

# GEOLOGICAL AND TOPOGRAPHICAL SURVEY OF UNION COUNTY, INDIANA.

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1884.

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## HISTORICAL AND DESCRIPTIVE.

Union county is a small county, but the energy and intelligence of its people make up for any lack of territory. With \$691 as its *per capita* valuation of taxable wealth, it has for years lead every other county in the State.

The boundaries of the county are: Wayne county, on the north; Preble and Butler counties, Ohio, on the east; Franklin county, on the south, and Fayette county on the west.

It is twelve miles wide, east and west, by fourteen miles in length, north and south, comprising 168 square miles; 104,346 acres of land appraised for taxation, and 21,571 not reported. In 1883 the total value of taxables was \$5,325,365; value of lands, \$2,877,755; value of improvements within the year, \$435,875; value of town lots, \$92,790; value of town improvements for the year, \$169,050; value of personal property, including telegraphs and railroads, \$1,749,895.

The old Indian boundary line, established in 1798 by Israel Ludlow, in accordance with the treaty made with the aborigines at Greenville, August 3, 1795, ran from Fort Recovery, Ohio, to the Ohio River opposite the mouth of the Kentucky River, dividing the county into nearly equal parts. West of this treaty line, the remainder of the county was opened to settlement by the "Twelve Miles Purchase," or treaty of General Harrison, made at Fort Wayne, September 30, 1809. The work of the Government surveyors was completed east of the Greenville treaty line May 14, 1805, and west of the line in the fall and winter of 1810.

At the date of its erection into a separate county, in 1821, Brownsville was the county seat, but it was removed to Liberty in 1823.

Liberty is an attractive town of 1,600 inhabitants, situated on a plateau of land one hundred feet or more above the bed of Silver Creek. It is seventy-one miles southeast of Indianapolis, on the C., H. & I. Railroad,

and fifty-two miles northwest of Cincinnati. Its manufacturing interests are extensive and rapidly improving. The Reede Brothers, manufacturers of corn and wheat drills, employ seventy-five hands, besides other interests in the way of carriage shops, flouring mills, etc. Perhaps no other town of its size in the State presents a more metropolitan character in the way of wholesale and retail business establishments.

Brownsville is a thriving town of 500 inhabitants, on the east bank of East White Water River, and once was a rival claimant with Liberty for the honor and business advantages of the county seat. Dunlapville is a village of 200 inhabitants, situated on the west bank of White Water, in Liberty township. The White Water Presbyterian Academy, a fine brick structure, was located here, but has been turned over to the township authorities for common school purposes. College Corner is a pretty town in a beautiful country, built up on both sides of the Indiana and Ohio boundary line. Philomath, Hopeville and Clifton, in Brownsville township; Beechy Mire, in Harrison township; Goodwin's Corner, Lotus and Cottage Grove, in Centre township; Billingsville, in Union township; Roseburg, in Liberty township, and Quakertown, in Harmony township, are small neighborhood villages and post offices. Brownsville, Liberty, Lotus and Cottage Grove are on the C., H. & I. Railroad.

The Cincinnati, Hamilton & Indianapolis Railroad, a division of the C., H. & D. system, running from east to west, is the only railroad in the county, but as the county is small there is no apparent need for another road, unless it be as a competing line.

The principal pikes and gravel roads are the Liberty and College Corner, Liberty and Roseburg, Liberty and Richmond, Liberty and Connersville, Liberty, Boston and Richmond, Liberty and Camden, Liberty and Brownsville, and the College Corner and Western. The ordinary roads throughout the county are good and kept in repair by the constant addition of gravel. The present system of repairs will in time make gravel roads of all the leading thoroughfares. Good roads enhance the value of the land through which they pass at least ten per cent. An old resident of an adjoining county told me that the land on the pikes in his vicinity was worth ten dollars an acre more than land of equal fertility located on the mud roads. It is short-sighted economy, the great size of the nickel in hand compared with the one in prospect, that keeps the people from having good roads everywhere.

#### TOPOGRAPHY AND DRAINAGE.

The rocky bed of Union county, underlying the earthy deposit, is probably wholly made up of Lower Silurian rocks, and as there is satisfactory geological evidence that the top of the early Lower Silurian upheaval of Indiana and Ohio was primarily a broad expanse of level country from

the western side of Fayette county, Indiana, to Greene and Clinton counties, Ohio, it follows that the present inequalities of the surface along the course of East White Water River and its confluent are the results of erosion and denudation. So slight is the difference in the elevation of the western and eastern sides of this ancient geological island of old ocean that the nicest measurements are necessary to demonstrate it.

The East Fork of White Water River flows through the central part of Brownsville, Liberty and Harmony townships, and as the excavation of the river bed and valley has been in proportion to the supply of water the bluff banks are higher here than on the creeks. In the vicinity of the river the bluffs reach an altitude of 200 feet and over above the bottom of the stream. It seems probable that in the early geological history of the Lower Silurian, when the stone was less resistant than at present, the water courses excavated channels like those of the famous canyons of the West, but their much greater geological age has given time for the action of forces that have extended the width of the channel to that of a valley without increasing the depth, and rounded off the rough and precipitous contours. Yet the river and creek bluffs are in places bold and present rocky fronts. The valleys are narrow but fertile. The upland is level and most admirably adapted to agricultural pursuits. The west part of the county is broken by the river and creek bluffs, the eastern townships, Harrison, Centre and Union, level. The vast body of the land of the county can be cultivated.

The main tributary creeks of East White Water are Simpson's and Eli's Creeks on the west, and Silver and Hannah's Creeks on the east. The creeks on the west side of the river have their origin on the divide between the East and West Forks of White Water, and are consequently short in their course and small, while those on the east side are longer and carry a greater volume of water.

*Elevations taken on the Cincinnati, Hamilton & Indianapolis Railroad.*

| Miles from<br>Indianapolis | POINTS AT WHICH THE ELEVATIONS ARE TAKEN.                 | Feet above<br>Ocean. |
|----------------------------|---|----------------------|
|                            | Indianapolis, Union Depot . . . . .                       | 721                  |
| 57.1                       | Connersville . . . . .                                    | 844                  |
|                            | Simpson's Creek, natural surface . . . . .                | 794                  |
|                            | East Fork of White Water bridge . . . . .                 | 802                  |
|                            | East Fork of White Water River, natural surface . . . . . | 773                  |
| 65.3                       | Brownsville, grade line . . . . .                         | 806                  |
|                            | Richmond Creek bridge . . . . .                           | 818                  |
|                            | Richmond Creek, natural surface . . . . .                 | 777                  |
|                            | Arlington pike . . . . .                                  | 886                  |
|                            | Liberty and Brownsville pike . . . . .                    | 986                  |
|                            | Silver Creek bridge . . . . .                             | 962                  |
|                            | Silver Creek, natural surface . . . . .                   | 890                  |
| 71.4                       | Liberty, grade line . . . . .                             | 992                  |
|                            | Summit, natural surface . . . . .                         | 1,042                |
|                            | Hannah Creek bridge . . . . .                             | 991                  |
|                            | Hannah Creek, natural surface . . . . .                   | 945                  |
| 74.3                       | Lotus, grade line . . . . .                               | 1,055                |
|                            | Summit, natural surface . . . . .                         | 1,090                |
|                            | Little Indian Creek, natural surface . . . . .            | 1,019                |
| 76.5                       | Cottage Grove, grade line . . . . .                       | 1,054                |
|                            | Big Indian Creek, natural surface . . . . .               | 1,019                |
| 79.4                       | College Corner, grade line . . . . .                      | 1,002                |
|                            | State line, natural surface . . . . .                     | 998                  |
|                            | Hamilton, Ohio, grade line . . . . .                      | 839                  |

## GENERAL GEOLOGY.

From a pretty thorough examination of the rocky outcrops on the East Fork of White Water River and its tributaries in Union county, I feel convinced that the top members of the Hudson River group of the Lower Silurian division of the Silurian Age, are the only portions of that Age to be seen. That the Upper Silurian may be found on the very highest points I am not prepared to deny, but such outcrops will be found to be wholly exceptional to the general rule.

An ideal section, based on numerous measurements of the stone exposed to view, at various places, including the black soil, river deposits, clay and gravel, given below, shows the general average for the county:

## GENERAL SECTION OF UNION COUNTY.

## QUATERNARY AGE, OR AGE OF MAN.

## RECENT PERIOD—

Alluvium, black soil, river and creek deposits . . . . . 10 ft.

## DRIFT PERIOD—

Yellow clay, blue clay, sand and boulders . . . . . 50 ft.

Silurian Age, Lower Silurian Division, Hudson River Period,  
alternating strata of limestone and marl or shale in beds  
ranging from one inch to two feet in thickness, the  
stony portions highly fossiliferous . . . . . 230 ft.

Total . . . . . 290 ft.

The reader, by comparing the above with a general geological section of the earth's crust, as that in Webster's Unabridged Dictionary, will see that only a part of the lower portion of the sedimentary and fossiliferous rocks are represented, and that all the long ages and masses of stone found at various places over the face of the globe are here wanting. The Lower Silurian rocks of Indiana and Ohio were elevated above the influences of the ocean at or about the time of the genesis of the oldest mountains of the East and the mountains of Missouri, and were probably dry land from that day to the Drift Period.

The rocky portion of Hudson River group stone in Union county is largely composed of the remains of animal life that were entombed in the mud of an ancient ocean. The marl or clay partings near the top of the outcrops are frequently fossiliferous, but as a rule they are devoid of organic remains. The section hereafter given of Mr. Farley's quarry at Liberty shows the ratio of marl to stone, excluding the shale beds that could not be separated into its component parts, as 5.75 to 9, but if all the marly portions are included the proportion of marl to stone will be increased. It will be found that the nearer the top of Hudson River group the quarry is opened the greater the per centage of stone and the heavier the bedding. It follows from this, that aside from the expense of stripping, the best quarries can be opened near the top of the highest bluffs. The bedding is tolerably even, and a single stratum may be followed for several feet, but shows more tendency to run out, change to marl or split into a number of strata, than the Niagara group limestone. Vertical seams are common, hence long slabs or flags are not readily found. The existence of vertical seams explains why no overhanging rocks are seen on the bluffs; as soon as the stone is undermined by the wasting of the clay partings the stone falls for want of lateral support. And yet it is a singular fact that no fragments of stone or talus are seen at the foot of the most precipitous banks; nor are they found in the over-

lying clay. The eastern face of the bluffs west of Brownsville, near the railroad bridge, shows an earthy deposit nearly to the top with a very few loose slabs on the surface; the same fact is illustrated in the vicinity of Liberty and at Dunlapville. The clay and soil seems to have accumulated in the same ratio that the bluff has receded; the detached fragments of stone have crumbled to mother earth and replaced the constantly wasting soil.

LIST OF HUDSON RIVER GROUP FOSSILS, MOST COMMONLY  
FOUND IN UNION COUNTY.

|   |                  |
|---|------------------|
| <i>Streptelasma corniculum</i> . . . . .          | Hall.            |
| <i>Monticulipora rugosa</i> . . . . .             | Edwards & Haime. |
| <i>Monticulipora pulchellus</i> . . . . .         | Edwards & Haime. |
| <i>Monticulipora mammillata</i> . . . . .         | d'Orbigny.       |
| <i>Monticulipora dalii</i> . . . . .              | Edwards & Haime. |
| <i>Zygospira modesta</i> . . . . .                | Say.             |
| <i>Rhynchonella ventricosa</i> . . . . .          | Hall.            |
| <i>Rhynchonella capax</i> . . . . .               | Conrad.          |
| <i>Strophomena alternata</i> . . . . .            | Conrad.          |
| <i>Strophomena planoconvexa</i> . . . . .         | Hall.            |
| <i>Strophomena nasuta</i> . . . . .               | Conrad.          |
| <i>Strophomena tenuistriata</i> . . . . .         | Sowerby.         |
| <i>Orthis occidentalis</i> . . . . .              | Hall.            |
| <i>Orthis biforata</i> var. <i>Lymx</i> . . . . . | Eichwald.        |
| <i>Orthis subquadrata</i> . . . . .               | Hall.            |
| <i>Orthis sinuata</i> . . . . .                   | Hall.            |
| <i>Orthis testudinaria</i> . . . . .              | Dalman.          |
| <i>Tentaculites richmondensis</i> . . . . .       | Miller.          |
| <i>Bellerophon bilobatus</i> . . . . .            | Sowerby.         |
| <i>Ambonychia costata</i> . . . . .               | James.           |
| <i>Orthodesma rectum</i> . . . . .                | H. & W.          |
| <i>Modiolopsis planorbiformis</i> . . . . .       | Hall.            |
| <i>Pleurotomaria</i> , 2 sp. (?) . . . . .        |                  |
| <i>Orthoceras</i> , 3 sp. (?) . . . . .           |                  |
| <i>Calymene senaria</i> . . . . .                 | Conrad.          |
| <i>Asaphus gigas</i> . . . . .                    | DeKay.           |

In the branch or ravine one-quarter of a mile southeast of the Brownsville railroad station is a famous locality for finding trilobites of the *Calymene senaria* species. The specimens are imbedded in a stratum of soft, blue clay that is probably one hundred feet below the top of the Hudson River group. An equivalent bed outcrops in the southwest part of Liberty. The specimens from these beds are perfect, and require no other cleaning than the vigorous use of a stiff brush before the specimen

becomes dry. Other remains found in these beds are in an equally good state of preservation. The postmaster and a number of other persons in the town have good trilobites. And I here wish to enter my protest against people thinking that if a visitor does not want to buy everything they exhibit, he has no interest in finding out the geology of a neighborhood, and that stories about what some man in Philadelphia would give for a trilobite has nothing to do with my business. Collectors visiting Brownsville had best seek their own specimens if they want to save money. The fancy price paid by a drummer does not govern the market. Not that I wanted to buy, but that parties failed to show their collections when satisfied that I was not on a begging or buying expedition. Scientists should never encourage persons who simply collect for the money there is in what they find, especially if a man grown to the years of maturity; they are invariably guerillas and bummers, that expect to fleece the unwary, and should be promptly and severely let alone. From what little time I had for collecting in the quarries at Liberty and on Hannah's Creek, I can promise collectors that they will find fine cabinet specimens in those localities, and especially in the marly partings of Mr. Farley's quarry.

### LOCAL DETAILS.

#### HUDSON RIVER PERIOD.

##### *Section at Patrick Shirkey's Quarry.*

Section 6, Town 12 N., R. 14 E. 2d principal meridian.

|                                       |                   |
|---------------------------------------|-------------------|
| Rubble, Hudson River period . . . . . | 2 ft. 0 in.       |
| Blue stone . . . . .                  | 4 in.             |
| Blue stone . . . . .                  | 4 in.             |
| Blue clay or marl . . . . .           | 5 in.             |
| Blue limestone quarry . . . . .       | 4 in.             |
| Blue clay . . . . .                   | 2 in.             |
| Blue limestone . . . . .              | 4 in.             |
| Blue limestone . . . . .              | 4 in.             |
| Clouded limestone . . . . .           | 6 in.             |
| Clouded limestone . . . . .           | 2 in.             |
| Blue limestone . . . . .              | 2 in.             |
| Dimension stone . . . . .             | 10 in.            |
| Dimension stone . . . . .             | 4 in.             |
| Total . . . . .                       | <hr/> 6 ft. 5 in. |

Mr. Shirkey's quarry is on a little creek that comes down from near Philomath, and is opened near the top of the Hudson River group stone. The percentage of stone to marl is larger than at many other places, and

on the creek in that vicinity other quarries can be opened and worked for some years to supply the local demand at a small expense. The quality of the stone is above that of the average Lower Silurian rock. East of Mr. Shirkey's, section 22, town. 12 north, range 2 west of 1st principal meridian, between Hopeville and Clifton, are some quarries opened on the high bluffs that have considerable local reputation for furnishing good stone for ordinary building purposes.

*Section on the Bluff west of the Brownsville Railroad Bridge.*

|   |        |        |
|---|--------|--------|
| Soil and yellow clay . . . . .                                    | 4 ft.  | 0 in.  |
| Ochery colored limestone . . . . .                                |        | 4 in.  |
| Marl . . . . .  |        | 2 in.  |
| Limestone . . . . .   |        | 6 in.  |
| Marl . . . . .  |        | 1 in.  |
| Limestone . . . . .   |        | 7 in.  |
| Limestone . . . . .   |        | 3 in.  |
| Marl . . . . .  |        | 3 in.  |
| Limestone . . . . .   |        | 6 in.  |
| Marl . . . . .  |        | 2 in.  |
| Limestone . . . . .   |        | 3 in.  |
| Limestone . . . . .   |        | 2 in.  |
| Marl . . . . .  |        | 1 in.  |
| Limestone and marl in strata ranging from 2 to 8 inches thick . . | 5 ft.  | 10 in. |
| Total . . . . .   | <hr/>  | <hr/>  |
|   | 13 ft. | 2 in.  |

I climbed the steep bluff at this place, hoping to find an outcrop of the Niagara or Clinton groups, but was disappointed. The stone quarried shows fair slabs that are highly fossiliferous, and has been used in building the abutments of nearly all the bridges. One thing at least can be said for the economical working of the quarry—the ease with which the product can be moved down the face of the precipitous bluff.

*Section at Mr. P. Farley's Quarry, near Silver Creek, Liberty, Ind.*

|                                     |        |        |
|-------------------------------------|--------|--------|
| Soil, clay and gravel . . . . .     | 10 ft. | 00 in. |
| Shale, Hudson River group . . . . . | 4 ft.  | 00 in. |
| Limestone, flag . . . . .           |        | 2 in.  |
| Limestone, flag . . . . .           |        | 3 in.  |
| Marl . . . . .                      |        | 6 in.  |
| Flag . . . . .                      |        | 2 in.  |
| Marl . . . . .                      |        | 1 in.  |
| Flag . . . . .                      |        | 2 in.  |
| Marl . . . . .                      |        | 1 in.  |
| Flag . . . . .                      |        | 2 in.  |
| Marl . . . . .                      |        | 3 in.  |
| Limestone, quarry stone . . . . .   |        | 3 in.  |
| Limestone, quarry stone . . . . .   |        | 3 in.  |



|  |        |        |
|--|--------|--------|
| Limestone, quarry stone. . . . .       |        | 4 in.  |
| Marl . . . . .                         |        | 3 in.  |
| Limestone, flag. . . . .               |        | 4 in.  |
| Shale . . . . .                        | 1 ft.  | 3 in.  |
| Limestone, good quarry stone . . . . . |        | 8 in.  |
| Marl and shale . . . . .               | 2 ft.  | 00 in. |
| Limestone, good quarry stone . . . . . |        | 5 in.  |
| Marl and shale. . . . .                | 2 ft.  | 00 in. |
| Limestone, quarry stone. . . . .       |        | 4 in.  |
| Limestone, good quarry stone . . . . . |        | 5 in.  |
| Shale and stone . . . . .              | 3 ft.  | 6 in.  |
| Limestone, quarry stone. . . . .       |        | 3 in.  |
| Marl . . . . .                         |        | 2 in.  |
| Limestone, quarry stone. . . . .       |        | 3 in.  |
| Limestone, quarry stone. . . . .       |        | 4 in.  |
| Marl . . . . .                         |        | 4 in.  |
| Limestone . . . . .                    |        | 2 in.  |
| Limestone . . . . .                    |        | 2 in.  |
| Marl . . . . .                         |        | 6 in.  |
| Limestone, good quarry stone . . . . . |        | 6 in.  |
| Marl . . . . .                         |        | 1 in.  |
| Limestone, quarry stone. . . . .       |        | 4 in.  |
| Marl . . . . .                         |        | 2 in.  |
| Limestone, good quarry stone . . . . . |        | 5 in.  |
| Marl . . . . .                         |        | 2 in.  |
| Limestone, good quarry stone . . . . . |        | 4 in.  |
| Marl and shale. . . . .                | 1 ft.  | 5 in.  |
| Limestone, good quarry stone . . . . . |        | 6 in.  |
| Total . . . . .                        | 43 ft. | 11 in. |

This quarry is opened in the bluff bank on the east side of the creek and the northwest part of the town. Quite an amount of quarrying has been done and considering the per cent. of waste coming from the shale and marl beds the dump is not large. In the main the limestone ledges are all fair Lower Silurian stone that meets a demand for stone in light structures.

The quarry of Mr. W. H. Stevens, southwest of town, shows the same or a similar quality of stone to that given above. The local advantages of a few inches more or less in the thickness of the strata of quarry stone compared with the marl and shale change within a few feet, so that sections might be taken every 100 feet that differ in the general result nearly as much as that of sections taken one mile apart, hence it is not necessary to repeat them here.

I again wish to call the attention of geological collectors to the specimens to be found in the marly parting and shale in the vicinity of Liberty. The trilobite bed in the blue clay below town is the equivalent horizon of the Brownsville bed, and in both places they are about 100 feet below the top of the bluffs.

The quality of the limestone of Union county is equal to that of the Lower Silurian at other places. In a general way the bedding may be said to be even throughout the extent of the quarry. In color it is not uniform, but is almost universally known as the *blue limestone*. Exposure to the surface, by permitting the action of the oxygen of the atmosphere on the contained protoxide of iron converting it into a higher oxide causes a change of color from blue to a yellowish or light blue.

The semi-crystalline structure of the stone and its high per cent. of calcium carbonate renders it peculiarly valuable for burning to lime. It makes a medium "hot" or strong lime.

In a general way it is not as valuable for building purposes as the Niagara, because of a want of uniformity in structure, the result of its fossiliferous character. The best building stone found in the State is either free from or nearly devoid of organic remains.

#### QUATERNARY AGE.

##### RECENT AND DRIFT PERIOD.

The Drift deposits of the county, that are everywhere present on the high lands, are the two divisions of the overlying yellow clay and the underlying blue clay, or hardpan. They are both of foreign origin. In the valleys are found clay, gravel and sand beds that are the result of forces now acting, changing and re-arranging the materials of the Drift Period, to which is constantly being added the waste from the native stone.

On the high lands the Drift deposits reach a thickness of one hundred feet, in places, but as a rule will not average over forty feet. The yellow clay stratum or subsoil of the uplands will average about fifteen feet. A well on the pike from Liberty to College Corner gave the following:

*Section of D. W. Moore's Well, two miles west of College Corner.*

|                             |               |
|-----------------------------|---------------|
| Soil . . . . .              | 2 ft. 00 in.  |
| Yellow clay . . . . .       | 30 ft. 00 in. |
| Blue clay . . . . .         | 20 ft. 00 in. |
| Water in the sand . . . . . | 00 ft. 00 in. |
| Total . . . . .             | 52 ft. 00 in. |

The thickness of the yellow clay in this well is exceptional. But little clean gravel occurs on the uplands, and bowlders are infrequent, but an occasional mass of stone, grauite, greenstone or quartzite is met with on the East Fork of White Water River and the creeks, measuring two or three feet in diameter. On the bluff east of Brownsville, water-worn and polished fragments of stone were seen showing one surface highly polished

and the other rough as if just detached from its native bedding. Without any intention to indicate a theory as to the origin of these stones, further than that they are not native to Union county, but once had their home in the North, probably north of the Great Lakes, I wish to call attention to the fact that the polishing on some of them is equal to that of the work done in the marble yards of to-day, and certainly can not be the result of one stone grinding promiscuously over the native rocks, but rather the result of the effect of passing over a soft clay bed. Identical specimens were seen on Big Williams Creek, in Fayette county.

The native soils formed *in situ* from the decomposition of the blue limestone rocks, are confined to the bluffs, river and creek bottoms, and together with the black soil of the high lands, are the only representatives of the Recent Period found in the county. Compared with the Drift soil they are very limited in extent; but as a covering to the Drift clays, especially the yellow clay that constitutes the sub-soil of the uplands, the black soil, in its general diffusion over the surface of the county, is the basis of unbounded wealth. Possessed of great fertility, the black soils, including the yellow clay lands that have for years been enriched by the accumulation of *humus* from decaying vegetation, produce year after year the most exhausting crops without deterioration.

## ECONOMIC GEOLOGY.

### AGRICULTURE.

The unrivaled resources of Union county, as shown in the *per capita* wealth of its inhabitants, is largely due to the more than average wealth of its farmers. Except the rocky faces of the precipitous bluffs that may be striking in appearance, but are unimportant in area, every foot of the county is available for farming purposes or pasture. No finer or more productive land than that of the high lands and the river bottoms can be found, and from the fine residences that are seen on the highways and byways, the visitor is more than impressed with the thrift and wealth of the people.

A dense forest of burr oak (*Quercus macrocarpa*), swamp white oak (*Quercus discolor*), swamp Spanish oak (*Quercus palustris*), beech (*Fagus feruginea*) and American elm (*Ulmus americana*), were most commonly found on the wet or black soil of the county. On the dryer portions of the land, sugar maple (*Acer saccharinum*), black walnut (*Juglans nigra*), and yellow poplar (*Liriodendron tulipifera*), were frequent, and an occasional fine specimen is to be seen at this day.

### OTHER RESOURCES.

Sand for plastering and masonry work is abundant on the creeks. Gravel for road making is also found on the creeks, and especially in the bottoms of White Water River. Clay for making brick and tile can be

had at all points wherever it is desired to erect a kiln or factory. Orchard products are not very abundant and apples do not seem to do well, but pears, according to a recent report of the Indiana Horticultural Society, are more than an average success. It seems to the writer that pears are a success in all parts of Indiana south of Indianapolis. The famous old pear tree of Vincennes is proof that the climate is favorable, and that soils adapted to its growth can be found on any farm is self-evident to the most casual observer.

#### INDIAN MOUNDS.

Ancient mounds were reported as found on the farms of John F. Bell, Jacob Keller and D. T. Harvey, in Brownsville township. None of them are peculiar, other than that they are the burial places of an extinct race. Relics are common, or rather were common, in all parts of the county.

#### THANKS.

I am under obligations for favors to all the people of Union county that it was my fortune to meet. And especially am I indebted for favors to Professor E. A. Allen, of Rising Sun, Indiana, who accompanied me while in the field; to the Chief Engineer, civil, of the C., H. & I. Railroad, and to my wife and daughter, who have helped me to put my manuscript in shape for the printer.