

GEOLOGY

OF

PIKE COUNTY, INDIANA.

GENERAL FEATURES.

Pike County is bounded on the north by Knox and Daviess, east by Dubois, south by Warrick and Gibson, and west by Gibson; and contains 338 square miles. White river forms its northern limit. Patoka river crosses it centrally from east to west. The former is navigated at the spring and winter floods by steamboats and broad-horns, and the latter by rafts and flatboats. Numerous creeks and branches in all parts drain off the rain fall. The surface is level or gently undulating, except the middle portion of the eastern side, where hills and deep, stone-walled valleys are contrasted with romantic boldness. The bottoms and terraces of White river are extensive and wonderfully productive. Those of the Patoka and its affluents are of exaggerated width compared with the present sizes of these streams, and, generally formed from "modified loess," are cold, impervious to air and moisture, and not well improved. Springs of *pure* water are scarce, and owing to the constitution of the soil, many wells in the eastern part of the

county can not favorably compete with cistern water for drinking and culinary purposes.

The upland soil is a black, brown, or red loam, and was originally covered with a magnificent growth of timber. Some unrivalled groves of white oak, poplar, and hickory are still standing.

The beds of coal are numerous, of great thickness, and of good quality.

These treasures of the field, the forest, and the mine, are isolated and undeveloped. They urgently invite the construction of railways for their transportation, and promise immediate and remunerative returns.

SURFACE GEOLOGY.

The Glacial Drift, so constant a feature in the central and northern parts of the State, can hardly be recognized in this county. Beds of pipe and potters' clay, on Case's farm, near Highbanks, obscurely laminated and interchanging with layers of sand, are with doubt referred to this age. True boulders and gravel from the drift are sparingly met with, even at the southern boundary of the county; but so rare are they as to be pointed out as curiosities. Their transportation has been effected by rivers and water courses.

The Loess Loam is found in place on a few of the high hills northeast, south and southeast from Pikesville. Modified and washed by the rains of ages, the ash-gray impalpable sands of this deposit, cover the hill sides, and form the cold soils of the Patoka bottoms.

At the close of the loess epoch, the great currentless rivers and lakes, on whose borders this loamy soil was deposited, were, by oscillation in the earth's crust, drained away by more rapid discharge of their waters to the southwest. The change was probably gradual and was accomplished in the course of many centuries. During this time the Wabash, White and Patoka rivers, and perhaps the Ohio, traversed the western and southwestern parts of the county, and taken separately or as a whole, have left marks by which

their courses may be indistinctly traced. The valley of South Patoka, a basin nearly eight miles square, has been eroded to a depth of from 120 to 160 feet, but still retains a surrounding wall of peaks and hills. In this wall of hills the strata are in regular order. One is the counterpart of the others; showing conclusively that the basin owes its origin to erosion. From the absence of clays and gravels, this was done subsequent to the glacial period, and as I infer, by the joint action of two or more of these rivers.

The results indicated above, and other facts noticed in the detailed report, warrant the opinion that rivers have traversed the western and southwestern parts of this county in almost every direction. This view is further confirmed, by the existence of a large system of terrace deposits southwest from Winslow, locally known as the "Barrens," which is evidently an old river-bed silted up with fluvial drift, and the "mulatto loam" or "poplar divide" running parallel with and between Patoka and White rivers.

To the east of Petersburg, on the Jasper road, is spread out a large extent of country almost perfectly level, having a black rich soil, and a young growth of timber. This was evidently a prairie country at no distant period. Beneath the surface, beds of clay and sand, distinctly laminated, with fragments of trees and enormous grape vines, point out the lacustrine origin of the plain, and indicate a warm climate for the growth of the vegetation inclosed.

This plateau is bounded at the north by ancient sand bars on the bluffs of White river, one hundred to one hundred and ten feet above the present channel, which indicate the high-water level of the ancient river. These are further noticed in the Geology of Dubois county, and conspicuous examples may be seen at Sand Hill north of Petersburg, at Highbanks, and at the railroad cut in the north part of township number 1 north, range 7.

PALEOZOIC GEOLOGY.

The only rocks visible in this county are the massive conglomerates or subcarboniferous sandstones, and those of the
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coal measures proper. The following connected section brings in one general view all the rocks and coals from the uppermost seam of the Indiana and Illinois coal fields down to the conglomerate seam A. It will be seen that the space from A to K, so richly filled with block coals in Clay county, is here almost entirely barren. A single seam in the southwest part of the county, apparently located between A and K, may, with doubt, be referred to I. The section commences near the county line, west of Centerville, and ends at the lowest visible beds east of Pikesville.

CONNECTED SECTION.

SPACE.		FR.	IN.	
		1 — 40		Loess.
84.		2 — 10		Drift.
		6 — 8		Lacustrine clay.
		8 — 20		Micaceous and ferruginous sandstone. "Merom Rock."
		3 — 6		Argillaceous limestone.
1.6		0 — 1	6	Rash COAL and slate.
		2 — 4		Fire clay.
28.		15 — 20		Siliceous shales and flagstones.
		5 — 4		Limestone, sometimes argillaceous.
.8		0 — 0	8	Rash COAL and slate.
		2	4	Buff-colored fire clay.
49.4		8 — 25		Siliceous shales and thin bedded sandstone.
		40 — 15		Quarry sandstone, buff.
		20 — 2		Siliceous shales. [ings.
		12 — 5		Clay shales with carbonaceous part-
		3 — 0		Black slate.
4.4		1 — 4	4	COAL N.
		4 — 2		Fire clay.
		20 — 12		Siliceous flagstones.

CONNECTED SECTION—Continued.

SPACE.		Fr.	In.	
18.6		2 — 3		Ferruginous limestone.
		3 — 1		Calcareous and clay shale.
		0 — 0	6	Black slate.
2.6		0 — 2	6	COAL M.
		1 — 2	8	Fire clay.
62.8		18—21		Argillaceous sandstone.
		20		Siliceous shales and flagstones.
		5 — 14		Clay shale.
		10— 5		Soapstone with fossil plants.
10.9		3 — 10	9	COAL L.
72.		5		Fire clay.
		3		Soapstone.
		12—20		Soapstone and clay shale.
		12		Thin bedded sandstone.
		10		Siliceous flagstones and sandstone.
		5 — 9		Aluminous shale.
		2 — 4		Clay shale with iron nodules.
		2 — 3		Calcareo-magnesian limestone.
		2 — 3		Aluminous shale and ochre.
		2 — 3		Black bituminous sheety slate.
5.9		1 — 0		Pyritous clod.
		5	9	COAL K, from 2 to 10 ft. thick.
		5		Fire clay.

CONNECTED SECTION—Continued.

SPACE.		FR.	IN.	
		20		Coarse, ferruginous laminated sand-rock.
79.3		70—40		Massive conglomerate.
		5 —10		Gray aluminous shale.
		0 — 2		Calcareous shale.
		1 — 2	3	Black slate and cannel coal.
1.6		5 — 1	6	COAL A.
			3	Fire clay.
9.4		6		Siliceous shales and flagstones.
430.	Total.			

RECAPITULATION

SPACE.		FR.	IN.	
		84		Space.
		1	6	Rash COAL.
		28		Space.
			8	Rash COAL.
		49	4	Space.
		4	4	COAL N.
		18	6	Space.
		2	6	COAL M.
		62	8	Space.
		10	9	COAL L.
		72		Space.
		5	9	COAL K.
		79	3	Space.
		1	6	COAL A.
		9	4	Space.
	Total.	430	1	

The foregoing section and recapitulation give a general view of the rocks of Pike county, and represent the number and relative position of the coal seams as nearly as may be determined in their present undeveloped condition.

Coal A underlies the whole county, but outcrops only in ravines amongst the hills on each side of Patoka river, near the eastern border. Varying from one to four feet seven inches in thickness, it usually contains at least one stratum of about fourteen inches of good, compact, splinty cannel or block coal. Hard, free from dust, and rich in carbon, this stratum is suitable alike for parlor use or that of the blast furnace. When thickened to a much greater extent, it has been done at the expense of its more valuable qualities, and becomes impure and pyritous. This seam is often topped with a layer of pure, choice cannel coal from four to ten inches in thickness, and occasionally the black bituminous roof slate is replaced by a fair article of cannel coal, rich in gas. In such last mentioned banks, at the junction of the slate and cannel, are found casts of the horny-shelled *Lingula*, *Chonetes* and *Piscina* in good preservation; also faint impressions of *Productus Spirifer*, etc.; the thick calcareous material of the latter made soluble and wasted during the process of fermentation which occurred in the vegetable matter with which they were in contact prior to the change which formed coal.

The calcareous shales are pretty persistent, and are sometimes hardened into dark bituminous limestone, containing *Spirifer cameratus*, *S. lineatus*, *Productus punctatus*, *Nautilus decoratus*, *Orthoceras Rushensis*, fishbones and Crinoid stems.

The gray aluminous shales are highly charged with pyrite, (sulphuret of iron,) which, on exposure to the air, decomposes. This renders the whole stratum soft and friable, which, torn out by winter torrents, leaves spaces, roofed by the overlying sandstones, known as "rock houses."

The coarse ferruginous sand rock below coal K, is readily identified as the massive conglomerate. Although no pebbles are here present, it offers all the other character-

istic features of that group. It may be quarried in immense blocks. The quantity is unlimited. Endowed with a capacity to resist in a very great degree the action of heat and the variations of the atmosphere, this rock will be found a material of great value for the hammered masonry of foundations, piers, etc. By careful selection, stone of several different tints may be obtained, which will contrast with good effect in chiseled work. The upper member of this deposit is soft, coarse, and liable to disintegrate. The geological level of the silicious ores, so notable in counties to the north and east, is here but slightly charged with ores of iron. These rocks are a continuation of the conglomerate ridge which traverses Dubois county from east to west, south of the Patoka, and at its most westerly terminus passes beneath the surface a short distance northwest of Winslow.

Coal K is found high up on the sides of the hills and peaks which abound in the region of the conglomerate sandstone. Rapidly dipping to the north, south, and west, it as rapidly increases in thickness until, near the line dividing ranges seven and eight, it attains a generous width, ranging from five feet to nine feet seven inches at Dr. Posey's bank, section 15, township 1 north, range 8 west. To the east, this coal is somewhat splinty, but generally it is a fat, caking coal, rich in volatile matter, and on combustion leaves a red ash with some clinker, indicating the presence of sulphuret. On trial it has been found to be an excellent grate and steam coal, and is highly esteemed by blacksmiths. A stratum of black, sheety slate, from three to three and a half feet in thickness, overlies K, and forms an excellent roof. In the lower member of this slate are a great many large pyritous boulders or "pot-stones," some of large size and filled with marine fossils.

Still above this, and even more persistently accompanying K, is a band of limestone from two to three and a half feet thick. At the eastern side of the county it is tolerably pure and has been burned, furnishing a strong dark colored sample of lime. It contains the following fossils, viz.:

Productus punctatus, *P. semireticulatus*, *P. costatus*, *Spirifer eameratus*, *S. lineatus*, *Athyris subtilita*, *Pinnæ*, *Myalina*, *Allorisma*, *Discina* (large n. s.), *Nautilus decoratus*, *N.* (n. s.), and Crinoid stems. At Dr. Posey's bank and northeast from Pleasantville, this rock becomes sandy and at the same time highly magnesian, and in addition to the above list of fossils, contains *Gasteropods*, *Aviculopecten Providensis*, a *Phillipsia*, and *Chonetes mesoloba* in abundance.

The silicious flagstones and quarry sand rock is sometimes used for foundations and hammered masonry. Not of the best, it is only adopted when choice stone is not attainable.

Seam L is found capping the tops of the highest hills near Pikesville, and near the surface in the highlands east of Otwell, one and a half to two feet thick. From north to south through the center of the county, this seam has been almost wholly eroded. At Hathaway's, and Well's and Whitman's banks, one mile southwest of Winslow, it is seen again, and thence may be found with few interruptions to the western border, ranging in thickness from four to ten and a half feet. Throughout its whole extent, L is a gray or white ash caking coal, burning well in grates and steam furnaces, and will be found a choice fuel for locomotive and rolling mill use. L, as usual, is generally overlaid by clay shales and a thin bed of soapstone known as the "fern bed," containing many plant remains amongst which were noticed the following characteristic species: *Pecopteris arborescens*, *Neuropteris rarinervis*, *Annularia longifolia*, *Sphenophyllum Schlotheimii*, *Asterophyllites equisetiformis*, *Cordaites angustifolia*, *Paleoxylon*, *Lepidodendron elegans* and *Sigillaria reniformis*. A few points excepted, these shales are continued up to the next seam, and, although sometimes silicious and so compact as to seem to the quarryman enduring rock, yet on account of their aluminous nature they will on exposure to the elements soften and decompose.

Outcrops of seams M and N are found in the region about three miles west of the line dividing ranges 7 and 8, except in the southwestern part of the county where both are eroded. Soon after their first appearance, these

seams in the northern townships dip at the rate of from thirty to fifty feet per mile in a northwesterly direction; but to the west and southwest, in the same course, beyond Pleasantville, M is an inconstant, sulphurous seam and of little or no practical value. It is accompanied by an overlying bed of calcareous shale inclosing carbonates and sulphurets of iron. Above this is a ferruginous limestone of great persistence, from two to three feet thick, and containing a few indistinct Gasteropods, *Spirifer lineatus*, and *Cheteles milleporaceus*, in thick layers. Generally this bed is highly ferruginous and will pay for transportation to iron furnaces as a rich flux.

Seam N is worked at two localities near Petersburg; at both of which places it is found in isolated knolls of no great extent. Hence, by exposure to air and moisture, it has been robbed of some of its gaseous properties. The coal is free from sulphur, burns with a clear flame, and leaves a white ash without clinker. In the western part of the county, where covered by heavy hills, it contains more volatile matter, and will furnish fair to good gas coal. Above N, occurs a bed of buff or yellow sand rock, of considerable persistence. It has been quarried near Centerville and Hawthorn, and will furnish large amounts of good stone.

The *rash coals* are not constant. They were not seen of workable thickness in this county; but the underclays and overlying limestones are of great persistence, and when by erosion of intermediate strata, as at "Snake Knob," in Warrick county, the two limestones are brought close together, they form a marked feature, capping the hills with a hard argillaceous clinking limestone, that has proven a bulwark against the currents of erosive rivers and the levelling power of the elements. These seams are believed to be the highest coals in the Indiana and Illinois coal fields.

Still above is found a bed of coarse, soft red sandstone, probably equivalent to the "Merom rock" in the geology of Sullivan county. (Ind. Report 1871.) For the present

it is included among the rocks of the coal measures, but facts not yet fully studied will, it is believed, assign this rock to a higher position and a later age.

The foregoing is a general outline; to this will now be added representative sections and details for local information.

LOCAL DETAILS.

The conglomerate spur which pierces the coal measures from the eastern side of the county terminates with abruptness. The strata dip rapidly and thus a line of precipitous bluffs formed a mural breakwater, upon and against the slopes of which the different coal seams were successively deposited.

Commencing at the highest known rocks, the following section, taken in section 7, township 1, range 9 west, Gibson county, at a point 235 feet above the Wabash, is given as a better showing of the upper strata than any seen in this county:

SECTION IN GIBSON COUNTY.

Loess and river sand.....	20 ft. 0 in.
Pebbly, fluviatile drift	8 ft. 0 in.
Soft white and yellow sandstone.....	30 ft. 0 in.
Soft laminated sandstone.....	22 ft. 0 in.
Quarry sandstone, "Merom rock".....	18 ft. 0 in.
Calcareous and argillaceous shales, and lime rock.....	10 to 3 ft. 0 in.
Black bituminous slate	1 ft. 4 in.
<i>Rash coal</i>	8 in. 0 ft. 2 in.
Fire clay.....	2 ft. 6 in.
Clay shales.....	6 to 15 ft. 0 in.
Limestone, with Crinoid stems	2 to 4 ft. 0 in.
Clay shale.....	2 to 5 ft. 0 in.
Black slate.....	3 to 1 ft. 0 in.
<i>Rash coal</i> (reported).....	2 ft. 0 in.
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	134 ft. 0 in.

This section is interesting from the fact that the coarse, loose sandstone near the top may be traced almost continuously to the Wabash river in the vicinity of Hazleton. This shows the abruptness of the local dip in that direction and the great depth at which the lower coals must there be sought.

West of Centerville is a long ridge, which, at a height of 135 feet above Patoka, is covered with an ancient river sand-bar. This constitutes a warm loamy soil. Elevated above the region of sudden changes of temperature, it is to a great degree exempt from late frosts and invites the attention of fruit growers. The tender fruits are grown successfully. Pears ripen in perfection; and at the time of my visit the trees were breaking down with large, sweet red peaches. From the top of this hill, near Olive Branch Church, can be seen the spires at Oakland city, seven miles to the south, and other points ten miles away down and across Patoka valley.

That part of the connected section, from the rash coal down to coal N, gives an exhibit of the rocks in this neighborhood. A local section of coal N, the only seam here worked will be added.

SECTION AT FALL'S BANK.

Heavy bedded sandstone.....	10 to 20 ft. 0 in.
Calcareous and argillaceous clod.	14 to 0 ft. 7 in.
Coal N:	
Slaty coal.....	2 ft. 4 in.
Pyritous partings.	3 in. to 1 in.
Choice caking coal	1 ft. 1 in.
Slaty pyritous coal	0 ft. 4 in.
	3 ft. 10 in.
Fire clay to water.....	3 ft. 0 in.
	27 ft. 5 in.

The upper division of this coal burns without clinker, and leaves a white ash. It is too splinty for blacksmiths' use. Outcrops or openings with an average thickness of three and a half feet were seen on the following lands, viz.:

Lewis Wilson, northwest quarter Sec. 13, T. 1 S., R. 9 W.
 Lewis Wilson, southwest quarter Sec. 13, T. 1 S., R. 9 W.
 R. Falls, N. W. qr. N. E. qr. Sec. 24, T. 1 S., R. 9 W.
 W. Carr, N. E. qr. N. E. qr. Sec. 24, T. 1 S., R. 9 W.
 Mr. Hellsby, south half Sec. 19, T. 1 S., R. 9 W.

Going east, the ferruginous limestone (iron ore) covering coal M, and sometimes the coal itself, may be seen almost connectedly from Dongola to the north side of township number 1 south, range 8 west. Large quantities have been thrown out in digging the canal north of Hosmer. This would be valuable as a flux for iron furnaces, enriched, as it is, with a very appreciable amount of iron. Thin outcrops of M are seen near and in the canal bed on sections 10, 22 and 27, township 1 south, range 8 west; none reported to be of workable thickness. Tradition, which could not be traced to a reliable source, reports coal L five feet thick in a sixty feet bore, near the base of "Slickum hill." This is the average space between L and M from neighboring localities, and to say the least, is probably correct.

On the road leading from Hosmer to Petersburg, seam N is worked on Hosea Alexander's land by H. Smith. The coal comes out in good sized blocks, has a glossy metallic lustre, burns with much flame and leaves a white ash with no clinker. Considerable quantities have been mined to supply mills and factories at Petersburg.

SECTION AT HOSEA ALEXANDER'S.

Silicious shale.....	6 ft. 0 in.
Compact soapstone.....	1 ft. 6 in.
Gray soapstone, "fern bed," with <i>Pecopteris arborescens</i> , <i>Neuropteris rarinervis</i> , <i>N. hirsuta</i> , <i>Sphenophyllum Schlotheimii</i> , <i>Asterophyllites longifolium</i> , <i>Calamites</i> , <i>Cordaites borassifolium</i> , <i>C. angustifolium</i> , <i>Lepidodendron</i> , (—————), <i>Sigillaria</i> and <i>Stigmaria</i> , abundant	2 in to 0 ft. 11 in.

Coal N:

Laminated coal.....	0 ft. 6 in.
Compact good coal.....	2 ft. 0 in.
Parting blk. sulph..	3 in. to 0 ft. 1 in.
Choice coal.....	2 ft. 0 in.
	————— 4 ft. 7 in.
Fire clay, plastic.....	5 ft. 6 in.
Fire clay with nodules and pebbles.....	1 ft. 2 in.
	—————
	19 ft. 8 in.

Outcrops of same were noticed on the adjoining lands, section 34, township 1 north, range 8 west, and section 4, township 1 south, range 8 west. More will be discovered in the adjacent knolls, but as this seam has suffered much from erosion the patches will be isolated and of no great extent.

Petersburg is pleasantly situated in the fertile valley of Prides creek, two miles south of White river. During the short life of the Wabash and Erie canal, it was the center of a large trade in dry goods, agricultural products, and coal. Since the canal was abandoned, the citizens have been compelled to look out for other means of transportation. High hopes are entertained of securing one of the proposed lines of railway, and thus surpass their former prosperity. Good crops of corn, wheat, oats, and grass are raised. Fruit is abundant and of superior quality. A few miles to the south, is an extensive grove of giant oaks and poplars. All offer paying inducements for railway construction.

In mineral wealth the neighborhood is still richer. At Sand Hill, two miles north of town, the following section was taken, where the ferruginous limestone overlying seam M may be seen dipping west toward "Rocky Ford" at the rate of sixty feet to the mile. It is probable that the dip is still greater in a direction a little north of west.

SECTION AT SAND HILL.

Ancient river sand.....	10 to 20 ft. 0 in.
Silicious shale.....	7 ft. 0 in.
Soapstone with <i>Pecopteris</i> , <i>Neuropteris</i> , <i>Asterophyllites</i> , <i>Cordaites</i> , and <i>Flabellaria</i>	0 ft. 6 in.
Coal N.....	3 to 4 ft. 4 in.
Fire clay.....	2 to 4 ft. 0 in.
Soapstone.....	8 ft. 0 in.
Silicious shale.....	2 to 12 ft. 0 in.
Ferruginous limestone, with <i>Productus punctatus</i> , <i>Spirifer lineatus</i> , <i>Cyathaxonia prolifera</i> , <i>Chaetetes milleporaceus</i> , <i>Athyris subtilita</i> , and <i>Gasteropods</i>	2 ft. 4 in.
Calcareous and pyritous clay.....	3 to 1 ft. 0 in.
Coal M :	
Slate and coal.....	0 ft. 6 in.
Pyritous and bituminous clay.....	0 ft. 8 in.
Caking coal.....	1 ft. 8 in.

	2 ft. 10 in.
Fire clay.....	8 ft. 0 in.
Sandstone	5 to 20 ft. 0 in.
Covered silicious flags and shales... (Low water in White river.)	20 ft. 0 in.
Soapstone.....	10 ft. 0 in.
Coal L (reported).....	8 ft. 0 in.

	127 ft. 4 in.

The strong dip mentioned before would, in reverse, carry all these coals above the surface at Petersburg; and hence we find they have all been eroded with a possible exception of L at a few isolated points. Borings for water at several wells in town have, according to report, found coal, or a

black slate filled with bowlders similar to the roof-rock overlying coal K. A shaft and bore near the woolen mill in the southwest part of town, is reported to have found coal K ten feet thick, with the following exhibit:

SECTION IN PETERSBURG.

Soil and clay.....	28 ft. 0 in.
Shelly stone.....	10 ft. 0 in.
Slate and bowlders.....	2 ft. 0 in.
Coal K.....	10 ft. 0 in.
Fire clay to bottom.....	2 ft. 0 in.
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	52 ft. 0 in.

Going northeast on the Washington road, we ascend to the elevated ridge bordering White river. Near the summit, about one hundred and thirty feet above low water, coal L one and a half feet thick was found in digging wells on the lands of J. Vaughn and S. Maffley, not more than eighteen to twenty feet under the surface, with seam K thirty to fifty feet below in ravines. The strata probably dip from this place in every direction, as may be learned from disconnected exposures. A deep bore would definitely settle some doubtful points.

Two miles north of Petersburg, on Lick and Muddy creeks, and between them, coal K is magnificently developed—A crowning effort of the carboniferous age. The solid coal ranges from five and a half to over nine feet on Dr. Posey's land, section 12, township 1 north, range 8 west. A man six feet high can generally walk erect in Posey or Shandy's mines and have considerable space overhead. The seam furnishes a rich, gaseous, caking coal, which burns with much flame and leaves a red ash with some clinker. It is a good coal for steam or grate use, and is sought after and hauled long distances by blacksmiths. The following section, taken at Dr. Posey's mine, section 13, township 1 north, range 8 west, gives a general view of the neighboring exposures, except that the overlying limestone is purer and

thinner in some localities, and at others highly ferruginous and compact; at Shandy's bank the seam is not so distinctly laminated, and the coal is more homogeneous:

SECTION AT DR. POSEY'S MINE.

Sandstone.....	5 to 20 ft. 0 in.
Magnesian, limestone with <i>Productus punctatus</i> , <i>P. semireticulatus</i> , <i>P. costatus</i> , <i>Discina</i> (n. s.) <i>Spirifer cameratus</i> , <i>S. lineatus</i> , <i>Allorisma</i> , <i>Astartella</i> , <i>Nautilus decoratus</i> , <i>Aviculo-pecten Providensis</i> , <i>Lingula</i> , and Crinoid stems.....	4 ft. 0 in.
Ferruginous limestone.....	3 to 1 ft. 4 in.
Dark pyritous argillite filled with <i>Productus</i> , <i>Chonetes</i> , <i>Cephalopods</i> , and <i>Gasteropods</i> , in confused pockets.....	2 to 0 ft. 0 in.
Black sheety slate with pyritous ironstone boulders from one to five feet in diameter.....	5 ft. 0 in.
Coal K:	
Thin bedded, often cannel	0 ft. 6 in.
Steam coal.....	1 ft. 10 in.
Parting of black sulphur.....	0 ft. 1 in.
Good steam coal.....	2 ft. 4 in.
Parting (pyritous).....	0 ft. 2 in.
Smiths' coal.....	1½ to 2 ft. 4 in.
Grate coal (pyritous).....	1 ft. 0 in.
	8 ft. 3 in.
Stigmarial fire clay.....	5 ft. 5 in.
	44 ft. 0 in.

The great iron boulders or "pot stones" fall down from the roof, after exposure, and hundreds of tons could be

obtained here. I suggest to iron makers the feasibility of separating the sulphur on the spot by roasting with refuse coal, and in this way secure a large quantity of iron at little cost. Decomposition of the pyritous and aluminous shales produce quantities of alum and copperas in Dr. Posey's mine. At an early day copperas was here manufactured for home use, one gallon of water leached from the mine yielded one pound of that salt.

In the older part of this mine, long ago exhausted, owls and great flocks of bats have taken up their quarters. Back in the ghastly twilight one will be surprised to find that the old timbers and props have seemingly come to life again. They have sent out strange twisted and forked branches, some white, others gray or dusky, and all decked with globules of condensed water, which sparkle like diamonds. Some of these fungi were two feet long and presented a never ending medley of grotesque unsymmetrical forms. The timbers were often coated with patches of a leathery white substance, which probably at a time of greater darkness would blaze with phosphorescent light (fox-fire).

Coal K has been worked or opened in this vicinity as follows, viz.:

Dr. Posey, 4 drifts, Sec's 12 and 13 T. 1 N., R. 8 W.

Shandy, shaft and slope, Sec. 13, T. 1 N., R. 8 W.

Holloway, drift, Sec. 18, T. 1 N., R. 7 W.

Bennett, drift, Sec. 7, T. 1 N., R. 7 W.

Adams, drift, Sec. 7, T. 1 N., R. 7 W.

Hawthorn, drift, Sec. 7, T. 1 N., R. 7 W.

Hawthorn, shaft to L (?), Sec. 7, T. 1 N., R. 7 W.

DeBruler, northwest quarter Sec. 8, T. 1 N., R. 7 W.

Case, (reported), Sec. 20, T. 1 N., R. 7 W.

Dr. Posey's bank has been worked over twenty-five years. About four acres have been exhausted supplying the demand of local market and smith-shops for a region twenty miles around, and for shipment by canal and river to Evansville, Mount Carmel, Graysville and New Harmony. The

proprietor estimates that over one million bushels have been sold.

From the Posey and Shandy mines, southeast quarter section 13 township 1 north, range 8 west, coal K dips rapidly to the northwest. Near the river flats, a test shaft was put down to the coal at a considerable depth below the surface. Along the canal and bank of the river, in northwest corner of section thirteen, is a band of ferruginous limestone, with *Chaetetes milleporaceus*, exactly similar to the bed overlying M at all other points. A seam of coal similar to the general aspect of M is present, while below in the river, with the usual space (sixty-two feet) intervening, is a coal, according to descriptions furnished me, exactly analogous with L. This requires a sudden and rapid dip of strata to the northwest, of not less than one hundred feet to the mile. A dip of such intensity is barely possible. Hence more exact data are necessary before positive determinations can be made.

At DeBruler's bank, northwest quarter section 8, township 1 north, range 7 west, the roof slates afford a variety of fossils, viz.: *Productus*, *Chonetes*, *Discina*, *Bellerophon*, *Macrocheilus* and *Pleurotomaria*, some represented by several species.

SECTION OF DE BRULER'S COAL.

Fat cannel-like coal.....	0 ft. 4 in.
Steam coal.....	3 ft. 0 in.
Sulphur parting.....	.....
Good bituminous coal.....	1 ft. 5 in.
Parting.....	.....
Choice bituminous coal.....	1 ft. 0 in.
Rash coal.....	1 ft. 8 in.
	<hr/>
	7 ft. 5 in.

Rhoads & Hawthorn's bank, on the west half northwest quarter section 7, township 1 north, range 7 west, was once worked extensively and the product shipped by canal.

The seam averages 5 feet, and is a good sample of caking coal. At one time the canal broke opposite this bank, and exposed beneath its bed a ledge of coal reported to have been six or seven feet thick, fifteen feet below the upper seam. Whether a lower seam or a fallen ledge of K, there was no evidence to determine.

Ascending White river, we find, on section 4, township 1, north, range 7 west, an ancient sand-bar, high up on the river bluffs, cut through by the "Straight Line Railroad," showing a thickness of twenty-four feet. In section 10, on lands of C. White, the same company quarried an amount of stone sufficient for the high piers necessary to bridge the river. This material has been lying here exposed to frost and air for a period of sixteen years. It weathers well. The bed of sandstone quarried here, at McCain's, Postlewait's, and Crowe's, is compact, splits readily, and chisels well. Generally the material overlying coal L is too argillaceous to be valuable for building purposes. This is exceptional, and was evidently compacted by currents of water powerful enough to transport the coarse sands of which it is composed. As is usual in such cases, we find the underlying coal thin and partially eroded by said currents.

Coal has been worked to a very considerable extent on John Crowe's farm, section 10, township 1 north, range 7 west. Quantities have been exported by flat-boats on the river. It is a choice caking coal, burns with white flame, runs together but little, and leaves a white ash without clinker. It is so free from sulphur that a quantity which had been exposed to the weather "in stock" for six months, showed no efflorescence of copperas.

SECTION AT CROWE'S.

Slope.....	.....
Sandstone, soft and coarse.....	11 ft. 0 in.
Sandstone, thin bedded.....	12 ft. 0 in.
Clay shale and soapstone.....	9 ft. 0 in.
Coal L?.....	3 ft. 6 in.

Fire clay.....	3 ft. 9 in.
Covered.....	50 ft. 0 in.
Hard sandstone.....	1 ft. 6 in.
Soapstone, with iron nodules contain- ing zinc blende.....	5 ft. 0 in.
Flagstones and ferruginous limestone..	12 ft. 0 in.
Coal K? in White river.....	? ft. ? in.
	<hr/>
	107 ft. 2 in.

Continuing up the river, we find bluffs capped with fluvial sands one hundred to one hundred and thirty feet above the channel. On G. W. Daily's land, southwest quarter, northeast quarter section 13, township 1 north, range 7 west, is the following outcrop:

SECTION ON DAILY'S FARM, Highbanks.

White fluvial sand with shells.....	33 ft. 0 in.
Red clay, modified drift.....	8 ft. 0 in.
Blue potters' clay—glacial drift? with trunks of trees and vines.....	10 ft. 0 in.
Soft disintegrating sandstone.....	11 ft. 0 in.
Coal, rash.....	0 ft. 5 in.
Clay parting.....	0 ft. 1 in.
Coal, good.....	1 ft. 6 in.
Coal, rash.....	0 ft. 2 in.
	<hr/>
	2 ft. 2 in.
Stigmarial clay.....	5 ft. 0 in.
	<hr/>
	69 ft. 2 in.

Coal in this vicinity outcrops, or has been worked as follows, viz.:

- Thomas Crowe's, north half section 10, T. 1 N., R. 7 W.
- Clint White, N. W. qr. S. E. qr. Sec. 10, T. 1 N., R. 7 W.
- McCanes, northwest quarter Sec. 24, T. 1 N., R. 7 W.
- G. W. Daily, northeast quarter Sec. 13, T. 1 N., R. 7 W.
- J. Hancock's, S. half N. W. qr. Sec. 18, T. 1 N., R. 6 W.

J. Mitchell, S. E. qr. S. E. qr. Sec. 7, T. 1 N., R. 6 W.

Gray, north east quarter Sec. 19, T. 1 N., R. 6 W.

T. Case, northwest quarter Sec. 19. T. 1 N., R. 6 W.

South of Highbanks, on the way to Otwell, in section number 30, where the road crosses a branch flowing into Rocky run, numerous sink holes or conical pits were noticed. The branch had cut down to a stratum of impalpable quicksand. Here, in past time, herds of buffalo would gather to wallow in the fine sand and dust, as their descendants still do in the dust "wallows" of western Kansas. Well worn trails or paths of an ancient date, were noticed leading to this favorite resort.

Otwell is a vigorous young town. It is situated in the center of a level tract of land which extends some twenty miles from east to west, about half as wide as it is long, and is one hundred and ten feet above White river. The soil is black or gray. Beneath, in digging wells, beds of clay inclosing fragments of wood, alternate with bands of fine sand, inducing the belief that this was once the bottom of a lake. The present growth of timber is generally young, showing that not many years ago this area was a prairie.

Three mounds, a short distance north of the village, are probably artificial and relics of the "Mound Builders." Time did not allow an examination.

South of Otwell, in section 20, township 1 south, range 6 west, Mr. Wm. Davenport reports finding a log of sweet gum (liquidambar) in a well forty-eight feet below the surface.

DAVENPORT'S WELL.

Soil and modified loess.....	5 ft. 0 in.
Yellow and red clay.....	6 ft. 0 in.
Blue clay with layers of sand.....	30 ft. 0 in.
Blue clay inclosing drift wood.....	2 ft. 0 in.
Blue mud and sticks.....	7 ft. 0 in.
	50 ft. 0 in.

At nearly an equal depth on an adjoining farm was found a black walnut log. These trees are still natives.

In the Davenport neighborhood the coal seams were not being worked. They were reported as furnishing a fair article of coal, with thickness varying from one to two and a half feet. The different localities are marked on the map. I was told that the coal formerly worked on Demette farm, northwest quarter section 27, township 1 south, range 6 west, and dug to in a well on Trayler's land, section 2, township 1 south, range 7 west, was at each of these places over four feet thick.

A small seam near the top of the hills is referred to L. Commencing thirty-five feet below this, Mr. J. Dillon dug and bored, on southeast quarter southwest quarter section 28, township 1 south, range 6 west, and, at a depth of thirty-five feet below, found K; thus determining the space between at seventy feet. Just above the lower coal, his auger passed through a layer of "very hard stone," supposed to be the cherty lime rock over K, which crops out in Flat creek two miles below. At one opening on this farm L is reported to be five feet thick.

The "White Sulphur Springs," Captain J. F. Townsend, proprietor, situated on the northwest quarter section 33, township — south, range — west, flow out at crevices in the limestone roof of coal K. The water has the medicinal qualities peculiar to white sulphur springs. It has been found to be a specific in many chronic diseases. Comfortable quarters are fitted up in which to entertain invalids. On the same farm, Captain Townsend has worked seam K, having a thickness of two feet eight inches. The coal is sulphurous.

South and west of the "sulphur springs," K rapidly mounts the conglomerate ridge. Seam A (or possibly a seam intermediate between K and A) is found in the valleys and ravines. It yields a rich, glossy-black coal, breaking with splintery fracture, and free from dust. The overlying roof-slate is highly bituminous. At several localities it changes into a laminated cannel coal, which is rich in gas

and burns with a flame of great volume. If transportation was convenient this cannel coal would be valuable to the gas maker, and for torches, kindlings, etc., etc. One of the best exposures is here added, taken on the land of G. W. Thomas, southeast quarter section 31, township 1 south, range 6 west.

SECTION AT THOMAS' MILL.

Slope, covered.....	
Soft laminated sandstone.....	8 ft. 0 in.
Silicious and argillaceous shale.....	4 ft. 10 in.
Blue clay shale.....	0 ft. 6 in.
Dark slate, with scales, teeth, and spines of <i>Petrodus occidentalis</i> , and <i>Discina</i> ..	1 ft. 6 in.
Black bituminous sheety slate.....	0 ft. 10 in.
Cannel coal.....	1 ft. 1 in.
Hard coal, some sulphur.....	2 ft. 0 in.
	————— 3 ft. 1 in.
Fire clay, to branch.....	5 ft. 3 in.
	—————
	24 ft. 0 in.

The cannel coal and bituminous slate above contains leaves, stems, and stalks of ferns, *Cordaites borassifolia*, *Lingula umbonata*, and *Discina nitida*, with a few fragments of Crinoid stems and of *Productus*.

In the region between Flat creek and Patoka river, coal seams are visible or have been worked at the following localities, viz. :

- Anderson's, northeast quarter Sec. 27, T. 1 S., R. 6 W.
- DeMotte's, northwest quarter Sec. 27, T. 1 S., R. 6 W.
- Davenport's, south half Sec. 27, T. 1 S., R. 6 W.
- Rodarnell, northwest quarter Sec. 28, T. 1 S., R. 6 W.
- Dillon, southwest quarter Sec. 28, T. 1 S., R. 6 W.
- Townsend, northwest quarter Sec. 33, T. 1 S., R. 6 W.
- Carpenter, northeast quarter Sec. 31, T. 1 S., R. 6 W.
- G. W. Thomas, southeast qr. Sec. 31, T. 1 S., R. 6 W.
- Taylor & Davis, Sec. 25, T. 1 S., R. 7 W.

- Garrison, northwest quarter Sec. 4, T. 2 S., R. 6 W.
Davidson, southwest quarter Sec. 4, T. 2 S., R. 6 W.
Taylor, northeast quarter Sec. 8, T. 2 S., R. 6 W.
Wolfe, southwest quarter Sec. 8, T. 2 S., R. 6 W.
Case, northeast quarter Sec. 17, T. 2 S., R. 6 W.
"Copperas factory," N. W. qr. Sec. 18, T. 2 S., R. 6 W.

These coals rarely attain a thickness of more than two and a half feet except at localities heretofore mentioned.

"Miller's Ague Spring," section 5, township 1 south, range 6 west, is locally known as a "cure" for that disease. The waters are a saline chalybeate, flowing out of ferruginous beds of sandstone. Their qualities are highly esteemed by those who have tried them.

"Milburn's Spring," T. C. Milburn, proprietor, situate on southeast quarter section 35, township 1 south, range 7 west, has a high reputation in that vicinity as a remedy for diseases of the stomach, bowels, kidneys and of the skin. It is generally known as "the ague cure," but is reputed as still more efficacious in derangements of the liver and digestive organs. Many certificates from reputable persons indicate especial virtue in cases of gravel and rheumatism. At the time of my visit not less than twenty persons were drinking the water, and it was being hauled away so extensively as to almost exhaust the receiving cask. It contains salts of soda, magnesia and iron, with traces of bromine and arsenic.

The spring flows out at about the level of coal K, the shales and roof stones of which are near by. Beneath, the ferruginous and massive conglomerates are seen, and are well developed. A short distance to the west, this rock is suddenly depressed below the surface within the space of a quarter of a mile, and we find a mass of shales and soapstones thrown against and upon the tilted strata of sand rock. In a field adjoining the spring were found some good casts of *Calamites*, *Sigillaria* (3 Sp.), *Lepidodendron*, (2 Sp.) and *Trigonocarpum olivæformis*. Indications of coal K were noticed in ravines, but no openings were visible.

At Winslow, coal K is well developed, and has long been worked to supply mills and forges. It is a caking coal, good for steam use, and, by selecting the upper or lower divisions, furnishes an article pretty free from sulphur and well liked by blacksmiths. Moulton's bank is worked at two openings, with four other outcrops on the same section 28, township 1 south, range 7 west.

SECTION AT MOULTON'S BANK.

Slope, thin to heavy sandstones.....	40 ft. 0 in.
Limestone.....	1 ft. 8 in.
Calcareous shale.....	4 ft. to 0 ft. 0 in.
Black sheety slate with iron stones.....	2 ft. 4 in.
Coal K:	
Good blacksmith coal.....	1 ft. 0 in.
Steam coal, pyritous part's..	4 ft. 7 in.
Good blacksmith coal.....	1 ft. 0 in.
	————— 5 ft. 7 in.
Fire clay.....	3 ft. 5 in.
	—————
	53 ft. 0 in.

At this mine, the seam rises to the east one foot in a distance of forty feet; and dips at the same rate to the west.

Thomas' bank, on the Crowe estate, south half southwest quarter section 29, township 1 south, range 7 west, was also being mined. The dip here was west southwest at the rate of fifty feet to the mile.

SECTION AT F. THOMAS' BANK.

Slope.....	.....
Limestone with <i>Productus</i> and <i>Spirifer</i> ...	1 ft. 3 in.
Calcareous clay.....	1 ft. 6 in.
Black bituminous sheety slate.....	1 ft. 8 in.
Coal K:	
Good smiths' coal.....	1 ft. 2 in.
Steam coal.....	1 ft. 6 in.
Caking coal.....	1 ft. 6 in.
	————— 4 ft. 2 in.
Fire clay.....	3 ft. 5 in.
	—————
	12 ft. 0 in.

I am indebted to Mr. Charles DeBruler for much information as to these coals, and also about outcrops on sections 20, 21, 22 and 32, which were covered and not visible; the reported thickness varying from three to five feet.

In part the flora and fauna of this vicinity are sub-tropical in their affinities. Persimmon bush and sweet gum are common. Canebrakes formerly existed. Tobacco grows well. Mr. DeBruler, a few years ago met and killed two black "cotton-mouth" snakes north of Winslow, and Mr. Corn, a few miles southeast, captured another. They were of a mottled, rusty, yellow color above, copper colored beneath, and clear white about and under the mouth.

South of Winslow coal outcrops, or has been discovered in wells, as follows, viz.:

	THICKNESS.	
	Ft.	In.
Wells & Whitmen, L, Sec. 1, T. 1 S, R. 8 W	4	8
Unknown, K, Sec. 2, T 1 S., R. 8 W	3	9
Hathaway, L, Sec. 6, T. 1 S., R. 7 W.....(?)	4	0
On line of L. and St. L. R. R.:		
Thomson, L(?), S. E. qr. Sec. 13, T. 2 S, R. 8 W.....	3	0
Skinner, K, W. half Sec. 18, T. 2 S., R. 7 W.....		
——, K, N. W. qr. Sec. 18, T. 2 S., R. 7 W.....		
Pancake, K, N. W. qr. Sec. 17, T. 2 S., R. 7 W.....	?	2
Beer, K, S. W. qr. Sec. 17, T. 2 S., R. 7 W...represented	3	6
Ashby, K, N. E. qr. Sec. 17, T. 2 S., R. 7 W. represented	4	0
Morgan, K, S. W. qr. Sec. 17, T. 2 S., R. 7 W. represented	3	0
Beech, K, W. half Sec. 21, T. 2 S., R. 7 W...represented	3	6
Wilder, K, S. W. qr. Sec. 21, T. 2 S., R. 7 W. represented	3	0
White heirs, A, S. E. qr. Sec. 16, T. 2 S., R 7 W.....	4	7
Corn, A, S. W. qr. Sec. 15, T. 2 S., R. 7 W	4	0

Wells and Whitman's bank has been considerably worked for local use. The product is a light caking coal, free from sulphur, which burns with a white flame, leaving a gray ash and no clinker.

SECTION AT WELLS AND WHITMAN'S BANK.

Silicious shales, with carbonaceous and clay partings.....	12 ft. 0 in.
Soapstone fern bed, with <i>Neuropteris rarinervis</i> , <i>N. hirsuta</i> , <i>N. Collinsii</i> , <i>Alethopteris Serlii</i> , <i>Pecopteris arborescens</i> . <i>P.</i> (——) <i>Cordaites</i> , and <i>Calamites</i>	0 ft. 8 in.
Coal L:	
Slaty coal.....	0 ft. 4 in.
Pure laminated.....	0 ft. 6 in.
Cubic, gas coal.....	1 ft. 2 in.
Choice angular bright.....	2 ft. 8 in.
	————— 4 ft. 8 in.
Fire clay, dark bituminous.....	0 ft. 9 in.
Fire clay, white stigmarial.....	4 ft. 3 in.
Soapstone, with calcareous balls and bands.	2 ft. 3 in.
Soapstone and silicious shales	12 ft. 0 in.
	—————
	36 ft. 7 in.

Hathaway's bank, section 6, township 1 south, range 7 west, was not opened, but from weathered fragments and accompanying material, the coal was very similar to Wells and Whitman's. From this point west, seam L is probably persistent along the line of the Louisville and St. Louis Railroad. To the east, coal L has been eroded, and was not seen again until met on the highest hill tops at Pikesville, one hundred and eighty feet above Hathaway's. This shows the amount of erosive power necessary to remove the absent strata in the intervening area, and also the rapidity with which this seam ascends to the highlands.

The coals K, on the head of Barren creek, were not visible and could not be measured. They are reported as varying from two and a half to four feet. The only measurement possible was taken near the quarter post between sections 17 and 20, where the thickness was less than two feet.

Many outcrops of A are found down in ravines bordering the Patoka, in the northeast part of township 2 south, range 7 west. Generally the seam is thin; but at several localities it is widened up by layers of coal, separated by clay or slaty partings, which indicate that the upper divisions have been transported from other localities. The following, taken on White's land, north half southeast quarter section 16, township 2 south, range 7 west, begins under the "rock house" sand rock:

SECTION AT WHITE'S BANK.

Aluminous shale.....	10 to 15 ft. 0 in.
Black sheety slate.....	1 ft. 10 in.
Coal A:	
Splinty coal, with clay and slate parting.....	3 ft. 4 in.
Good splinty cannel.	1 ft. 3 in.
	4 ft. 7 in.
Fire clay.....	5 ft. 0 in.
	<u>26 ft. 5 in.</u>

A natural bridge on Jackson Corn's land, southwest quarter southeast quarter section 16, township 2 south, range 7 west, is formed by a small branch passing beneath a ledge of "rock house" sandstone. It is symmetrical, thirty feet long, ten feet wide with a chord of twenty feet.

Coal A is found on adjoining land below the water level.

SECTION AT CORN'S.

Slope .....	.....
Coarse, soft disintegrating sand- stone.....	10 to 30 ft. 0 in.
Massive sandstone with "rock houses".....	50 ft. 0 in.
Aluminous shale.....	10 to 15 ft. 0 in.
Black sheety slate.....	2 ft. 0 in.
Coal A.....	4 ft. 6 in.
	<u>101 ft. 6 in.</u>

Pikesville is located on high land geologically, as well as topographically. Coal L is found in wells near the surface, K crops out on the side hill, and the place of A is but little below the level of low water in Patoka river. The following approximate section was taken by barometric measurement:

SECTION AT PIKESVILLE.

Soil and loess loam.....	20 ft. 0 in.
Silicious shale and soapstone.....	18 ft. 0 in.
Coal L.....	1 ft. 6 in.
Fire clay.....	3 ft. 0 in.
Silicious and clay shale.....	30 ft. 0 in.
Ochre and black slate.....	3 ft. 0 in.
Coal K.....	1 to 3 ft. 0 in.
Laminated sandstone.....	20 ft. 0 in.
Massive sandstone.....	60 to 40 ft. 0 in.
Aluminous shale in Patoka river (estimated).....	10 to 30 ft. 0 in.
Place of coal A.....	.....
	<hr/> 168 ft. 6 in.

A spring flowing out near the roof slate of coal K in the northern part of the village, is locally known as an "ague cure." The water contains sulphates of iron, alumina and perhaps magnesia.

East and southeast from Pikesville, we find a succession of hills and deep narrow ravines. Coal L is rarely met with. K soon mounts to the hill tops, and at the dividing ridge between Patoka and the Ohio runs out or is eroded. A is found near the water level in the deep valleys. Intermediate between K and A, the conglomerate sandstone is well developed. The upper division, coarse and disintegrating, is sometimes sufficiently compact to furnish grindstones of excellent quality, as on the north half section 28, township 2 south, range 6 west. The "massive division" from sixty to eighty feet thick is often precipitous, and on north half section 28, the underlying aluminous shales have

been excavated by Rocky (or Paint) creek, so as to form "rock houses;" one of which has a sufficient capacity and was often used as a shelter by a small tribe of Indians. In this cave were found a number of incipient "Indian mortars"—round cavities drilled into the solid rock by pebbles from the upper stratum agitated by drops of water trickling from the roof-stones.

SECTION ON J. CASE'S LAND, NORTHWEST QUARTER SECTION
28, TOWNSHIP 2 SOUTH, RANGE 6 WEST.

Slope .....	.....
Massive sandstone.....	60 ft. 0 in.
Aluminous shale, "rock houses".....	8 ft. 0 in.
Soapstone.....	3 ft. 0 in.
Limestone.....	0 ft. 8 in.
Black slate	2 ft. 0 in.
Coal A :	
Compact splinty cannel.....	1 ft. 1 in.
Block coal.....	0 ft. 5 in.
	————— 1 ft. 6 in.
Fire clay to Rocky creek.....	3 ft. 6 in.
	—————
	78 ft. 8 in.

Near the southeast corner of section 28, township 2 south, range 6 west, Dr. DeTar, and other citizens, have made examinations, and found an excellent article of cannel, superior to any that I have seen in the State. The seam is eight inches thick, resting upon another of bright, compact, semi-block coal, one and a half feet thick. This last will pay all expenses for mining, and leave the cannel as clear profit. The roof is a highly bituminous cannel-like slate, which on further exploration may answer for many uses to which cannel coal is devoted. On failure of the Pennsylvania wells, coal oil may be distilled from this slate at a cost not exceeding fifty cents per gallon.

SECTION AT DE TAR'S BANK.

Loess	25 ft.	0 in.
Slope, covered.....	50 ft.	0 in.
Massive sand rock.....	45 ft.	0 in.
Aluminous shale with iron nodules.....	16 ft.	0 in.
Ferruginous limestone.....	1 ft.	1 in.
Ochre.....	0 ft.	10 in.
Black cannel-like slate.....	2 ft.	0 in.
Coal A :		
Choice cannel coal.....	0 ft.	8 in.
Bright compact splinty-		
cannel.....	1 ft.	1 in.
Block coal.....	0 ft.	6 in.
	—————	2 ft. 3 in.
Fire clay to Rocky run.....	2 ft.	6 in.
	—————	134 ft. 8 in.

The above cannel coal is rich in volatile matter, burns with a great volume of flame, does not snap as cannel slates usually do, but leaves a considerable amount of white ash. An outcrop, a short distance southeast from Dr. DeTar's bank, indicated that another coal seam at least one and a half feet thick there existed between K and A, and about thirty feet above the latter. The connecting strata could not be seen, and consequently nothing more than a probability can be expressed. This is sustained by the fact, that in Warrick, near the southwest corner of Pike county, such a state of affairs does exist.

In the valley of Cup creek, coal has been mined to a small extent at several banks. The thickness ranges from two to five and a half feet, and averages two feet four inches.

COAL NEAR PIKESVILLE.

		THICKNESS.	
		Ft.	In.
In the village.....	L	1	6
Stephens, Sec. 20, T. 2 S., R. 6 W.....	L?	1	4
Miller, Sec. 21, T. 2 S., R. 6 W.....	L?	0	8
Miller, Sec. 21, T. 2 S., R. 6 W.....	K	1	7
Case, Sec. 28, T. 2 S., R. 6 W.....	A	1	6
Unknown, W. half Sec. 28, T. 2 S., R. 6 W.....	A	2	0
DeTar, S. E. qr. Sec. 28, T. 2 S., R. 6 W.....	A	2	3
Todrank, N. E. qr. Sec. 30, T. 2 S., R. 6 W.....	K?	.....	.....
Boling, S. W. qr. Sec. 30, T. 2 S., R. 6 W.....	.....	.....	.....
Spradley, W. half Sec. 27, T. 2 S., R. 6 W. (rep'd)	K	2	6
Stone, S. W. qr. Sec. 27, T. 2 S., R. 6 W.....	.....	.....	.....
Powers, S. W. qr. Sec. 24, T. 2 S., R. 7 W. (rep'd)	K	3	0
Miller, S. E. qr. Sec. 24, T. 2 S., R. 7 W.....	K	.....	.....
Abshire, N. E. qr. Sec. 25, T. 2 S., R. 8 W. (rep'd)....	K	2	0
Dutton, S. W. qr. Sec. 25, T. 2 S., R. 7 W. (rep'd)...	K	2	4

These coals are generally semi-block, with partings often half a foot or more in thickness of good block coal. The thin seams are pure; where thickened are usually pyritous.

Stendal was named by the Rev. W. Baumeister after his native city the capital of the province of Altmark, Prussia. It is situated upon a narrow ridge or "backbone" which separates the valley of Cup creek from the basin of South Patoka. This ridge, commencing near Winslow, continues in a south westerly direction beyond Stendal to the southern boundary of the county in almost a direct line, and is nearly the western margin of the conglomerate. It was the ancient Indian war path leading from the upper Wabash to the Ohio near Troy. When first visited by white men, this trail was distinct and beaten as if it had been long and much used. By it one may traverse this wild and hilly region on a level road or highway from one hundred and twenty to two hundred and ten feet above the adjoining water beds. On the farm of Mr. Baumeister, northeast quarter section 11, and northwest quarter section 12, town-

ship 3 south, range 7 west, are frequent outcrops of seam K well up to the top of the hills. The coal is block, but only a few inches thick. The black slate above K is rich in fish remains, amongst which were found *Petrodus occidentalis*, (teeth, scales and spines;) fish bones and coprolites, and fragments of a buckler-headed crustacean. The decomposed pyritous nodules and limestones, parting with their excess of sulphur, have formed several sulphates which are seen on the slope below, viz.: copperas, sulphate of lime crystallized, and also a fine clay, beautiful as meerschaum, which roasted, leaves a pure clear white residuum. To the east of Stendal the country is a succession of valleys and hills supported by the "massive" sand rock. Below, near the level of the streams, coal A is found. This sand rock has all the good qualities necessary to insure a large industry in quarrying and preparing blocks for building, when a demand for fire proof material of great endurance arises.

Near the southeastern corner and generally along the southern boundary of the county, the strata dip rapidly toward the Ohio river. Coal K soon approaches and then passes under the level of the streams. Here another seam comes in a few feet below K, between that seam and A, as may be seen by the following section, taken on the Beardsly farm, section 29, township 3 south, range 6 west, in Warrick county, and about a mile south of the county line:

SECTION AT BEARDSLY'S BANK, WARRICK COUNTY.

Thin bedded sandstone.....	10 ft. 0 in.
Ferruginous limestone.....	1 ft. 0 in.
Aluminous shale.....	4 ft. 0 in.
Dark shale.....	1 ft. 8 in.
Black slate with fish remains and <i>Pleurotomaria carbonaria</i> , <i>Macrocheilus paludinæformis</i> , <i>M. primogenius</i> , <i>M. fusiformis</i> , <i>Petrodus occidentalis</i> , <i>Orthoceras Rushensis</i> , <i>Aviculopecten rectilateraria</i> , and <i>Chonetes mesoloba</i>	0 ft. 6 in.

Black slate filled with large bowlders or "pot-stones" containing <i>Edestus vo-</i> <i>rax</i> , <i>Allorisma</i> ———, <i>Nautilus de-</i> <i>coratus</i> , <i>N.</i> (sp.), <i>Bellerophon carbonarius</i> , <i>B. percarinatus</i> , <i>Cyathaxonia prolifera</i> , <i>Chonetes</i> (2 sp.), <i>Productus semireticu-</i> <i>latus</i> , <i>Spirifer cameratus</i> , <i>S. lineatus</i> , etc., etc.....	0 ft. 10 in.
Coal K, caking.....	1 ft. 8 in.
Fire clay.....	4 ft. 0 in.
Soapstone and shale with iron nodules.	4 ft. 2 in.
Coal (I ?) pyritous.....	2 ft. 2 in.
Fire clay.....	3 ft. 0 in.
	<hr/> 33 ft. 0 in.

COAL NEAR STENDAL.

- Martin, S. E. quarter Sec. 4, T. 3 S., R. 6 W.
 Hillmyer, S. E. quarter Sec. 9, T. 3 S., R. 6 W.
 ———, N. E. quarter Sec. 8, T. 3 S., R. 6 W.
 Sakel, west half Sec. 8, T. 3 S., R. 6 W.
 Myer, S. W. quarter Sec. 7, T. 3 S., R. 6 W.
 Bartle, N. W. quarter Sec. 18, T. 3 S., R. 6 W.
 Fark, S. E. quarter Sec. 16, T. 3 S., R. 6 W.
 Doetker, S. E. quarter Sec. 21, T. 3 S., R. 6 W.
 Taylor, S. W. quarter Sec. 21, T. 3 S., R. 6 W.
 Case, N. E. quarter Sec. 20, T. 3 S., R. 6 W.
 Blake, S. W. quarter Sec. 1, T. 3 S., R. 7 W.
 Beazlee, N. W. quarter Sec. 11, T. 3 S., R. 7 W.
 Henke, S. E. quarter Sec. 10, T. 3 S., R. 7 W.
 Baumeister, N. W. quarter Sec. 11, T. 3 S., R. 7 W.
 Brust, N. W. quarter Sec. 12, T. 3 S., R. 7 W.
 McKeen, S. E. quarter Sec. 12, T. 3 S., R. 7 W.
 Gille, N. W. quarter Sec. 13, T. 3 S., R. 7 W.
 Powers, S. W. quarter, Sec. 14, T. 3 S., R. 7 W.

These coals vary from semi-block to caking, and range from one and a half to five and a half feet in thickness with an average of two and a half feet. More or less sulphur is generally present.

Going west from Stendal, we find the western front of the conglomerate wall fretted with small spurs which project still farther into the coal basin. These spurs and intermediate valleys existed before the era of coal K. We find this seam deposited thinly on the crests and side of the hills, but thickening as it descends to the dividing valleys, and especially as it rapidly dips westward to the basin of South Patoka, on the head of which it develops an average thickness of four feet two inches. Considerable quantities have been dug. The product is a bright caking coal. The pyrite is banded and may be easily removed in mining.

The following exhibit of outcrops on the Powers and Tevault farms, sections 16 and 17, township 3 south, range 7 west, shows the accompanying strata, viz.:

POWERS-TEVAULT SECTION.

Magnesian limestone.....	6 ft. 0 in.
Aluminous shale.....	1 ft. 0 in.
Black sheety slate.....	2 ft. 6 in.
Coal K.....	4 ft. 2 in.
Silicious shale.....	5 ft. 4 in.
Argillaceous sand rock, to Buck creek..	10 ft. 0 in.
	33 ft. 3 in.

The limestone above appears to be highly magnesian, and contains the following fossils, viz.: *Productus punctatus*, *P. semireticulatus*, *Chonetes mesoloba*, *C. ———*, *Eumicrotis Hawni* (?), *Nautilus decoratus*, and *Allorisma*.

I visited several openings at the Warrick county line, in sections 28 and 29, township 3 south, range 7 west, worked by Miller, Skegs and Gentry, where the following was taken:

SECTION AT MILLER'S BANK.

Slope.....	20 ft. 0 in.
Thin bedded sandstone.....	8 ft. 0 in.
Quarry sandrock.....	10 ft. 0 in.

Silicious shale.....	9 ft. 0 in.
Potters' clay with iron stones.....	1 ft. 0 in.
Ferruginous limestone, with <i>Spirifer cameratus</i> , <i>S. lineatus</i> , <i>Productus punctatus</i> , <i>P. costatus</i> , <i>Chonetes</i> , and an Articulate (sp.?).....	1 ft. 8 in.
Ferruginous paints.....	0 ft. 7 in.
Gray clay shale.....	2 ft. 2 in.
Ochreous clay.....	0 ft. 6 in.
Black bituminous sheety slate.....	2 ft. 5 in.
Coal K:	
Slaty coal.....	0 ft. 4 in.
Fair coal.....	1 ft. 0 in.
Pyritous coal.....	1 ft. 2 in.
Good coal.....	2 ft. 0 in.
	4 ft. 6 in.
Fire clay to creek.....	4 ft. 0 in.
	66 ft. 10 in.

At Pleasantville I was much indebted to Rev. John Ferguson for hospitality, information and guidance. This enabled me to visit many outcrops, which otherwise my limited time would have compelled me to pass unnoticed.

COALS EAST OF PLEASANTVILLE.

	THICKNESS.	
	Ft.	In.
Farmer, S. W. qr. Sec. 6, T. 3 S., R. 7 W.....K		
McClary, S. E. qr. Sec. 7, T. 3 S., R. 7 W.....K	4	2
McClary, S. W. qr. Sec. 8, T. 3 S., R. 7 W.....K	4	0
Roy, N. W. qr. Sec. 18, T. 3 S., R. 7 W.....K	4	0
Lance, N. W. qr. Sec. 18, T. 3 S., R. 7 W.....K	4	0?
Fleming, N. E. qr. Sec. 18, T. 3 S., R. 7 W.....K	4	0?
Powers, S. E. qr. Sec. 17, T. 3 S., R. 7 W.....K	4	4
Tevault, S. W. qr. Sec. 16, T. 3 S., R. 7 W.....K	4	2
Sprinkle, N. W. qr. Sec. 21, T. 3 S., R. 7 W.....K	4	1
Miller, S. E. qr. Sec. 21, T. 3 S., R. 7 W.....K	3	6
Ferguson, (well) S. W. qr. Sec. 21, T. 3 S., R. 7 W..K	4	0?
DePriest, (well) S. E. qr. Sec. 20, T. 3 S., R. 7 W..K	4	0?

	THICKNESS.	
	Ft.	In.
McKinney, N. E. qr. Sec. 19, T. 3 S., R. 7 W.....K	.....	.....
Miller, N. E. qr. Sec. 29, T. 3 S., R. 7 W.....K	4	6
Skeggs, N. W. qr. Sec. 29, T. 3 S., R. 7 W.....K	4	2
Hamilton, N. W. qr. Sec. 1, T. 3 S., R. 8 W.....K	5	0?
Hamilton, N. W. qr. Sec. 1, T. 3 S., R. 8 W.....K	5	6?

Northeast from Pleasantville, the yellow limestone roof of K is in thin bedded strata, and is quarried and used for walling wells, etc. Partings between the laminæ are covered with *Chonetes*. Immediately at the village, seam K with a dark limestone roof, passes below the surface. A short distance west, seam L is seen. At Tyring's bank, northeast quarter section 23, its usual roof material is removed and replaced with coarse sand rock as will be seen by the following exhibit, viz.:

SECTION AT TYRING'S BANK.

Soil and modified drift.....	15 ft. 0 in.
Loose soft sandstone.....	8 ft. 0 in.
Quarry sandstone, coarse, ferruginous.	7 ft. 0 in.
Coal L.....	2 ft. 4 in. to 3 ft. 0 in.
Fire clay.....	3 ft. 0 in.
Covered.....	27 ft. 0 in.
Limestone roof of K.....	2 ft. 0 in.
Covered.....	5 ft. 0 in.
Black sheety slate of K in creek.....	.....
	70 ft. 0 in.

The product of this bank is a rich caking coal, which burns with a clear flame, leaves a white ash without a clinker, and is much sought after by blacksmiths.

Good clay iron stones, suitable for the manufacture of ochreous paints, were noticed in considerable quantities in southeast quarter southeast quarter section 22, and near center of section 21, township 3 south, range 8 west. Further exploration alone would determine whether the quantity would be sufficient to command the attention of

iron makers. The surrounding slopes are deeply covered. No rocky outcrops were seen. It is believed that this band of paint stones represents the place of coal M, which is reported in wells at this horizon.

To the south and to the west, a line of conical hills and narrow ridges, capped with massive argillaceous limestone, separates the basin of erosion in which is collected the water of South Patoka from the basins of the Wabash and Ohio rivers. From the summit of one of these, which is marked on the map McGregor hill, section 9, township 3 south, range 8 west, a beautiful view is spread out. The cup-shaped valley of the South Patoka lies 175 feet below. To the southeast of Snake knob, seven miles distant, is seen Detney Hill, twelve miles southsouthwest. Stendal, eleven miles due east. To the northeast the alluvial plain, gently terraced with modified drift, is backed by the hills near Winslow. It is a scene at once interesting and attractive—a mighty record of the past, of noble currents and cycling ages. A witness that time is long.

The following section combines measurements taken at McGregor hill above mentioned with those of Snake knob, section 34, township 3 south, range 8 west, on Captain Fowler's farm, in Warrick County, the latter in the second column. The two sections are here brought together for the purpose of showing the equivalence of strata at stations separated by a space of more than three miles :

SECTION AT M'GREGOR HILL AND SNAKE KNOB.

	Ft.	In.	Ft.	In.
Soil and clay.....	5	0	15	0
Limestone, argillaceous, clinky.....	6	0	3	6
Space covered, place of upper <i>rash coal</i>	6	0	15	0
Limestone, compact, clinky.....	3	0	4	0
Clay shale and nodules.....	4	0	2	0
Place of lower <i>rash coal</i>	?		?	
Fire clay, buff.....	2	4	2	6
Sandstone, coarse, red.....	8	0	15	0
Silicious shale with carbonaceous partings.....	16	6	8	0

Argillaceous shale with pyritous partings.....	8	0	12	0
"Black clod," rotten slate.....	2	0	1	3
Coal <i>N</i> , choice white ash gas coal.....	1	0	1	1
Fire clay.....	3	0	3	2
Silicious shale and thin bedded sandstone.....	20	0	18	0
Calcareous and clay iron stones, place of coal <i>M</i> . ?	?		?	
Clay shale mostly covered to the level of coal				
<i>L</i> at nearest point measured by barometer...72	0	70	0	
			156	10 170 6

The argillaceous lime rock in the above section is sometimes widened up to a thickness of eight or ten feet. Compact and not easily eroded, it proved, along this its apparent eastern limit, a bulwark against which the ancient currents could not always prevail. And hence the conical hills so capped. Crevices are found between, and cavities beneath; the immense blocks undermined and thrown out of place. These cavities, at the time of the first settlement of this region, were the winter resort of the snakes that occupied an area of from three to nine miles around. Here the venomous tribes, with consorting sub-families and friends, would collect in autumn, remain torpid through the winter, and then, wakened by the sunny smiles of spring, go forth to their old summer homes.

Snake knob was a famous resort. Peter Ferguson, an early pioneer, noticed serpents in the fall gathering here from all parts within a compass of several miles. He collected a squad of neighbors, and dug them out in winter, when torpid, killing over one hundred, mostly rattlesnakes, but including a few chicken-snakes. The animals in their torpid condition could not offer resistance, and were only revived by the brilliant sunlight enough to writhe a little when cast out into the snow. After this campaign at Snake knob, a similar massacre at McGregor hill and another at a station a few miles east, allowing a range of nine to twelve square miles for each community, the rattlesnake family was nearly exterminated. They are now rare. Mr. P.

Ferguson, during his lifetime, killed a rattlesnake having twenty-nine rattles and a button, indicating an age of thirty years. Others have seen and known of their capture when armored with rattle-rings numbering fifteen, twenty, twenty-one to twenty-five. After passing beyond an age of twelve years these rings are always much worn on the under side, especially in stony or sandy regions. A monster of this species was killed near Pleasantville in 1871, and brought to the village for exhibition. It weighed fifty pounds on the warehouse scales.

In addition to the openings at Tyring's bank, coal L was formerly worked on M. Parker's land, northeast quarter southwest quarter section 14, township 3 south, range 8 west, and on the Mosier farm, section 4, same township and range. The reported thickness at each of these banks was three and a half to four feet. At Bell's, section 17, the seam was less than two feet thick.

Near Arcadia, coal K has been worked for smiths' use at Lemaster's bank, and is four feet thick. At other farms in this vicinity it has been dug to in wells, and evidently underlies a considerable area.

COALS NEAR ARCADIA.

Lemaster, S. W. quarter Sec. 25, T. 2 S., R. 8 W.

Ashby, S. E. quarter Sec. 25, T. 2 S., R. 8 W.

Gentry, S. W. quarter Sec. 35, T. 2 S., R. 8 W.

Sandusky, S. E. quarter Sec. 26, T. 2 S., R. 8 W.

Werth, S. E. quarter Sec. 22, T. 2 S., R. 8 W.

Continuing northwardly, K descends and passes below the bed of the streams, and coal L is discovered above the water level. On the line of the Louisville and St. Louis railway this seam probably becomes persistent, and at G. W. Massey's bank, northeast quarter section 4, township 2 south, range 8 west, where the Evansville Straight Line Railroad crosses Patoka river, Dr. D. D. Owen reported the thickness at over ten feet, and said that it was one of the thickest coals that he had seen in the State. At Thomas

Martin's bank, coal L is not less generously thickened up. The product is a rich caking coal, which burns with a slightly-tinted flame, leaving a white ash, but no clinker.

SECTION AT MARTIN'S BANK, NORTH HALF SECTION 9,
TOWNSHIP 2 SOUTH, RANGE 8 WEST.

Soil, clay etc.....	18 ft. 0 in.
Black slate.....	1 ft. 0 in.
Soft slate (rotten coal?)	1 ft 6 in.
Coal M.....	1 ft 1 in.
	————— 2 ft. 7 in.
Fire clay.....	4 ft. 6 in.
Silicious shales and soapstone covered (measured by barometer).....	57 ft. 7 in.
Soapstone with ferns.....	4 to 1 ft. 0 in.
Coal L:	
Slaty coal.....	0 ft. 4 in.
Laminated coal.....	2 ft. 6 in.
Soft black slate.....	0 ft. 4 in.
Good smith coal.....	1 ft. 6 in.
White clay and soft coal	0 ft. 2 in.
Good smith coal.....	2 ft. 6 in.
Rash pyritous coal (not seen).....	2 ft. 0 in.
	————— 9 ft. 2 in.
Fire clay.....	4 ft. 9 in.
	————— 98 ft. 0 in.

The floor of the entry at Martin's bank was covered with water at the time of my visit. A complete measurement could not be effected. The seam at this and Massey's bank may be worked up to a thickness of six or seven feet of fair to choice coal, after making allowance for impurities. It is probable that on more extensive work it will be found that these coals dip rapidly to the northwest at a rate of not less than twenty to forty feet to the mile.

West of the county line Andrew Hargrave has erected a

lime kiln and burns the "gray limestone" mentioned by Dr. D. D. Owen in his report.* This rock is probably equivalent to the deposit of a similar nature on top of Snake knob and McGregor hill. Formerly its eastern limit was miles beyond this locality, as blocks of limestone, rounded, grooved and singularly cut by water, are found on the farms of G. W. Massey and Horace Williams, two miles distant.

ECONOMICAL GEOLOGY.

COAL.

The coals of this county are generally caking. In quantity they are fully up to the average of similar coals in the Western States. An examination of the foregoing section and details shows from frequency of out crop, that they are of great persistence. They are the thickest beds of such grand extent that I have seen, and would seriously try the carrying capacity of *all* the railways that have ever been projected in the county. The present demand is limited to local supply. No shafts have been sunk. Openings have only been made on natural outcrops. These are enough to show, that, with facilities for transportation at hand the coals of Pike county could pay off our great national debt, and still leave a handsome profit to the owners.

CLAYS.

The loess sands and yellow clays furnish good material for bricks. The fire clays underlying the coals are almost as valuable as the fuel resting upon them. The future demands fire proof buildings. From these clays will be made window and door casings, cornice and ornamental coping, at once durable, handsome and incombustible. Good potters' clay may be obtained by weathering this deposit, or from the glacial and lacustrine clays in the northern part of the county.

*D. D. Owen, Geological Recon., Ind.

IRON.

Silicious ores are found amongst the conglomerate sandstones, north and east of Pikesville. They are not desirable. The ferruginous limestone quarried from the bed of the canal south, and along the banks of White river north of Petersburg, will furnish a flux rich in iron to mix with the specular ores of Missouri. The clay iron stones in the southern part of the county will make good paints; and when abundant, as in the southwestern corner, they will merit the attention of iron makers.

OTHER METALS.

Small quantities of gold and copper are found in the modified drift and clays of the glacial age. The particles are minute and of no importance. Occasional specimens of lead ore are found; but oftener "plants" are made by swindlers who guide innocent parties to the deposit and deceive the unwary. The red men had no knowledge of metallurgy, even the simplest: yet fifty places are pointed out by Indian story, as "lead and silver mines." Prof. Orton naively remarks on this subject; "If the red man owes any malice to the race that has dispossessed him of his hunting grounds, he may take a grim satisfaction in contemplating the arduous and unrequited toil to which his idle tales have doomed the laziest of his oppressors." No evidence was seen that indicated natural deposits of either lead or silver ore in this county, and we may add, that their existence is highly improbable if not impossible. Small crystals of sulphuret of zinc were sometimes seen in the iron stone nodules and septaria.

BUILDING STONE.

The massive member of the subcarboniferous sandstone so well developed for miles in every direction about Pikesville, furnishes the best of material for masonry. Natural outcrops exhibit a wonderful capacity for withstanding the disintegrating influences of air and moisture. Characteristically, it

is known as a fire stone, and may be used for hearths of furnaces and rolling mill ovens. Good coal-measure sand rock is found near Highbanks, at Hawthorn and Centreville. The limestone roof of coal K, has been used for foundations. It is generally argillaceous, and when so, will not bear exposure.

SOIL.

The soil of the northern half of the county consists of dark colored alluvium, sandy loams, and loess. It is generally productive. Good crops of wheat, oats, corn and grass are raised. White river bottoms, are remarkable for luxuriant crops of corn. Patoka bottoms consisting of impalpable sands, etc., washed from the loess hills, are impervious to air and moisture. Parched by drouth, or overwhelmed by rain falls, they require underdraining, which will remedy both these difficulties; when so improved, the "coming farmer" will undoubtedly irrigate these broad flats from the river which flows a few feet below.

In the basin south of Patoka, the earth is highly charged with mineral salts, and has the peculiar red hue of soils which contain the decomposed iron stones of the mountain limestone. Here tobacco grows well. I am informed by experts that the "leaf" will compare favorably with the best Kentucky or Missouri product. Tobacco land, exceeding the Connecticut valley in productiveness, may be bought at less than thirty dollars per acre.

The areas throughout the county from one to two hundred feet above the water courses, are elevated beyond the level of sudden changes in temperature. They are exempt from biting frosts, and are specially adapted to the growth of fruit. Peaches and pears are nearly as reliable as corn or wheat. The fruit is large, beautifully colored, and highly fragrant.

SPRINGS AND WELLS.

North of Patoka river, the water derived from this source is fair to good. South of that stream, and in the conglom-

erate region about Pikesville, the waters are highly charged with mineral salts, unpleasant to the taste, and, in times of drouth, cause inflammatory diseases. Persons having a due regard to comfort and health, construct cisterns. The rain fall furnishes an abundant supply of pure water. Pools are easily made in small basins or ravines, to insure comfort and health to farm animals.

MEDICINAL SPRINGS.

The "White Sulphur Spring," Captain Townsend proprietor, has all the good qualities belonging to springs of this kind. The water is not so highly saline as those of Orange county, but is equally efficacious in chronic diseases of the liver and digestive organs. The Ague Chalybeates, near Pikesville are locally well known.

Millburn spring, near Winslow, according to a proximate analysis by Dr. DeTar, contains, in addition to the sulphates of magnesia, alumina, lime and iron, a small amount of arsenite of iron and a trace of bromine. These and other unknown ingredients have effected many cures. Certificates are published representing this water as nearly a specific in gravel and diseases of the spleen.

The acidulous water of Coats' spring, near Centerville is locally well esteemed. It is believed to act on the secretions generally, and was highly recommended by a corpulent gentleman on the spot, to his brother "fat-men."

TIMBER.

The finest growth of White Oak and Poplar timber that I have ever seen, is found in a belt lying one to three miles north of the Patoka. Trees five feet in diameter, with perfect trunks fifty or more feet in length, were common, while monsters of much larger growth are not unusual. A giant Hickory, northwest of Centerville, on section 8, township 1 south, range 9 west, was measured with the assistance of Rev. L. Wilson, and found to be over five feet in diameter three feet above the ground. The trunk was of great uniformity,

maintaining that size to a height of sixty feet without limbs; and for size challenges its kind throughout the world. Choice unculled White Oaks are abundant in the southeast corner of the county.

ANTIQUITIES.

An oblong mound south of Petersburg, whether natural or artificial, contains implements and bones of our predecessors. A few regular mounds are seen near Pleasantville and Otwell. The high sand-bars capping the bluffs of White river, have been used as places of ancient sepulture. Axes made from dark granite of the boulder drift, ornaments of northern variegated soapstone, and large spear-heads made of flint, are probably relics of the Mound-Builder.

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