy Pigeon and its affluents near Fort Branch.

The following is a list of openings or outcrops near McGregor Hill, the banks were not in work and were filled with water; the reported thickness is given:

COALS NEAR M'GREGOR HILL.

J. C. McGregor, N. W. ¼, Sec. 8, T. 3, R. 9.....	2½ ft. to 3 ft. 00 in.
R. McConnell, S. W. ¼, Sec. 5, T. 3, R. 9.....	2 ft. to 3 ft. 00 in.
J. K. McGregor, N. W. ¼, Sec. 8, T. 3, R. 9.....	2 ft. to 2 ft. 03 in.
S. B. McGregor, N. W. ¼, Sec. 8, T. 3, R. 9.....	2 ft. to 2 ft. 06 in.
J. M. McGregor, sr., N. E. ¼, Sec. 12, T. 3, R. 9.....	2 ft. 06 in.
Josie Duncan, N. E. ¼, Sec. 7, T. 3, R. 9.....	2 ft. 06 in.
A. Mason, N. E. ¼, Sec. 5, T. 3, R. 9.....	2 ft. 00 in.
A. & J. Faris, S. E. ¼, Sec. 5, T. 3, R. 9.....	2 ft. 06 in.

Near Somerville and Buckskin, the quarry sandstone overlying coal M is found in the foot of the hills and in the valleys; and M is reported in many wells in this vicinity having a thickness varying from two to five feet, at a depth below the surface varying from twenty feet in Fritz's, to fifty feet at Maikran's well.

The only rocky outcrops near Fort Branch and Haubstadt are the rash coals and their companion strata; they are of no economic importance, and only of interest because they fix the geological position of the surface and indicate the great depths at which the lower workable coals must be sought.

Fort Branch, a thrifty village with neat churches, school and business houses, mills, etc., is surrounded by a good agricultural region embracing a variety of soils. To the west "McGarry Flat," a broad belt of rich black land, extending like a river plain north nearly to Princeton and four miles wide, is noted for heavy timber or well improved farms, and substantial farm houses. Blue grass, "the gold finder of Indiana," was observed struggling against and triumphing over neglect, in the waste places and fence corners. A forest of Papaw bushes attracted attention by their tree-like size, being nearly a foot in diameter.

Owensville is surrounded by one of the very best agricultural regions I have ever seen. The soil is a rich calcaro-alluvial loam, producing from forty to fifty-five bushels of corn and from twelve to thirty-three bushels of wheat per acre, proportioned to the care and energy of the farmer. This is a prolongation of the poplar ridge mentioned as dividing the ancient flood waters of White river and Patoka deposited at a time when the latter had its channel, by way of "McGarry Flat," between the town and Fort Branch. The brown and mulatto loams owe their calcareous riches to detrital matter brought from the sub-carboniferous limestones by the former stream. This ridge northwest of town presents a boldly escarped bluff of Merom sandstone on L. Skelton's land, S. W. qr., Sec. 33, T. 2, S. R. 12, where the following section was taken:

SKELTON'S CLIFF.

Soil and fluviatile sand	70 ft. 00 in.
Soft yellow sandstone	10 ft. 00 in.
Massive red and yellow sandstone	12 ft. 00 in.
Brown ferruginous sandstone	8 ft. 00 in.
	98 ft. 00 in.

The face of the cliff is ridged with wave marks, and pierced with rock bores driven by ancient currents which, having removed the main body of the sandrock, left this cliff to to tell the story of the past. From the top of the cliff an interesting view is spread out, ranging over the broad level bottoms to the bluffs in Illinois. To the south the "Upper and Lower Rocks" rise like sharp cones against the sky. The Mound-builders with characteristic appreciation for the picturesque and a wide outlook, erected their tumuli on the summit of the cliff. Choice watermelons are grown on this and adjoining sandy knolls. Mr. Skelton mentioned specimens one to one and a half feet long, weighing from fifty to sixty-five pounds. They are shipped hence to the markets of Chicago, Detroit, Buffalo and New York. The surrounding bottoms grow crops of corn ranging from fifty to eighty-five and averaging fifty-five bushels, and of wheat ranging from twelve to thirty-five and averaging over twenty bushels per acre.

A bore put down by Mr. James Montgomery, who furnishes this statement from the drilling record, developed the following:

SECTION AT OWENSVILLE.

Surface clay	8 ft. 00 in.
Sandstone	2 ft. 00 in.
Rash coal	02 in.
Clay parting	10 in.
Black slate	2 ft. 06 in.
Gray shale	8 ft. 06 in.
Gray limestone	3 ft. 00 in.

Soapstone	3 ft. 00 in.
White limestone	47 ft. 00 in.
Gray shale	29 ft. 06 in.
Black slate	6 in.
Soft, rotten coal	2 ft. 10 in.
Shaly fire clay	4 ft. 00 in.
Gray limestone	30 ft. 00 in.
Gray shale	21 ft. 00 in.
Fire clay	20 ft. 00 in.
Gray limestone	3 ft. 00 in.
Coal	6 in.
Colored clay	2 ft. 00 in.
Hard flinty limestone, with partings	10 ft. 00 in.
Soft, red sandstone	4 ft. 00 in.
Black slate	4 ft. 00 in.
Fire clay and gray shale	10 ft. 10 in.
	217 ft. 10 in.

At the "Dripping Spring," on W. A. Walters' land, N. E. qr. Sec. 33, T. 2, S. R. 12, we find the horizon of the upper rash coal and limestone. The following section was noted:

SECTION AT "DRIPPING SPRING."

Covered, Merom sandstone?	60 ft. 00 in.
Silicious shale	11 ft. 00 in.
Fire clay	4 ft. 00 in.
Argillaceous limestone, containing crinoid stems, *Spirifer lineatus*, *Lophophyllum proliferum* and *Productus semireticulatus*	3 ft. 00 in.
Calcareous clod	2 ft. 00 in.
Shales, covered to bottoms	30 ft. 00 in.
	110 ft. 00 in.

A cluster of mounds on the summit of the hill mark the habitations of our ancient people.

In a well on Sylvester Benson's land, S. E. qr. Sec. 26, T. 2, S. R. 12, the Merom sandstone was found, to which is added the hill side outcrop, viz.:

SECTION AT BENSON'S.

Soil and sand in well	25 ft. 00 in.
Sandstone in well	15 ft 00 in.

(*In outcrop.*)

Sandstone	15 ft. 00 in.
Irregular coal	03 in.
Clay	2 ft. 00 in.
Argillaceous shale	14 ft. 00 in.
Bituminous limestone, highly argillaceous	3 ft. 00 in.
Calcareous shale	1 ft. 03 in.
Black bituminous slate—rash coal	1 ft. 06 in.
Fire clay	2 ft. 00 in.
	79 ft. 00 in.

Princeton, the county seat, is pleasantly situated on the Evansville and Chicago railroad, and is surrounded by a gently rolling, fertile region, with bold hills to the east and northeast. It is one hundred and forty-six miles southwest from Indianapolis, and has an elevation of ninety feet above low water in the Wabash at Mt. Carmel bridge, of one hundred and nineteen feet above Evansville, and of four hundred and eighty feet above the level of the ocean.

Thanks are due to Captain Kurtz for the statement resulting from a bore put down under his supervision near town:

PRINCETON BORE.*

Lacustral (or Erie) muck	36 ft. 00 in.
Sandrock	2 ft. 00 in.
Silicious shale	17 ft. 00 in.
Slate and rash coal	1 ft. 00 in.
Fire clay	4 ft. 00 in.
Limestone in bands	15 ft. 00 in.
Soapstone	8 ft. 00 in.
Gray limestone	2 ft. 06 in.
Carbonaceous parting—coal N	02 in.
Fire clay	14 ft. 00 in.
Gray limestone	3 ft. 00 in.
Soapstone	17 ft. 00 in.
Limestone	06 in.
Quarry sandstone	10 ft. 00 in
Soapstone and gray shale	16 ft. 00 in.
Coal M	1 ft. 00 in.
Fire clay	4 ft. 00 in.
Argillaceous sandstone	12 ft. 00 in.
Limestone	5 ft. 00 in.
Blue shale	55 ft. 00 in.
Blue slate	3 ft. 00 in.
Blue shale	32 ft. 00 in.
Coal L	2 ft. 06 in.
Fire clay	7 ft. 06 in.
Sandrock	9 ft. 00 in.
Carbonaceous clod—coal?	1 ft. 00 in.
Fire clay	2 ft. 06 in.
Shale and slate	8 ft. 10 in.
Lime rock	7 ft. 00 in.
Shale	2 ft. 00 in.
Black limestone	1 ft. 00 in.
Black slate, place of K	25 ft. 08 in.
	327 ft. 00 in.

*Thanks are due to Wm. Adams, of Paxton, Indiana, practical well borer, for carefully testing with acids, and recording the strata in the wells bored by him at Paxton, Princeton, Mt. Carmel, Owensville, etc.

Coal L. was struck within two feet of the estimate made for its place before the drilling was commenced, proving great regularity in the underlying strata.

Although the seams found in this bore are not of workable extent, nor, judging by samples brought up in the augur tube, of desirable quality; yet the well is richly worth its cost. It proves persistence of the coals in their regular order at least this far west, and shows a strong probability of finding the seams continuously better developed in proportion to the distance, going east from the center of the valley. In other words it favors the presumption that much of the country east of the Evansville and Chicago railroad is underlayed by workable seams of coal. The following bore just completed by Captain Kurtz Sec. 5, T. 2, R. 10, favors this indication, viz:

KURTZ' BORE.

Silicious shale and soapstone.....		30 ft. 00 in.
Sandstone and shales.....		20 ft. 00 in.
Coal.....		trace.
Silicious shales.....		40 ft. 00 in.
Coal, laminated.....	1 ft. 00 in.	
Clay parting.....	1 ft. 06 in.	
Cubic coal.....	2 ft. 00 in.	
Rotten coal.....	06 in.	
	— —	4 ft. 06 in.
Fire clay.....		2 ft. 06 in.
		— —
		97 ft. 00 in.

At Mt. Carmel, Ills., twelve miles nearly west, a bore in which the strata were carefully tested and recorded by Mr. J. Zimmerman, shows a heavy predominance of limestone, and that the coals are thin or absent. The bore was commenced about thirty feet below the base of the "Merom rock," which outcrops in the Mt. Carmel bluff.

MT. CARMEL BORE.

Shelly sandstone	2 ft.	00 in.
Sandrock	2 ft.	00 in.
Soapstone	4 ft.	00 in.
Sandrock	35 ft.	10 in.
Hard shale	4 ft.	00 in.
Soapstone	1 ft.	00 in.
Black slate coal N		07 in.
Fire clay	9 ft.	00 in.
Sandstone	2 ft.	00 in.
Blue slate	1 ft.	04 in.
Fire clay	3 ft.	10 in.
Limestone	23 ft.	00 in.
Sandstone	1 ft.	00 in.
Limestone	28 ft.	00 in.
Blue slate	5 ft.	06 in.
Soapstone	13 ft.	00 in.
Gray slate	4 ft.	00 in.
Coal M		7 in.
Fire Clay	3 ft.	00 in.
Limestone	13 ft.	8 in.
Fire clay	2 ft.	00 in.
Cherty, limestone with clay partings	10 ft.	00 in.
	169 ft.	4 in.

Bald Hill, two miles north of Princeton, is a lofty knob, which attains an elevation of about one hundred and thirty feet above town or two hundred and twenty feet above the Wabash. Its summit, which was probably rounded into shape by the Mound Builders, affords a wide view over the Wabash and Patoka bottoms. To the west, the houses in Mt. Carmel ten miles distant, and the high ridge at Allendale twelve miles to northwest, are easily recognized. Still more to the north a slight sag in the horizon indicates the trough of the Embarras valley, and beyond, glimpses are caught of the hill tops north and west

of Vincennes. To the east, the upper valley of the Patoka opens a vista toward sunrise reaching well into Pike county.

On the lands of C. Myers adjoining, the following outcrop is seen:

MYERS HILL SECTION.

Slope—covered	70 ft.	00 in.
Merom sandstone	29 ft.	00 in.
Black sheety shale	1 ft.	4 in.
Pyritous clod		9 in.
Coal (irregular)		7 in.
Fire clay	5 ft. to 3 ft.	6 in.
	105 ft.	2 in.

Near Severn Bridge on the northwest bank of Patoka, Section 23, T. 1, R. 10, the rocky strata are locally depressed, and thickened up to such a degree as to afford quarry beds similar to those east of Hazelton near the horizon of the rash coals. The stone is laminated, varying from thin flags to heavy or massive beds. It is a grayish yellow color, and hardens on exposure, weathering brown. Patoka bridge piers, built thirty two years ago, afford a fair and satisfactory test of its enduring qualities. The following section commences at the top of the quarry hill and is continued across the river to the south, so as to include lower strata there brought to view by irregularities in the ancient surface:

TOWNSEND QUARRY SECTION.

Soil	10 ft. 00 in. to 14 ft.	00 in.
Heavy sandstone	5 ft.	00 in.
Rash coal and slate		8 in.
Fire clay	1 ft.	2 in.
Heavy bedded and flaggy sandstone	30 ft.	00 in.
Shaly sandstone	10 ft.	00 in.

Gray shale.....		31 ft.	00 in.
Nodular iron ore.....	2 in to		6 in.
Bituminous limestone		1 ft.	00 in.
Calcareous shale, Argillite		1 ft.	4 in.
Black sheety slate...	3 in.		6 in.
Rash coal.....			6 in.
Fire clay to Patoka..		9 ft.	00 in.
		104 ft.	8 in.

In Sections four and five, Town 2, Range 10, this section is continued to the lower rash coal, viz:

SECTION NORTHEAST OF TAFFTOWN.

Bituminous limestone with *Productus semireticulatus, P. longispinus, Athyris subtilita, Chonetes, Cardinia, Spirifer Kentuckensis, Machrocheilus*, and *Pleurotomaria*, ...	1 ft.	6 in.
Calcaro-argillite with some fossils.....	1 ft.	2 in.
Black sheety slate, with *Pectens, Lingula, Discina, Crania, etc*.....	3 ft.	00 in.
Pyritous clod.....		10 in.
Rash coal, (upper)...	1 ft.	00 in.
Fire clay.....	4 ft.	00 in.
Fire clay, with iron stone nodules.....	6 ft.	00 in.

Gray shale.....		5 ft. 00 in.
Hard argillaceous limestone.....	3 ft. 00 in. to	8 ft. 00 in.
Fire clay—place of lower rash coal...		5 ft. 00 in.
Gray shale.....		10 ft. 00 in.
		45 ft. 4 in.

The seam in this section has been worked by Capt. Kurtz, Mr. Carnahan and Mr. Harmon, and although thin, affords a bright lustrous coking coal, containing enough pyrite to cause disintegration on exposure. The following fossils were seen in the slaty roof of the coal, at Kurtz's bank, N. E. qr. Sec. 5, T. 2, S. R. 10, viz.: *Nucula inflata, Chonetes Verneuilanum, Leda bellistriata, Athyris subtilita, Orthoceras Rushensis, Bellerophon carbonarius, B. Montfortianus, Pleurotomaria tabulata, P. spherulata, P. Grayvillensis, Macrocheilus primigenius*, etc., and crinoid columns.

Patoka, situated upon the river from which it takes its name, at the crossing of the Evansville and Chicago Railway, is a thrifty manufacturing town. The extensive distilleries of Bingham Bros. consume large amounts of corn and manufacture great quantities of highwines, etc.

The locality is favorable on account of the comparative absence of lime and other minerals so common in the Western streams. The whole valley of the Patoka, fifty miles long, sends the choice of its forests to this town for manufacture, and immense quantities of lumber are produced. Generally the Patoka, near this place, is covered for miles with saw logs rafted or floated from Pike and Dubois counties, and justifies to this day the Indian name.*

Below the mill the following outcrop occurs, viz.:

*Patoka, the Miami (Piankashaw) name, means "The crooked river, filled with logs."

SECTION AT PATOKA.

Loess, ash gray		15 ft. 00 in.
Loess, reddish		5 ft. 00 in.
Covered, Merom sandstone	5 ft. to	10 ft. 00 in.
Slaty coal	5 in. to	1 ft. 02 in.
Gray shale and flaggy sandstone		40 ft. 00 in.
Bituminous limestone or clod with *Productus longispinus, P. costatus, Nucula inflata, Spirifer cameratus, S. Kentuckensis, Macrocheilus primigenius, Bellerophon carbonarius, B. Montfortianus, Pleurotomaria spherulata, Lophophyllum proliferum,* etc	2 in. to	08 in.
Argillite with fossils		2 ft. 00 in.
Black slate, with *coprolites* and *fucoides*	2 ft. to	4 ft. 00 in.
Blue shale	3 ft. to	4 ft. 06 in.
Coal, rash		07 in.
Fire clay		3 ft. 00 in.
Hard argillaceous limestone changing to buff silicious shale	2 ft. to	4 ft. 00 in.
Fire clay, place of lower rash coal		2 ft. 06 in.
Soapstone, with iron nodules		5 ft. 00 in.
Laminated sandstone to river		1 ft. 00 in.
		98 ft. 05 in.

The place or horizon of coals M and L, is from one hundred and seventy-five to three hundred and fifty feet below the bed of the stream, and the probable thickness ranges from nought to three feet.

ECONOMIC GEOLOGY.

The peculiar formation of the surface deposits endow this county with a variety of fertile soils, and insures a diversity of pursuits so necessary for the social, pecuniary and political welfare of a community. In the western half recent alluvial bottoms prevail, and crops of corn, potatoes and grass are produced equal in yield to the most favored locality. The ancient delta of the White and Patoka rivers in the northern and central areas, presents a gently rolling or knolly surface, beautiful and at the same time desirable. This part is fertile in a superalative mood, producing large crops of wheat, oats, grass, etc. The southeastern division although not so fertile, is of average quality and is clothed with forests of valuable timber.

It may not be improper to suggest that with long continued cropping the best of lands will deteriorate. The present generation ought not to impoverish the soil and rob the future. Rest, rotation and clover, expedients now scarcely thought of, would maintain or support this element of wealth.

The "Sand Barrens" in the southwestern part of the county have their special value. On this soil, worthless to ordinary agriculture, melons, sweet potatoes, etc., of superior size, excellent flavor and in immense quantities are produced: they are shipped by rail to the principal cities of the nation.

DRAINS AND LEVEES.

The bottoms are subject to overflow, and in part are swampy or covered with ponds. It is a well settled axiom

with engineers, that evaporation will remove ordinary rainfall from a plat of land, if flood waters are kept away. A system of levees erected under competent direction, would reclaim large areas, double the income of the people, and to a considerable extent prevent malarial diseases. The State of Illinois with wise outlook for the future, exempts for a limited time from taxation, lands which are being so improved. This example is worthy of consideration by our own legislature.

WELLS.

Springs are not common, but water is obtained in wells of moderate depth; as is usual, such water leached through alluvial sands will dissolve and contain disagreeable or deleterious minerals. In all such—in almost every case, it is safest to rely upon the pure water which falls from the heavens. Secured in cisterns, rain water is cool and pleasant, and its use causes a marked absence of inflammatory diseases.

TIMBER.

The extent and giant size of the original forest has been heretofore mentioned. Immense quantities of the most valuable timber, as poplar and walnut, was used by the pioneer for rail fences or destroyed by burning; then a toilful encumbrance; which if preserved to this day, would bring more money than the present value of land and improvements. An extraordinary growth of ash was noticed near Owensville. In this vicinity Mr. W. A. Walters has measured trees having a circumferance as follows: Poplar trees eighteen feet, Black walnut eighteen feet, Sycamore twenty-four feet, Catalpa nine to twelve feet Sassafras seven to nine feet, and Maples (Sugar trees) thirteen feet.

In the White river bottoms opposite Hazelton, Mulberry trees were seen which measure from six to seven feet, Cypress seven to ten feet, Apple trees seven feet, and a Sassafras seven feet five inches in circumference. Near the same locality in Knox county, Mr. R. E. Starnate says that

Catalpa trees two and a half to three feet in diameter are common, that he has measured one four and a half feet, a Persimmon *bush* two feet, and a Sycamore seven feet in diameter. Col. Cockrum, Sr., of Oakland, mentioned a Catalpa four feet in diameter.

DURABILITY OF CATALPA TIMBER.

This timber is universally accredited with a wonderful power to resist decay and time. Experience is limited to the early settlement of the county little less than one hundred years, but I could find no one who was willing to say that the catalpa wood was liable to rot. Tests made at Vincennes and Decker station are memtioned in the report on Knox county. Col. Cockrum has known it in use without stain of decay for fifty years; and Capt. Kurtz knows Catalpa trees dead, but still standing in the overflowed bottoms of the Wabash, which were killed by the ice in the great January flood of 1828. Oakland Institute is covered with Catalpa shingles, but if steamed and cut, this process will injure their enduring qualities. The growth of a timber having these qualities should be encouraged. If found suitable for ties it ought to command the attention of persons in direction of railways, and thus secure a solution of the great railway problem of the near future. The tree is of rapid growth, offensive in odor and taste is not liable to be destroyed by animals, flourishes best in overflowed lands, and the trunk by measurement increases in diameter from one-half to three-fourths of an inch per annum.

STONE.

Stone suitable for building purposes is not common. The "Merom Rock" is generally friable, and will soon disintegrate on exposure. Fair quarry stone is found east of Hazelton, at Severn bridge on Patoka, and near the county line in Township No. 1, S. R. 9, all from the space between the rash coals. Stone indicating superior quality is found in the vicinity of Oakland.

COAL.

Coal of excellent quality in abundance, sufficient to supply any possible demand, it will be seen, occurs along the line which separates this from Pike county. The indications observed promise that seams K, L, and M, with an average thickness of over four feet each, may be found generally underlying the eastern half of the county—subject to the interruptions by erosion, horse backs, and barrens, which are found to exist in the best regulated coal fields. Test bores sunk during the past fall and winter, at the center and western part of the county, show that these seams although persistent, are there usually thin, pyritous, rarely of workable extent, and only found at a depth ranging from two hundred to four hundred feet. Within this district workable seams however, will occasionally be found, but the search will be attended with much cost and many disappointments.

CLAY.

Bricks of good quality are made in all parts, and material is abundant. All the coals are underlaid, and the places of the barren seams, occupied by fire clays, which in the future will equal the coals in value. These clays are suitable for the manufacture of tiles, terra-cotta and potters' ware, fire brick, etc., and will found extensive manufactories.

METALLIC ORES

Are not found in this county. Indian tradition to the contrary is false. Native gold and galena imported by the boulder ice, have been found in small lots in wells near the center of the ancient trough of the Wabash; the former in nuggets weighing from two to three grains.

ROAD MATERIAL.

Gravel for roads was not seen in quantity. Careful search will probably discover beds of this valuable and necessary material in the old terraces in the "bottoms" of the

Wabash and White rivers. If not so found, gravel and stone may be imported by rail or river transportation.

HEALTH.

The use of pure rain water for household and culinary purposes has already been earnestly advised. Bilious diseases and the effects of malaria may be in a great measure avoided by arranging sleeping chambers not less than ten to twenty feet above the surface of the earth. This truth is proverbial throughout the old world. Even animals respect it and seek their nightly rest on knolls and hill tops. Stairways or even ladders are cheaper and sweeter than quinine.

TRANSPORTATION AND MARKETS.

The Evansville and Chicago Railroad traverses the county from north to south, through the center, and the Wabash river, navigable during a portion of each year, forms the western boundary; these afford quick and direct communication with the great markets in the region of the lakes and the Mississippi valley, and indirectly with all the world. The Louisville and St. Louis Railroad is in process of construction, and it is believed will, within the coming year, open a direct outlet for the surplus products to the East or West.

FRUIT AND VINEYARDS.

The advantages found to exist in Knox, appertain in a superlative degree, to Gibson county. Nature has planned here at the center of the continental fruit belt a "pomological paradise," by adding to the genial climate a generous soil, and offers to reward persistent effort with rich harvests. Grapes are fully matured, and ripen sweet and fragrant. The Concord, Ives' Seedling, and Norton's Virginia, are favorite bearers. Wine, prepared by a skillful artist at Mt. Carmel, is considered by experts to fairly rival the famous brands of Rhineland.

ARCHÆOLOGY.

The tops of some of the knobs or peaks have been modeled by the Mound-builder; on many their small tumuli are still found, as at the Upper and Lower Lone Rocks, Skelton's Cliff, the Dripping Spring, etc. Extensive loess knolls at Buena Vista are surmounted by sacred mounds of great size; but intrusive graves of a later race are found at the surface near the summit. All the points mentioned combine the elements found necessary for the Mound-builders' civilization, viz.: productive farm lands, available springs, picturesque scenery and a wide outlook, embracing signal stations and confederate towns, miles away in the horizon.

THANKS.

Thanks are returned to Judge Hanna, of Petersburg; Capt. Kurtz, Mr. Harman, Mr. Mitchell and others, of Princeton; the Cols. Cockrum, of Oakland, for information, guidance and assistance; to Prest. Ingle, for transportation on the Evansville and Chicago Railroad.

GIBSON COUNTY COALS.

FINNEY'S COAL.

Three miles east of Princeton, seam one foot thick, mined by W. C. Harmon, dull black caking coal.

Specific gravity, 1.307. One cubic foot weighs 81.86 lbs.

Coke, - -	58.00	Ash, brown, - -	6.50
		Fixed carbon, -	51.50
Volatile matter,	42.00	Water, - - -	6.00
		Gas, - - -	36.00
	100.00		100.00

Coke slightly puffed, lusterless, amorphous.

A moderate quality of grate coal.

JOHN MCGREGOR'S COAL N.

Sec. 8, T, 3, R. 8, seam two feet six inches thick, glossy black, caking coal, laminated structure.

Specific gravity, 1.249. One cubic foot weighs 78.06 lbs.

Coke, - -	56.00	Ash, yellow, - -	3.50
		Fixed carbon, -	52.50
Volatile matter,	44.00	Water, - - -	4.50
		Gas, - - -	39.50
	100.00		100.00

Coke puffed, amorphous, brilliant.

A fair quality of coal.

OAKLAND CITY COAL L?

A dull, slaty looking coal, found by sinking a public well; five feet thick?

Specific gravity, 1.391. One cubic foot weighs 86.93 lbs.

Coke, - -	62.00	Ash, red, - -	18.50
		Fixed carbon, -	43.50
Volatile matter,	38.00	Water, - - -	6.00
		Gas, - - -	32.00
	100.00		100.00

Coke, laminated, lusterless, not swollen.

This is probably mixed with a portion of the roof shale.

G. S. VANADA'S COAL M.

Two miles west of Oakland; seam one foot, nine inches thick, glossy black coal, laminated structure.

Specific gravity, 1.275. One cubic foot weighs 79.68 lbs.

Coke, - -	59.50	Ash, red, - - -	5.50
		Fixed carbon, -	54.00
Volatile matter,	40.50	Water, - - -	5.00
		Gas, - - -	35.50
	100.00		100.00

Coke slightly puffed, amorphous, brilliant.

A moderate quality of caking coal.