

# GEOLOGY

OF

# BROWN COUNTY.

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BY JOHN COLLETT.

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Brown county was organized in 1836, and is bounded east by Bartholomew, south by Jackson and Monroe, west by Monroe, and north by Morgan and Johnson counties. It contains an area of 320 sections, or square miles, of 640 acres each, with a totality of 204,800 acres. The surface is generally hilly—almost mountainous—but about one-fifth part consists of valleys and rich bottoms, with a like amount of level table lands in the southeastern corner. The timber on the hill sides is, white, black, and chestnut oaks, hickory, etc., with poplar, cherry, jack-oak and sassafras on the summit of the highest hills, and in the bottoms, poplar, maple, walnut, cherry, elm, sycamore, etc. Good crops of corn, potatoes and wheat, are grown on the river bottoms; some of the first averaging full 60 bushels to the acre. Fair crops of wheat, oats and grass are gathered on the ordinary hill lands, and on the table lands the crops are of excellent quality.

Salt creek, the principal stream, is composed of three main branches, the "North," "Middle," and "South Forks," which unite near the southwest corner of the

county, and flow thence through Monroe and Lawrence into East White River. Thus almost the whole watershed of the county together with a considerable portion of Jackson on the south, is drained by this stream. Bean Blossom creek has its source in the northeastern part and flows in a general western direction, passing across Monroe, and is discharged into West White River near Gosport. Just across the northern boundary in Morgan county, and in a valley nearly parallel with the county line, flows Indian creek, having the same direction as the last. To the east, small creeks and brooks are discharged in a few miles into Driftwood Fork of White River and its affluents.

Highland ridges, approaching the square form of the county surround it on the cardinal sides, while from east to west and southwest three other ridges traverse the county, all connecting on the divide near Trafalgar, in Johnson county. The first constitutes the southern bluff of Indian creek, and is called "Indian Creek Ridge;" the second, south of Bean Blossom, is known as "Bean Blossom Ridge," and the third, passing nearly through the middle of the county, is named "Central Ridge." All these ridges slope gently to the south and west but present steep faces to the north and east.

#### SURFACE GEOLOGY.

The surface configuration is remarkably diversified, and presents in epitome a vivid view of mountain scenery; central ranges and peaks overlook wide areas bristling with subordinate ridges or black with deep valleys. It is the Alpine region of the State of Indiana, and is well worthy of the leisurely visit and study of those who would by the toil of mountain paths gain the pure air, the romantic scenery, and broad outlook which may be enjoyed on the summit of the central knobs, or along the elevated roadway north of Nashville.

The careless observer has often wondered at this grand series of hills and valleys, surrounded to a great degree by

level plains, and comparing the volume of water discharged by Salt creek with other streams and their erosive results, would at once attribute their origin to upheaval and earthquake action. Close observation shows that this is not so. The uniform dip and parallelism of the rocks prove that no local disturbance of the crust of the earth has taken place by subsidence or upheaval. The body of the hills consists of soft, disintegrating shales and local beds of sandstone dipping to W. S.-W. Along the western side of the county, in Monroe, massive beds of limestone, at the base cherty and hard, cover these shales. Now, this chert bed of Keokuk limestone is found capping the highest peaks in the county, sometimes in place, but often in fragments, with underlying rocks, in regular succession beneath, showing conclusively that the Keokuk beds once formed a level surface covering nearly the whole county, some 400 to 500 feet above the bottom of the present valleys. As a consequence the hills remain as they were originally deposited. The valleys have, since the waters of the ocean withdrew, been eroded by fresh water.

But as heretofore hinted, the volume of the streams now flowing from the county and the limited area of their greatest possible water shed is not commensurate with the phenomena presented, and in seeking some extraordinary cause, we are at once referred by the facts in the case, to the great ice flow which inaugurated the Quaternary age.

#### GLACIAL PERIOD.

The Glacial or Boulder drift,\* a well known feature in the Central and Northern part of the State, does not exist in place in the Southern part. It is a vast sheet of pasty, un laminated blue clay, with occasional partings and beds of sand, and contains a variable but large amount of metamorphic, eruptive and crystalline rocks, minerals, etc., of extreme Northern origin. With a Southern limit in the

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\*Used as synonymous terms in my reports.

Northern part of this county, but of no great thickness, it increases in extent in the northern half of Indiana, and exhibits a depth of from 150 to 250 feet. It is sheeted down upon a polished, grooved and striated floor of underlying rocks, which often still retain these markings that record to this day the track of the ancient glacier as plainly and indisputably as the inscribed tablet tells some story of the past. This portion of the drift has been heretofore studied and elsewhere discussed.

But Brown county, from its peculiar position and elevation, reveals a chapter of the glacial history, as to its Southern limit, not so well exposed at any other point, and some features we believe not before recorded.

In my examination for report\* on Lawrence county, the effect of powerful erosive torrents was noted, degrading the central areas of that county, excavating great depressions now waterless, and hewing out valleys to a depth and width beyond the possible energy or needs of the actual streams. These phenomena I attributed to the glacial period, and predicated them upon a torrent of water rushing southward from the foot of the stranded or obstructed ice-flow at some unvisited point in an adjoining county to the north. This was an assumption based upon indirect evidence. Facts observed in Brown county prove that the assumption was well taken. Approaching the central areas from the East, from the West, † and from the valley of Bean Blossom Creek at the North, it was found that the county was enclosed by a wall of hills ranging from 350 to 450 feet in height. In valleys to East, West and North, glacial drift was present, mounting well up on the sides of the hills. But within this walled space, the scarcity or entire absence of boulders showed that the ice-drift had only for a short period, or *never* intruded—Bean Blossom Ridge marking the extreme Southern limit of the local glacier

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\*Geological Survey of Indiana, 1873, page 268.

†The western ridge is within Monroe county, with strike to the South-west.

foot. Against and upon this *wall like* ridge the stranded ice seems to have been continually massed; and, melted by each recurring summer's sun, it sent torrents of water south across the county, wearing slight depressions in the ridge as at Low Gap and the source of Greasy creek, bearing fine sediment, some gold dust and black sand, and but few or no pebbles or boulders. Pebbles and boulders would have been present in quantities, had the water carried floating ice. The power of these escaping torrents may be inferred from the fact that a continuation of such "sluiceways" from Bean Blossom Ridge may be noticed on the South side of Central Ridge, striking right across the latter with osars of sand and silt filling the ancient depressions and entirely ignoring the present \*valley of North Salt Creek, for it did not then exist. This flood was long continued—first flowing clear across the county, at a high level, and even across parts of Jackson—next following the synclinal axes of the underlying rocks, it excavated South and Middle forks of Salt creek, and finally following another synclinal, adopted the direct line of dip by the North fork. Obscure bench marks and terrace lines, widely separated on the elevated ridges, show the successive standpoints and cuts of this flood-like stream.

During this time the underflow from the glacier was also working a channel in the disintegrating shale along the east side of the county, and directly with the local dip, West  $16^{\circ}$ , by Bean Blossom, and finally left the interior basin of the county subject only to the action of its own water-shed. Down these side-cuts to White river immense bodies of water, bearing some ice with boulders and gravel, have flowed. The long continued melting of ice loaded with the most enduring debris of the Laurentian rocks, as greenstone, quartzite, quartz, gold and magnetite, deposited large

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\*A glance at the map will show that valleys exist in nearly every case on the South sides of the Central and Bean-blossom ridges, corresponding to the initial valleys and creeks on Indian Creek ridge.

quantities of these imported materials in Bean Blossom valley. The rapid current of the ice water would naturally carry down stream the lighter sand and gravel, and sort out and leave behind the heavier rocks, gold and magnetite in considerable quantities. Afterwards as the ice-foot withdrew toward the North\* this melting, sorting, sifting process was carried on North of Indian creek ridge, for a *longer time*, as is indicated by the greater width and depth of that creek valley, where gold and the heavier minerals will only be found beneath the present surface which is largely built up above the bed rock.

Still above the outside wall of the county, several peaks, notably the Weed Patch Knob, rise from 50 to 125 feet. Around their sides the ice water has deposited slight terraces containing minute pebbles and some imported material, as if to record the highest flood upon this meter of the great glacial river; while white and bare, these storm-scarred summits looked out over the wintry wild, and saw that rigid river of ice menace their base, or turn to right and left into the two White river valleys, and float by in a stream of ghostly silver. Remarkable as witnesses of the early Quaternary, their elevation above the ocean reaches back beyond the time which saw the Carboniferous, Mesozoic and Tertiary seas to the West, bury their treasures of warmth and wondrous animal life as they shrunk from existence.

#### LACUSTRAL PERIOD.

After the close of the Glacial Period large bodies of fresh water covered the interior of the continent, forming two extensive lakes—one in the Northern basins, and the "*Central Post-Glacial Lake*," separated by the line of the greatest and highest accumulation of true boulder drift, which runs through central and Northwestern Ohio and

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\*It is known that the ice-foot of the glacier was withdrawn gradually; reasoning from analogy, it approached by the slow march of ages.

Northern Indiana. The first occupying the whole basin of great lakes, was still within the influence of Northern cold, and gives evidence of the presence and transporting work of ice by the deposits known as the Boulder Beds of the "*Iceberg epoch.*" The paucity or entire absence of angular rocks and striated or polished boulders and the presence only of rolled, battered and well rounded pebbles and fine silt, indicate the absence of transporting ice in the warmer Southern lake. Remains of sub-tropical flora and fauna on the lower Wabash corroborate this view.\* The central lake covered a large part of Southwestern Indiana and adjoining regions to South and West, and reached up the *fiord-like* valleys cut out of the solid rocks by the glacial torrents. Where the water-shed was considerable, the central chasms were deeply silted up with quick-sand and a black tenaceous mud,† containing much vegetable matter, known as "Noah's barn yard," and sometimes remains of the Elephant, Peccary, Great Beaver and other large tropical animals. Along the shore lines and shallows of this lake, a light ash gray soil is found, known as the "Loess" or Lacustral beds. A large area of this is seen in the Southeastern part of the county furnishing a good, level, somewhat tenaceous, but productive soil. Parts of this deposit formed in shallow water, or subsequently modified, is known as the White creek flats or slashes. Where slow running currents struck the shore line, these Lacustral loams are thickened up containing much, and sometimes composed largely of coarse sand.

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\*Geol. of Indiana, 1873.

†This deposit was termed "Erie Clay," in my reports of Geol. of Ind. for 1873. Since the present rivers and streams have been in existence, this deposit has been almost wholly removed, the sand, clay, etc., carried away, and the gravel and coarse material deposited in terraces of modified drift. Traces of this silt were seen on Bean Blossom and North Salt Creek; in a well adjoining Elkinsville it was pierced over nine feet without reaching the bottom.

## ALLUVIUM.

The alluvial deposits which border the water courses are derived principally from the disintegration of the native aluminous shales and sandstones, and in such cases, although fertile, are often cold and tenaceous,—at other points, as on Bean Blossom, and at the upper part of the branches of Salt creek they are enriched by sand and calcareous clays from the glacial drift and from the former overlying limestones, and are very fertile. On the bluffs of the streams and particularly in the vicinity of Nashville, benches of ancient alluvium are seen containing a few pebbles of the most oburate material of the drift, as quartz, jasper, etc., marking the former bed of the creek, and showing that at the broader terraces (50 to 120 feet above its channel), the creek was long stationary.

These beds deposited upon and against the sides of the underlying rocks, with the most recent in the bottom of the valleys, are tabulated as follows, in the order of their sequence in time :

<i>Quaternary Beds.</i>		Ft. in.
1. Alluvium .....	2 to	40.00
2. Lacustral Loess.....	10 “	20.00
do Silt.....	0 “	50.00
3. Glacial Drift.....	0 “	40.00
		150.00

## PALEOZOIC GEOLOGY.

The rocks of this county comprise two members of the Sub Carboniferous period, and one of the Devonian. They dip regularly to W. S. W., but show probabilities of anticlinals of small extent beneath each of the ridges which traverse the county from east to west. The parallelism of the formations is *without fault*, and they seem to be conformable. Sections taken at isolated points give the following general view :



## GENERAL SECTION OF BROWN COUNTY.

## SUB-CARBONIFEROUS GROUP.

*Keokuk Beds.*

	Ft. in.
1. Reddish crinoidal Limestone (disturbed).....	0 to 1.00
2. Lower geode band, (disturbed).....	0 " 2.00
3. Lower chert band.....	0 " 8.00
4. Gray, buff and black pyritous clays and shale .....	5 " 25.00

*Knobstone Beds.*

5. Red ferruginous Coarse Sandstone, rarely massive, generally with irregular bedding.....	4 " 50.00
6. Gray aluminous shales, with wedge shaped layers and bands of blue and buff Sandstone.....	375.00
7. Quarry beds—wedge-shaped layers and massive bands of white and gray sandstone.....	35.00
8. Shale with thin plates of Sandstone.....	40.00
9. Clay shale with iron stones.....	5.00
10. Gray aluminous shale becoming ferruginous at base .....	10 to 85.00

## DEVONIAN AGE.

*Hamilton Group.*

11. Black Slate ( <i>Genessee Shale</i> ).....	110.00
Total.....	<hr/> 736.00

## GENERAL DESCRIPTION

The above geological formations are almost wholly non-fossiliferous. They are identified from lithological and stratigraphic reasons, but with certainty.

*Keokuk Beds.*

These are well developed and persistent in adjoining parts of Monroe along the western boundaries of the county. Broken and disturbed fragments of the reddish crinoidal limestone, the most persistent stony strata, were found at Baughman's, Browning's and Weed Patch hills, sufficient to identify them as belonging to the "fish bone" strata, but none of it in place. Of the next lower strata, the Geode bed, disturbed or floated remains are common at the points named, but as well in nearly every ravine in the county, indicating that once this deposit was spread out over and paved the whole surface on a plane passing through the tops of the highest hills. Geodes locally known as "nigger heads" and "boulders," are especially abundant on Bear Creek, near the northwest corner of the county, their exterior always roughly mammalated and homely, but within filled with variously tinted or pellucid crystals of silica, with occasional beautiful specimens of calcspar and sulphuret of iron and zinc. On Bear Creek at the "placer" of John Richards, Esq., many of them are geodized fossils of the genera *Zaphrentis*, *Bellerophon*, *Goniatites* and *Nautilus*. In the southern and eastern part of the county the rough exterior of the geodes found in the beds of creeks is worn and smoothed as if long washed and polished by running water. No. 3 of general section, the lower chert band was found in place on Baughman's hill, S. E.  $\frac{1}{4}$  Sec. 9, T. 9, R. 2 E. and although the outcrop was of small extent, it was prized as a sure means of identifying the geological position of the rocks. Below a variously colored shale is the bed of passage to the underlying strata. Crystals and a glittering band of sulphuret of iron (pyrites) in this shale has occasioned much

fruitless search for the precious metals. There is little or no probability of finding any valuable mineral at this horizon.

*Knobstone Shales.*

Excepting the few disturbed fragments or thin isolated outliers of the lower Keokuk beds above mentioned, these shales form almost the entire rocky substratum of the county, building up the hills and ridges and paving the floor of the deepest valleys, having an average thickness of about 500 feet. A careful search discovered no fossils. These shales and sandstones were deposited in the shallows or along the shore of an ocean, generally quiet, but sometimes swept by currents sufficiently powerful to pick up and transport the sands which form the frequent bands and pockets of sandstone. The circumstances were probably not favorable for marine life or for the preservation of animal remains.

The upper member, No. 5 of general section, is often seen near the tops of the hills and high ridges. It is well developed and of maximum thickness on Bean Blossom ridge north of Nashville, where highly ferruginous the harder bands have been utilized in "metaling" the excellent gravel road which leads to town; good exposures in massive outcrop were noticed on the north side of Weed Patch hill, becoming hard and in thick bands to the south. At Browning's hill south of Elkinsville, great cubes and columns are scattered on the hillside as if relics of a Titan's quarry. No. 6 is uniformly a disintegrating shale, or soft aluminous sandstone with plates and strata of thin bedded quarry stone at irregular spaces. The dark clayey shales contain considerable pyrites (*Sulphuret of iron*,) which decomposing on exposure, sometimes gives a sulphurous odor to the air and the iron in the change becoming a soluble sulphate colors black the vegetable matter in brooks and ponds. It varies in thickness from 325 to 400 feet.

The quarry bed No. 7 of section, is found well up on the hills in the eastern side of the county. Dipping west

and southwest at from 30 to 35 feet to the mile it soon approaches the level of the streams, and passes below them in the western parts. Many quarries are opened and worked. The stone is of beautiful drab color, and although often stained with iron, is enduring and of excellent quality. It is used for the foundations, door and window sills, and caps of the Nashville Court House, and is in much requisition for buildings at Columbus, an adjoining county-seat. Some massive outcrops were seen near Nashville, in layers varying from one to three feet thick, but often thinning to a great degree within a few feet or rods.

This stone has a good reputation and is well liked by all who have used it. Blocks which had been in use some 40 years and were tested with fire were in good preservation. Tombstones and monuments after an exposure of over 30 years, showed their inscriptions sharp and well cut. Polishing and grind stones of good quality are manufactured and marketed at Columbus and Taylorsville.

The lower members, 8, 9 and 10 are composed of gray shales, becoming aluminous toward their base with thin plates of sandstone. The latter, often attaining a thickness of several inches, are remarkable for their tendency to thin out, wedge like, in the space of a few feet, as at the water line below the mill near Nashville. In the southern part of the county this member contains concretions and nodules of excellent iron ore. In the same region thin shells of siliceous iron ore are weathered from cavities in the shales, and form the bed and bars of the creeks. This deposit is found to be a superior material for repairing roads.

#### *Black Slate.*

An outcrop near the county line on the Columbus road, exhibiting bituminous shale and some carbonaceous matter is referred with doubt to this age. The exposures seen were not entirely satisfactory. The slate is well exposed a short distance East in Bartholomew, and has been pierced and measured at two bores within Brown county, showing an average thickness of 110 feet.

## LOCAL DETAILS.

An elevated back-bone of glacial drift dividing the watershed into East and West forks of White river, has its Southern termination near the northeast corner of the county. On this, several of the principal streams of the vicinage, as Indian, Bean Blossom, Salt and Nineveh creeks have their origin. It is crossed by the Martinsville railroad near Trafalgar. Going West by rail along the valley of Indian creek, (from one to two miles wide,) a good view of Indian creek ridge may be had, which guards with great exactness the northern boundary of Brown county, and rises from 100 to 300 feet above that stream. The broad valley indicates that for a very long period, glacial ice was piled up against the ridge to the South, and melting, found outlet for its waters to the West. It is also evident that the valley was at that time much deeper at some central channel than now, and has since been built up by fluvial action. It is probable that by shafting down at such points, considerable amounts of gold, even if not in paying quantities, may be found.

Indian creek ridge is deeply covered with glacial drift, but exhibits some considerable surface areas of Loess. The soil is good to fair. Some excellent grain and stock farms and extensive orchards were observed. Bear creek and the numerous branches in the Northwest part of the county have immense quantities of geodes on their bars and some geodized fossils from the eroded or disturbed Keokuk beds. They are filled with sparkling crystals of many forms and hues.

Bean Blossom valley contains a large area of rich and very productive land, bearing good crops of corn and wheat. Near and just above the mouth of Bear creek it also comprises several hundred acres of modified Loess, here rather a heavy soil and devoted chiefly to meadows and grazing grounds. All the brooks and streams which have their origin on Indian creek ridge and have cut their beds in its sides, scatter on their bars, rocks, sand and other debris of imported material,

including considerable magnetite (black sand) and gold, which will be treated of in *Economical Geology*. These materials, survivors of the long crushing, grinding rolling and sifting processes of the glacial age, are principally derived from the Laurentian rocks of Canada, which contain partings and seams of magnetite and veins of quartz that are often gold bearing. A white quartz pebble was found West of Georgetown, which plainly contained bright particles of gold, indicating the origin of that metal here found adrift. Mr. George Staples, who is an extensive manufacturer of gold and silver fabrics, called my attention to "a polishing and grinding sand," outcropping on the hillsides near his factory one mile east of Georgetown. He finds it superior to any obtained elsewhere in the States, and considers it of great value when accurate finish of metals is desired. His experience of more than twenty years in the business, entitles his opinion to great weight. The following section was here taken :

<i>Section East of Georgetown.</i>	Ft.	in.
Soil .....	1 to	2.00
Loess .....	10 to	50.00
Polishing sand .....	0 to	1.00
White potters clay, apparently of excellent quality.....	2 to	4.00
Modified glacial drift with quartz, black sand, gold, etc .....		25.00
Indurated tough dark clay silt, to creek, depth unknown.....		2.00
		84.00

The extensive "Spectacle Factory" near Georgetown, is conducted by Mr. Staples—at once manager, proprietor and head workman. Ponderous machinery manipulates gold, silver and nickel like wax, drawing them out into wire or with the impress of dies moulding the different parts ready to solder together ; and a furnace and crucible are ready

to purify the metal or prepare ingots for rolling. He manufactures spectacle frames amounting to \$10,000 worth per annum, which meet a ready market in the cities of Louisville, Cincinnati, Indianapolis and the central Northwest. He also prepares gold and silver wire for making rings, chains, etc., to the amount of \$5,000 per annum. He finds the Indiana gold 24 karats fine, and has used about \$1,000 worth.

Two and a half miles east of Georgetown is located the extensive "Steam Tannery" of Parmalee Bros. They use 5,000 cords of chestnut oak bark yearly, and have sale for their products amounting to \$100,000 per annum. Their leather is of superior quality, having won first prizes at state, national and international fairs. The success of these enterprises indicates the wisdom and good sense of their projectors, who believed that cheap homes and food for their operatives, accessible raw material, and an immediate home market, would insure fair profits. This belief has been confirmed by results.

Going South from Georgetown, the road passes up the steep Northern face of Bean Blossom ridge, nearly 400 feet, while a "gap" a little to the East surveyed for a railroad, is reported as having an elevation of 337 feet above the creek valley. The crest of the ridge and of adjoining knobs is capped with the red sandstone No. 5 of general section, here highly ferruginous, and at places hardened with pyrite, or semi-crystallized silica. This bed has furnished good materials for the excellent and well conditioned gravel road leading to Nashville. In loamy deposits along this ridge and near Bald Knob, are pointed out "Bear wallows"; basins thirty to forty feet in diameter, with a depth rarely exceeding two or three feet, but tramped by these animals in early times and cemented with fine clay, never become dry except in times of excessive drought. The gravel road passes along a North-South ridge having a gentle slope to the South. To the right and left is a broad valley-like depression, filled with sharp North-South ridges, like supporting ranges along a mountain chain. The views

stretching away in the blue distance are full of a wild and romantic beauty hardly equaled in the State.

From an outlook on the road a prominence was pointed out as Baughman's hill, Sec. 9, T. 9, R. 2. Here was afterwards seen on a soil of yellow sandy loess, which yields fair crops of corn, wheat and clover, a thrifty and extensive orchard, comprising the peach, apple, quince and cherry trees. The protecting effects of the deep surrounding valleys was apparent. At an elevation of 405 feet above Salt creek at Nashville, green leaves were still clinging to the trees and shrubs while all in the valleys below was brown and sere. The following section was taken at the hill and along the brook below leading toward Salt creek :

## SECTION AT BAUGHMAN'S HILL.

	Ft. in.
Soil: Yellow Loess.....	12.00
Keokuk beds with geodes, and chert containing <i>Hemipronites crenis-</i> <i>tria</i> , <i>Productus semi-reticulatus</i> and Crinoid stems.....	8.00
Sand rock.....	2.00
Knob shales with plates and bands of Sandstone .....	230.00
Quarry Knob Sandstone to water level.....	4.00
	256.00

In the valley of Owl creek near by are several quarry beds of sandstone. Many geodes are seen on the bars of the creek and a few northern boulders. One of the latter, 2x3 feet, of yellow quartzite, is of remarkable size for this latitude. At the source of this stream a "Low Gap" in Bean Blossom ridge, shows that the valley was long a thoroughfare for ice water and accounts for these intruding rocks.



Needmore is situated upon a bench of modified drift. Floods of water which scalped the original deposit, bearing away the finer and lighter materials, has left in this vicinity considerable beds of boulders, and an unusual amount of "black sand," as at "Colorado placer," northeast and at John Chitwood's, south of town. At the latter place the "black sand" containing fragments of garnet is so abundant, "that a bushel may be panned out in a day." Mr. Chitwood had a fine specimen of blende, (Sulphuret of Zinc) in calcespar, and some delusive masses of pyrite. The village shows an air of thrift indicative of a fertile soil and valuable forests.

Nashville, the county seat, is situated near the center of the county, on the north bank of Salt creek, and at the southern foot of Bean Blossom ridge. The valley of the creek is here from a half, to one mile and a half wide, averaging about three fourths of a mile. To the west the bottom soil, composed of modified Loess and detrital matter from the argillaceous Knobstones, is often tough and cold; eastwardly it contains a larger proportion of sand, sifted from the glacial drift or torn from the upper sandstone bed, and is lighter and productive. Of the latter class, the fine farm of Hon. Alfred Williams, near the mouth of Clay Lick, may be mentioned. In the edge of town, near the school house, the following beds are exposed:

*Nashville Section.*

	Ft. in.
Soil and slope.....	5.00
• Hard Sandstone.....	.8
Shaly.....do.....	5.6
Laminated Sandstone.....	2.4
Blue Argillaceous Shale with plates of Sandstone.....	12.00
Quarry in brook.....	1.8
	27.2

Half a mile west of town, Judge Hester has opened a quarry of excellent stone. It is in strata from one to three feet thick, and the purity of the material indicates that it might be sawed to advantage. The following section was there taken, measuring up the hill by the road leading north :

*Section at Hester's Quarry.*

	Ft. in.
Soil on first terrace containing a few small quartz pebbles and minute grains of black sand from glacial drift.....	10.00
Soft friable reddish Sandstone.....	43.00
Shaly Sandstone with ferruginous bands .....	25.00
Sandy Shale with ferruginous plates and coneretions.....	65.00
<i>Quarry</i> Sandstone.....	6 to 12.00
	155.00

In the western part of the county several "Licks" or salt springs, were known to the Indians, who kindly allowed their white friends to make use of them as well. These gave name to the streams. Salt was scarce and precious. The poor natives refused to sell the land upon which they were situated, fixing a boundary which would still reserve these Licks; but by fraud and deception they were outwitted. The salines, I am informed, were donated by Congress to the State, and constituted a part of the old "Saling Fund." Jackson's Lick, six miles southwest of Nashville, was one of the best. Mr. Jackson, at an early day, bored a well 300 feet deep and found a fair flow of brine. He boiled salt for many years, with considerable yield and of superior quality. When the price of salt became reduced below one dollar per bushel, the enterprise did not pay, and work was abandoned. At "Howe's Lick," about ten miles W. S.-W. from town, a bore was put down during the "oil

fever." Dr. Arwine, of Columbus, one of the proprietors, kindly furnished the following statement of the strata in bore, taken "from the Superintendents' account:"

*Howe's Lick Bore.*

(On Storey's Farm.)

	Ft. in.
Sand stone.....	100.00
White or blue soapstone (shale)....	220.00
Red soapstone .....	45.00
Black slate.....	75.00
Carbonaceous soot (parting).....	0.00
Black slate.....	35.00
Sulphur rock.....	1.00
White sandstone (?) (Others interested in the bore report this stratum as limestone) .....	45.00
Fire clay, or something like it...	15.00
White sandstone or limestone.....	4.00
	540.00

Burning gas (carburetted hydrogen), was found in considerable quantities all through the black slate, with a small quantity of oil (petroleum). A stream of good brine was struck near the base of the slate.

Mr. Eugene Cully described the gas when struck as having burst up with great power, throwing the brine to a height of forty feet. This violent ebullition ceased after 24 hours, when brine continued to flow gently until shut down by plugging. The gas brought up much carbonaceous "soot," and a small quantity of very odorous, heavy lubricating oil. The quantity of brine was deemed sufficient to make one barrel of salt per day, with gas enough for evaporation.

East of Nashville several good outcrops of the "quarry" sandstone were noticed. At Watkin's mill, half a mile southeast, the following strata are seen:

*Section at Watkins' Mill.*

	Ft.	In.
Slope, mostly friable sandstone and siliceous shale.....	175.00	
Coarse sandstone.....	1.	8
Shaly sandstone.....	15.00	
Irregular strata of good sandstone, in wedges one to two feet thick, but rapidly thinning to a sharp edge, with partings of blue shale .....	5.00	
Blue argillaceous sandstone with conchoidal fracture, to low water.....	8.	4
	205.00	

At Clay Lick Branch, four miles northeast of Nashville, another oil well was bored by the same company that put down the Howe's Lick well. Dr. Arwine, in a letter reports the strata pierced as almost identical with the Howe's Lick well, excepting only that the depth to the Black Slate in this was considerable less than in the other. This indicates the conformability of the Black Slate with the Knobstone beds of the Sub-carboniferous. The report referred to, is added, although other members of the company say the depth to the slate was less than here given:

*Section in Clay Lick Bore.*

(On Curry's Farm.)

	Ft.	In.
Sandstone and shale.....	120.00	
White or blue soapstone.....	110.00	
Red soapstone.....	85.00	
Flint (?).....	1.5	
Black slate (Devonian) with a heavy bed of (carbonaceous) "Soot," 45 feet from its roof.....	110.00	
White sandstone (limestone?).....	24.00	
Gray limestone.....	10.00	
	460.5	

The black slate was found to contain some gas and asphalt. Salt water in no great quantity was struck near its base. The "Soot" was reported to burn freely, emitting a strong offensive odor of bitumen. The bottom limestone seemed to be saturated with petroleum.

Passing up Henderson branch the road gradually ascends the high central divide which separates North and Middle forks of Salt creek. At this elevation many peach trees were noticed loaded with luscious fruit, while in the valleys below the trees were barren. The soil was a reddish lively loam, indicating that it contained a generous wealth of calcareous matter from the now eroded ferruginous limestone (Keokuk) which once superimposed this region. These lands seem to invite the cultivation of tobacco as well as corn and wheat. Mr. Eli T. Moore, to whom I am indebted for much information, finds that clover and red top yield better returns than other grasses. The latter is indigenous throughout the county. His orchard has failed to bear peaches only twice in eighteen years, and on the highest hills has never failed. This region is noted for native fruits, as grapes, plums and persimmons. The latter exhibits two varieties, one the common, small, blue kind, filled with seeds; another of larger size and growth, matures early, dusky yellow when ripe—an examination of 175 specimens shows that as a rule they contain but one, and not a specimen contained more than two seeds. The latter are surely worthy of their expressive Greek name, *Diospyros*, or "fruit of the Gods." Quails and Pheasants are numerous in the fields and forests, collecting at winter in flocks to feed on the red partridge berry which is abundant at favored localities. The farmers of this vicinity regret the destruction of these birds by hunters and city "bummers." Repeated examinations prove that the Chintz bug, is the principal food of quails, when they are attainable. It seems wrong to destroy the only reliable enemy of these pests.

Belleville is situated on the head waters of Middle Salt creek. A broad, well cultivated valley, leads away to the

southwest. On John D. Malott's farm, S. E. quarter, Sec. 13, T. 8, R. 3, is a quarry formerly worked by Henry Cross. The stone is in layers of favorable thickness for work, homogeneous, evenly bedded, and has been tested for over thirty years, with the best of results for building purposes, and for grind and tomb stones; some of the latter bear inscriptions well defined and sharp, although dating back a quarter of a century.

South of the creek an elevated plateau of level land, except where cut by ravines and branch valleys, stretches well away to the south line of the county, and is well timbered. The soil is the peculiar ash gray loess or Lacustral loam, and when cleared produces a fair yield of corn, oats and tobacco, and extra crops of wheat. Buffalo ridge is noted for the quantity and quality of wheat produced, as well as for the thrift and energy of its inhabitants. Several good orchards were visited and sampled. The apples were well colored, of superior flavor and size, free from "knots" and "specks," and equal to the best. The peaches were perfect, and seemed to be unsurpassable. These fruits have failed but once since the settlement of this region. The Chintz bug (*Micropus leucopterus*, Say.) has lately become a serious pest, threatening, if its future is to be judged by the past increase, to seriously damage or destroy the cereal crops. Hon. J. A. McKinney informed me that his son shot a quail for the experiment, and on examination, found that it had fed on these bugs alone—that its craw or crop contained fifty-seven of these destructive pests by actual count. A. Carmichael has noticed quails eating the bug, and that they become fattened when the supply of such food is abundant; no other bird or animal is known to be fond of them.

Half a mile west of Christiansburg, Sec. 35, T. 8, R. 3, is an outcrop of "quarry bed" sandstone. Layers four feet thick were noticed of a quality similar to the Cross and Nashville quarries; also bands and concretionary nodules of excellent iron ore. At Wadsworth's mill in same section, another quarry occurs. The stone may be secured in large slabs or pillars, from layers one to four feet thick; it

has been in use for over thirty years, and as the sharp edges of the outcrops indicate, withstands atmospheric action satisfactorily. The bed and bars of Hamilton creek are deeply covered with scales and small pebbles of siliceous iron ore washed from concretionary deposits in the shaly hills. This material forms a first rate road bed. A short sample road near Christiansburg, demonstrates its great value, and invites its use.

At Hendricks' mill, Section 30, T. 8, R. 3, the creek cuts against the bluff and at west end of the dam exposes quarry stone, outcropping in beds from one to three feet thick. Pillars torn out by the water were seen from ten to fifteen feet long and two by three feet in cross dimensions. Just below the dam in the rock bottom of the creek, iron-stone concretions had decomposed, giving origin to circular "pot holes," one to one foot and a half in diameter and seven feet deep. This whole region is noted for the quantity and quality of the fruit grown on the hills and ridges. The hills contain also much valuable timber including white, red and black oak and hickory. The chestnut oak seems to require an equable climate and is found only on the top of the highest hills and ranges.

Near Elkinsville, the South and Middle branches of Salt creek unite in a broad deep valley. The bottoms, as usual, are rich and productive. The creek rarely, if ever, has cut down through the black Lacustral *Silt* to the bed rock of the ancient ice-water river. A well in the center of the valley half a mile southwest of the village, discovered a considerable bed of unmodified *Silt*.

*Section in Well at Elkinsville.*

	Ft. in.
Alluvial Soil.....	4.00
Quicksand, dark.....	7.00
Black and blue Lacustral clay and sand (Silt), including wood and vegetable remains...	9.00
	20.00

Browning's Knob, south of the village, (N. E., quarter, Sec. 10, T. 8, R. 2), was surmounted by a steep almost precipitous ascent of over 250 feet. On the upper part and sides were found fragments of Keokuk limestone and chert, which once covered this region, and will yet probably be discovered *in place* at this or some adjoining peak. They contained crushed and broken specimens of *Zaphrentis*, *Archimedes* and other *Bryozoans*, and *Crinoid* stems. A short space below the summit a massive strata of choice sandstone outcrops, which belongs to the upper member of the Knobstone beds. The stone is of superior quality. Undermined by disintegration and wasting of the underlying shales, grand cubes three by four feet, and pillars three by four and twenty feet long, ready squared and dressed as from a giants workshop, are scattered along the crest of the hill. One of them has been named by the proprietor "Professor's Dining Table," in remembrance of a jovial dinner discussed thereupon by Professor Cox and friends at the time of his visit. From the summit of the Knob a good view may be had ranging up and down the valley for miles, and across toward the Central ridge.

Mr. Jesse Hall informs me that quails seek fields infested with Chintz bugs in search of this special food, and he believes that the protection of these *friends* of the farmer, demand careful thought.

The road from Elkinsville to Nashville, passes up the North-South, deep canyon-like valley of Little Blue creek, and thence toward Schooner, by a gap or depression over the Central ridge or Back-bone of the county. The highest point in the road is little less than three hundred feet above Middle Salt creek at Elkinsville. The greater part of this wide area of knobby peaks and deep cut valleys, is a wild forest, in a state of nature, unimproved, and to a great extent not susceptible of cultivation. On the benches and hill sides was some valuable oak timber, and an immense number of hoop-poles. These for cooper's ware, are the main product and resource of this region. Chestnut



oak is found only on the top of the ridges and knobs, but in considerable quantity.

In the road near the top of the ridge, a somewhat sandy soil and a few minute quartz pebbles, hint that in true glacial times a heavy current of water may have swept across from the north. A glance at the map indicates that in early times North Bean Blossom, by Owl creek and Little Blue, took this route to Middle Salt creek before the more northern valleys had existence. This indication is supported by the great width, considering the small extent of its watershed, and depth of the Middle fork valley, now much built up above the former bed rock with gravel, silt and debris. This would also give priority in age to Middle and South, over the North or Main Salt creek. The Central ridge although somewhat uneven and diversified with peaks, traverses the county, I learn from Dr. Arwine, without break, from West to East. It there unites with the Wall ridge which guards the eastern side of the county and from an eminence of four hundred feet, looks down over the broad level valley of Driftwood-White river, in Bartholomew to the bluffs of Flat Rock ten to fifteen miles away in the eastern horizon.

"Weed Patch Hill," four miles southeast of Nashville, is the highest part seen of the central ridge and of the county.\*

It reaches up nearly 120 feet above the other knobs visited, and has a much greater altitude than any recorded for the State. Terrace-like benches some distance below the summit indicate stand points of flowing water. Some contain very minute pebbles or sand of northern origin, and are probable representatives of the ice water flow. But still above is a short space of *loamy* soil, indicating its origin from decomposition of limestone, fragments of which were here found. The summit has not been under water since it emerged from the subcarboniferous ocean, and, from all the evidence seen, was an unconcerned spectator of the grand

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\*The comparative elevation may be seen by the table of altitudes page 103.

phenomena which signalized the glacial age. "Weed Patch Hill" takes its name from the fact that just before it was first visited by the early pioneer, a tornado had scalped some 100 acres of the tip-top plateau, prostrating a magnificent forest of large poplar, walnut, oak and cherry trees. Weeds and grass succeeded in luxuriant growth, which, together with the trunks and branches of the fallen trees, were burned by each summer's fire, and commenced a miniature prairie; weeds and vines became the prevailing vegetable growth, and hence the name. Where not cultivated, a second growth of sassafras, jack, black and red oak and hickory, a vagabond race, take the place of the royal forest dethroned by the tornado.

The wild fruits flourish here in perfection. Following this hint Dr. Phillips and others have planted extensive orchards and vineyards, which, if *properly cared for*, will prove a first-class investment. In the latter part of November, the time of my visit, grass, and the leaves on shrubs and bushes were still green on the Phillips farm, but below in the valleys, frost and ice had seared and stricken every leaf.

Descending the northern slope toward the mouth of Clay Lick creek, the following section was taken:

*Section at "Weed Patch Knob."*

	(Sec. 82, T. 9, R. 3.)	Ft. in.
Light brown loam, containing angular fragments of Keokuk limestone and geodes, shading down to loess on the hill slope...		10.00
Coarse ferriferous sand rock in bands of 1 to 2 feet.....		4.00
Siliceous shale, with plates and bands of sandstone, the latter from a few inches to 4 feet thick.....		300.00
Coarse ferruginous S. S., in layers from 1 to 3 feet.....		16.00
Argillaceous and Siliceous shales.....		80.00

Quarry sandstone in bands.....	12.00
Clay shale with iron stone concretions, ( <i>septa-</i> <i>taria</i> ,) to low water in branch.....	9.00
	441.00

The following table of altitudes, and others mentioned heretofore, are calculated from Stansbury and Williams' determination of the elevation of White (Driftwood) river at Columbus above the ocean. They result from a single line of observation made with an Aneroid barometer, and are therefore subject to a probable error of from one to fifty feet. When the observations were repeated this range of "probable error" was found sufficient to cover the variation of the instrument.

## TABLE OF ALTITUDES.

Nashville above the ocean.....	652 feet.
Nashville above the mouth of the Wabash.....	355 feet.
Nashville above Columbus.....	35 feet.
Nashville above Wabash at Terre Haute	167 feet.
Nashville below Georgetown.....	42 feet.
Nashville below Spearville.....	285 feet.
Nashville below Indianapolis.....	46 feet.
Nashville below Bloomington .....	132 feet.
High wall ridge above valleys.....	300 to 400 feet.
High wall ridge above ocean.....	1002 feet.
Weed Patch Knob above ocean.....	1147 feet.
Weed Patch Knob above Nashville.....	495 feet.
Weed Patch Knob above highest alti- tude recorded in the State.....	221 feet.
Weed Patch above highest glacial drift at Elizabeth, Hendricks county.....	269 feet.
Extreme height of glacial ice above the ocean, this county .....	975 feet.

## ECONOMICAL GEOLOGY.

Brown county was originally settled by emigrants from Carolina, Kentucky and Virginia, but now a large proportion of the inhabitants are from Ohio. In the East and Northeast corner of the county, on "German Ridge," quite a number of Germans have bought the neglected hills and "slashes," and with characteristic industry and economy have made productive farms and comfortable homes. Owing to the unusual proportion of hilly and broken land, a large area is still a wild forest, and the population is scant compared with other parts of the State.

Population by census of 1860.....	6,503.
"    "    "    "    1870.....	8,680.
Attending schools of 1870.....	1,597.

In the foregoing general description and local details, mention is made as to the quality of the different kinds of soil. It may not be amiss to suggest that even the rich bottoms will wear out by continued planting and much sooner the thin clay uplands. This may be avoided by careful rotation of crops and the cultivation of plants that draw their food from the air. Clover or Alfalfa will deeply open up the ground by their long sub-soiling roots, and profitably restore its fertility. As an indication of the capacity of these bottoms, I may say that several fields were seen on Bean Blossom and Salt creek in which the growing crops, (Autumn of 1874), would average 50 to 60 bushels of corn to the acre, and I am informed that the wheat crop of Buffalo Ridge for the harvest of 1874 averaged 25 bushels per acre, yet the average of the county could not be put at over one-third of these amounts.

On the thin hill lands it is probable that orchard grass would grow and prosper if thickly seeded, and prove much more profitable than the indigenous "Red-top." Rye is known also to prosper on such lands, furnishing a profitable crop, as well as much winter pasture. A great many hogs

are fattened on the acorns and nuts ("mast") of the forests, the food which produces the "mellow touch and nutty flavor," that gives favorable pre-eminence to the celebrated Westphalian hams in the European markets.

### *Timber.*

This county possesses a large amount of valuable timber. The poplar and walnut trees, once common in the bottoms and on the loamy hill tops, have been mostly cut and used, but of white and red oaks, the supply is abundant, with a large surplus for export. A large amount of staves and hoop-poles are marketed, affording a precarious support to many.

*Tan Bark* is a large source of revenue. The bark of the "Chestnut Oak" is found to be of superior quality for tanning, and is largely sought for that purpose. Leather prepared with this bark has taken prizes at European fairs. The bark is sold on the trees at one dollar, cut and piled at \$3.00 to \$4.00, and brings \$10.00 per cord at the railway station in Columbus. Annual product, 20,000 cords. This species of oak grows only on the rich, brown loam of the highest hills—does not survive in the valleys—and with the present wasteful consumption, will soon cease to exist.

### *Tobacco.*

Tobacco is cultivated with profit, yielding fair crops of good quality. The harvest of 1873, from actual weights or estimates of Mr. E. T. Moore, amounted as follows:

	<i>Lbs.</i>
Van Buren Township.....	430,000
Jackson        "       .....	25,000
Washington    "       .....	10,000
	<hr/>
Total pounds .....	465,000

The soil and climate is well adapted for the cultivation of this plant, and it is said to yield handsome returns.

### *Fruit.*

This county is noted for the quality, size and superior flavor of its fruit. Apple orchards yield best on the hill-sides or lower ridges, but the tender fruits as peach, pear, apricot and grape thrive best and mature to fullest fruitage and perfection on the warm tops of the high knobs and ridges. The advantages found to exist are: 1. *An equable temperature*, the deep surrounding valleys, in time of sudden "cold snaps\*" receive and modify the heavier cold air, until the plants became hardened to the regular winter temperature; 2. The warm absorbant nature of the porous soil; 3. Decomposition of pyrite in the knob shales sets free sulphurous gases, which are believed to prevent or mitigate the growth of fungus parasites, and protect from some of the injurious insects. These advantages coupled with unlimited markets in the surrounding cities, are worthy the attention of fruit growers, and will insure with careful persistent cultivation, satisfactory returns. Jacob Baughman, NE  $\frac{1}{4}$  Sec. 9., T. 9, R. 2, has 10 acres planted with choice varieties of peaches and apples in thrifty condition, and he reports that it pays well. Levi B. Dubois, SW  $\frac{1}{4}$  Sec. 17, T. 9 R. 2, has devoted 15 to 20 acres to fruit culture, comprising peaches, apples, pears, apricots, plums, quinces and grapes. Dr. M. E. Phillips has planted the summit of Weed Patch knob with peaches, 10

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\*At such an occasion Gen. Carrington found a temperature of  $-48^{\circ}$  in a Western canyon modified by an ascent of 200 feet to  $-27^{\circ}$  Fah., a difference of more than  $1^{\circ}$  for every 20 feet of ascent. The same authority also mentions, in a sudden *cold storm* on Piney fork of Tongue river, it was found that the mercury was  $11^{\circ}$  lower in the valley than it was on an ascent of less than 100 feet. The survival of tender trees as the Chestnut and Chestnut oak, at elevated points, but which perish on the lower lands, indicates that this equilibrium in temperature has characterized Brown county for centuries.

acres in bearing and 20 acres in young trees. His two-acre vineyard of Concord and Ives' seedlings was in good order and will soon fruit. Several other orchards and vineyards ranging from five to eight acres in extent were noted. From one of the latter Mr. E. Carter annually sells \$500 of fruit. The product is generally marketed at Indianapolis. Mr. John Gemolin planted 4 acres of Catawba and Isabella vines in the valley adjoining Nashville, but as might be expected in this low valley they failed to fruit. Wine made by Mr. G. was excellent. Garden and field crops which require sulphur for their growth, as cucumbers, turnips and sweet potatoes, thrive and produce well, fed and protected by the decomposed pyrite in the soil. Common potatoes rarely fail or are stricken with the "rot."

#### *Water.*

The many creeks and brooks which traverse this county become low or cease to flow after an extreme drought. The rain fall furnishes a purer and better supply. It may be cheaply preserved in cisterns for drinking or culinary purposes, while for stock the "bear wallows" prove that slight basins will afford a resource.

#### *Gold.*

Gold is found in the bed, or on the bars of all the brooks that flow into Bean Blossom from Indian Creek ridge, and on the streams which flow from the foot of the "Drift backbone" in the northeast corner of the county, as South Bean Blossom, North Salt Creek, etc. Fine dust and minute scales may be found further within the the county wherever black sand and small pebbles indicate former currents of ice water, even as far south as Elkinsville. The metal is of unusual purity, averaging, I am informed by Mr. Geo. Staples, who has used in his shops \$1,000 worth, 24 carats fine. This purity is due to the long beating and squeezing process to which it has been subjected under the ice. Single

individuals, at favorable points, by hard, patient labor, have been able to make from one to one dollar and a half per day. Companies and careless workers have not averaged more than twenty-five cents per day. During the excitement a few years since, several companies took leases, made sluice-ways and prepared long-toms and rockers. The returns were not satisfactory. It is probable that the best "pay dirt" lies at the deepest part of the rocky trough in which the creeks now have their course. By bores the line of greatest depth may be ascertained, and by shafting the richest dirt—possibly in paying quantities—may be brought to the surface. Reasoning from the facts observed, this would be true of Bean Blossom, and especially, from its greater width and probable great depth, also of Indian Creek valley. This is mentioned as a reasonable deduction, warranted by the facts, and not for the purpose of exciting a mining fever. Mr. J. B. Richards gives an estimate of the amount of gold found, as follows:

Richards' farm and adjoining.....	\$ 400.00
Plum Creek.....	60.00
Chris Stumps—Georgetown.....	500.00
Anderson's.....	300.00
Salt Creek.....	1000.00
	<hr/>
Value.....	\$2900.00

This includes all within his knowledge; and he states the heaviest nugget found, worth one dollar. Mr. Staples, with more extended opportunities of securing information, estimates the total product at \$10,000 in value, and the best nugget weighed, at one dollar and ten cents.

Gold is the product of veins and beds in igneous and metamorphic rocks. Such rocks are not found in place within this State, consequently our gold is not native, but imported. In the "diggings" are found boulders and pebbles from the Laurentian and metamorphic formations of Canada and Lake Superior, which are often auriferous; these were



brought here by the great ice-flow which overspread the whole region to the North, broken, crushed and pulverized in the mills of nature; the gold was left in Bean Blossom sluice-way, and the lighter sands and clays borne away to build up the alluvium of Southern rivers.

#### *Other Minerals.*

Iron stone concretions were noticed near Christiansburg, of good quality, but not in sufficient quantity to be of economic importance. Facts observed, indicate that beds of silver, lead and copper, do not exist in the county. Pieces of copper and lead ore are found among the imported rocks of the glacial drift, and should attract interest merely as relics.

#### *Building Stone.*

In the foregoing general description and local details, mention has been made of numerous quarries in different parts of the county and of the good quality of the stone. Geologically it is from the same horizon which furnishes the justly celebrated Waverly freestone of Ohio and it presents qualities which, in some respects, compare favorably with that stone. It is of a beautiful buff or gray neutral tint, easily accessible, readily quarried in blocks or slabs of suitable size for architectural purposes, may be moulded by chisel and hammer into suitable forms for capitals, mouldings and tablets and its enduring qualities are proverbial. Samples which had passed the ordeal of fire in burned houses, indicate great heat resisting properties; and outcrops were noticed, which record the lapse of centuries, showing great resistance to atmospheric changes.

Prior to the introduction of marble into the west by rail this stone was used for tombstones and monumental purposes, which perpetuate the memories of departed friends and at the same time proclaim its enduring quality. At many stations, in fact generally, it is a sharp grit, and makes grind, currier and whetstones of a quality that invites a

larger manufacture that would bring wealth to the county. Much of this stone is shipped at Columbus and Taylorsville, on the Jeffersonville, Madison & Indianapolis Railroad to market.

At several stations the stone is free from iron stains, is close grained and homogeneous and may be sawed into caps, lintels and blocks for facings. Large quantities are quarried for exportation at the county line east of Nashville and from the "Wall Knobs" west of Taylorsville.

With facilities for transportation, now greatly needed, this stone would form a considerable industry.

#### *Summer Resort.*

Our pleasure-loving people require summer resorts for rest and recreation. We may suggest, that Brown county offers to those who can enjoy them, wild life, mountain scenery, dense forests, untrodden wilds and romantic look-outs, that will vie with more noted localities. Many of our citizens visit Little Mountain (Geauga county, Ohio), to catch the mountain air and purchase relief from "hay fever," not knowing that our Indiana mountain is fairly its rival in height, and needs only a hotel to become an acceptable resort.

In conclusion, thanks are returned to the county officers and citizens generally, for information and assistance. Acknowledgements for special favors are due to Judge J. Hester, E. T. Moore, Eugene Cully, W. W. Browning, James McKinny, George and William Carmichael, Jesse P. Browning, Jno. Chitwood, J. B. Richards and Dr. Arwine.