

# JENNINGS COUNTY.

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PROF. E. T. COX,

State Geologist of Indiana :

DEAR SIR:—Agreeable with your letter of instructions, of April 21, 1875, I have closely traced the geological formations of Jennings and Ripley counties, Indiana ; observed the character and position of pre-historic mounds ; inquired into the agricultural and manufacturing interests, and herewith respectfully submit notes on the same.

Yours Truly,

WM. W. BORDEN.

New Providence, Ind., Jan. 1, 1876.

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## DESCRIPTION.

Jennings county was organized in 1816, and named in honor of Jonathan Jennings, the first Governor of the State of Indiana. It is bounded on the north by Bartholomew and Decatur counties, east by Ripley and Jefferson, south by Jefferson and Scott, and on the west mainly by Jackson and Bartholomew counties. The east and west sides of the county are nearly parallel, but the north and south borders are very irregular. This county contains 375 square miles, or 240,375 acres. Enumeration of children for school in 1874, 3,834. The surface of the county bordering all the streams, is very much broken, while rich

alluvial valleys and high table-lands or "flats," form the water-shed between the streams.

This county is traversed by a number of water-courses, those in the northeastern part, flowing near the summit of the Lower Silurian rocks, and those on the remaining portion, flowing over the Niagara and Devonian formations. All the streams in the western part of the county, flow from a lower to a higher geological horizon. The principal streams are: Big creek, which washes the county on the southwest, Big and Little Graham, uniting below San Jacinto, the latter rising east of New Marion, in Ripley county, and the former near Versailles, and the North or West Fork of the Muscatatuck, which unites with the South Fork at Old Vernon.

Sand creek, which rises in Decatur county, flows through the western part of this county, and, with its various branches—Rock creek, Nettle creek, Wyalusing, Bear creek, Rat Tail, and other small tributaries, is one of the main feeders of White river. Along Sand creek, as its name indicates, an abundance of good, brown sand is found.

There are yet other streams of some note, as Coffee creek, Six Mile creek, Tea creek, Ice creek, Storm creek and Wolf creek. The small streams and creeks are very crooked, but after their union carry considerable water and become powerfully erosive, cutting deep abrasions in the strata and forming grand and romantic scenery of great geological interest.

The most recent deposits of Jennings county occur in the following order :

*Quaternary Beds.*

	Ft.	In.
1. Alluvium, recent.....	2 to	20 00
2. Champlain .....	20 to	40 00
3. Glacial Drift.....		

PALEOZOIC GEOLOGY.

The rock formations of this county, comprise three members of the Devonian age, and two of the Upper and one of the Lower Silurian. These rocks crop in various parts of

this county, and will hereafter be noticed in detail. They occur as follows :

## DEVONIAN AGE.

*Hamilton Group.*

	Ft.	In.
4. New Albany black shale, Genesee shale, N. Y. ....	45	00
5. North Vernon dark blue, compact, stratified limestone, (equivalent of the hydraulic cement limestone of Clarke county, Indiana). A durable bridge and foundation stone, with an occasional upper ledge of gray limestone....	11	03½
6. Corniferous limestone, containing the characteristic fossil corals, and at Scipio a white limestone, which, when burned, makes a very white lime.....	18	00

## UPPER SILURIAN AGE.

*Niagara Period.*

7. Niagara gray stratified limestone; in most parts a good building stone, which makes, when burned, a good lime.....	40	00
8. Clinton epoch.....	a trace.	

## LOWER SILURIAN AGE.

*Trenton Period.*

9. Cincinnati epoch.....	32	00
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*Cincinnati Epoch.*

A dark, compact, stratified limestone in the upper part, with some thin layers containing fossils, with unevenly bedded limestone and shale below, containing characteristic fossils.

The prevailing dip of all the strata in this county, is to the southwest, and the oldest one seen is represented by No. 9 of the Cincinnati epoch. These rocks, which crop in great force to the east of this, as in Ripley and Dearborn counties, have their most westerly outcrop on the south fork of the Muscatatuck, and on Otter creek and on the north fork of the Muscatatuck, as at Zenas, in the north-eastern part of the county. The first show of No. 9 is seen at the Quaker mill, south fork, 2½ miles south of Butlerville, Campbell township. A section here, on Robert Whinery's land, creek bluff, shows as follows :

1. Light colored clay soil with sand and an occasional boulder terminating in ocherous clay and sometimes a layer of sand above and again below 2 to 4 feet of hard pan..... 3 to 20 feet..
2. A very hard siliceous stratified stone, a mass of corals and shells, corniferous, known here as "mill-stone grit," and used extensively by the early settlers for that purpose ..... 3 to 5 feet..
3. Brown magnesian limestone, (Dolomite)..... 8 to 12 feet..
4. Light-gray shaly limestone, with white and gray compact flagstone below, (Niagara limestone) ..... 30 to 45 feet..
5. Dark-blue stratified limestone..... 5 to 6 feet..
6. Brown magnesian limestone, shaly and clay layers below, showing on northside of creek..... 6 to 8 feet..
7. Clay and shaly layers, blue, with Cincinnati fossils to the bed of the South Fork..... 2 to 3 feet..

Another section above, on the same stream, land of Harvey Wicks, Campbell township, shows a slight elevation of strata :

1. Light colored clay soil, and deeper shades below, with chert..... 4 to 14 feet..
2. Mill-stone grit..... 2 to 3 feet..
3. Brown magnesian limestone, Dolomite..... 2 to 3 feet..
4. Shaly limestone, with white and gray limestone below ..... 2 to 3 feet..
5. Blue stratified limestone, ..... 5 to 8 feet..
6. Brown stone of the above section ..... 5 to 8 feet..
7. Clay and shaly layers, with blue limestone, Cincinnati ..... 3 to 6 feet..

To the bed of the Muscatatuck.

The country here is broken along the streams, with rocky bluffs, and a scope of fertile bottom land opposite the high lands.

The following section is seen on the North Fork of Muscatatuck, below the mouth of Bush creek, and west of Butlerville, section 17, Campbell township.

1. Light and ocherous colored clay with sand and boulders..... 5 to 15 feet..
2. Millstone grit, full of fossils..... 3 to 4 feet..

3. Dolomite limestone, very sandy, red color... 4 to 6 feet.
4. Gray stratified Niagara limestone, in thick  
and thin flagging ledges, seen in out-crop  
along B. C. Heath's spring branch..... 30 to 45 feet.
5. Dark blue stratified limestone.
6. Not found.
7. A trace of Cincinnati fossils in the bed of North Fork.

There is no show of black shale in this part of the county. A section, same as the above, occurs along Pleasant Run with the addition of a few feet more of magnesian and white limestone on the highest points. The No. 3, dolomite limestone of the above section, which is first noticed on Graham creek below Paris crossing in the southern part of the county, at the horizon of the corniferous limestone beds at Deputy, a short distance south, is in the northeast part of the county a sandstone of a reddish color. The Cincinnati out-crop thickens along the north fork, going towards the head waters of the stream, and showing fifteen to twenty-five feet of the Lower Silurian at Zenas, in Columbia township. Some two miles above Zenas, on the creek, I find the following :

1. Ocherous clay soil, with sand and boulders..... 15 feet.
2. A very white stratified, crystalline limestone with a trace of pyrites and white chert below, and showing in all the bluffs, Niagara limestone..... 5 to 8 feet.
3. Thin stratified gray limestone, Niagara..... 10 to 20 feet.
4. Blue and gray limestone, showing crinoid stems, with clay layers below, and characteristic Cincinnati fossils, shells and corals..... 25 to 30 feet.

In the geological sections given above I have pointed out the position and extent of crop of strata which belong to the Cincinnati epoch, as seen in this county. The show of Lower Silurian is small and marks the boundary of that formation on the southwest but it increases in thickness to the east, as will appear in the geology of Ripley county.

The most southerly out-crop of Lower Silurian rocks in Indiana, as given in my survey of Clarke county, Geological Report, 1873, is on the Ohio river at the mouth of

Begg's run, one mile and a half above the mouth of Fourteen-mile creek. I shall have to correct that out-crop, for during the past fall, in company with H. C. Duvall and Phil. M. Dailey, of Charlestown, we traced that formation in a deep gorge which opens into Fourteen-mile creek, as far as Buffalo lick on J. Cole's branch and within one mile of Charlestown. Here the upper part of the Lower Silurian and Clinton show a remarkable amount of false bedding before the Niagara was deposited upon them. The Niagara strata are nearly horizontal or have a slight dip to the southwest after filling up the basin or trough of the underlying Clinton and Cincinnati. The false bedding is very marked where the branch has cut away the top of the cones which occur in a succession of four or five folds that are from two to three hundred yards apart.

UPPER SILURIAN AGE.

*Niagara Period.*

Clinton epoch, which is the next formation in the ascending order, has an outcrop only a few feet thick, overlying the Cincinnati. It contains a large per cent. of silica, lime and magnesia. In some localities, upon weathering, considerable beds of sand remain.

Niagara limestone: This formation is composed of gray and white, stratified, crystalline limestone, with occasional magnesian layers. These stones occur in heavy beds throughout the county, and crop along all the streams of any size. The most southerly crop of Niagara limestone in this State, is at the Falls of the Ohio, where it is sparingly seen at low water. It is 25 to 30 feet thick at Utica, on the Ohio river, and 75 to 80 feet on Fourteen-mile creek, in Clarke county. In Jefferson county, it thins out toward the Ohio river, where it overlaps the Lower Silurian. It passes through Jennings county, and is represented by a thin edge in the eastern part of Ripley county, and in the bordering counties, on the north and west of Jennings. The Niagara limestone has an extended crop along the eastern border of Jennings, as indicated above, and is easy

of access for quarrying building stone, curbing and flagging stones. These beds also furnish a good quality of quicklime.

The position of the Niagara rocks, in the southern part of Jennings county will appear from the following section above the mouth of Coffee creek, on or near Thomas Davis' land, section 36, Marion township :

1. Ocherous clay soil, with sand..... 5 to 25 feet.
2. New Albany black shale, here 5 feet.....in vicinity 40 feet.
3. Stratified gray and blue limestone..... 10 to 13 feet.
4. Stratified limestone, fine grained, light shade ..... 15 to 18 feet.
5. Stratified limestone, (Niagara).

To the bed of Big creek.

The land here is rolling, with shaly soil on the upland, and good, fertile, sandy bottoms on Coffee creek. A good outcrop of Niagara rocks, with some magnesian layers, is seen about the mouth of Graham, and on Neals creeks near Old Paris. The crop here is several feet in thickness, and many of the layers would make excellent lime and building material. Heavy beds of Niagara limestone show almost the entire length of Big Graham, even to its source in Ripley county ; also along Little Graham from its junction with Big Graham at San Jacinto, to the head waters of the stream east of New Marion, Ripley county. An out-crop of the strata as seen on Big Graham, section 22, Bigger township, and on the land of Vardivan Hughes, shows :

1. Ocherous clay soil..... 5 to 14 feet.
2. A very siliceous, brittle strata, filled with fossil shells and corals—corniferous, called "Millstone Grit"..... 2 to 3 feet.
3. Dolomite limestone, very bituminous, which contains disseminated masses, or nests of carbonate of lime, Iceland spar, showing double refraction, good cabinet specimens..... 12 to 15 feet.
4. Gray stratified Niagara limestone to the bed of Big Graham..... 12 to 16 feet.

A few sections of the outcropping rocks on the Musatatuck about Vernon will show the thickness of the Niagara formation near the central part of the county. One mile east of

Old Vernon, at the Tunnel mill owned by Wm. H. Sidell, section 10, Vernon township, the following crop occurs :

- |  |                |
|--|----------------|
| 1. Ocherous clay soil, with chert near the base.....   | 10 to 20 feet. |
| 3. New Albany black shale.....   | 10 feet.       |
| 3. Blue stratified limestone (North Vernon)  | 2 to 4 feet.   |
| 4. White limestone, stratified.....  | 8 to 10 feet.  |
| 5. Flint ledge.  |                |
| 6. Dolomite limestone, brown color.....  | 6 to 8 feet.   |
| 7. Gray stratified limestone, (Niagara).....   | 20 feet.       |
| 8. Blue shale in upper part, 4 feet, shaly, rough magnesian in lower part.....                         | 4 to 6 feet.   |
|  | 6 to 12 feet.  |
| 9. A fine-grained, stratified limestone, with chert.....   | 5 to 6 feet.   |
| 10. A fine-grained, stratified limestone, capped with a better grade of building stone.....            | 5 to 8 feet.   |
| 11. Various thicknesses of "flags," containing Othoceratites to the bed of Muscatatuck, (Niagara)..... | 10 feet.       |

Less than two miles northeast of the Tunnel mill, on the Jeffersonville, Madison and Indianapolis railroad, at the well-known quarry of Christopher Harman, section 12, Vernon township, the following marked crop occurs on Carney's branch. With the assistance of Mr. C. Harman, I was enabled to make the following section:

- |   |                 |
|---|-----------------|
| 1. Clay soil.....   | 2 to 4 feet.    |
| 2. New Albany black shale.....  | 5 feet.         |
| 3. 3 to 5 inches blue limestone, flagging (North Vernon).....   | 5 inches.       |
| 4. Hard, blue, stratified limestone, (North Vernon).....  | 22 inches.      |
| 5. Hard, blue, stratified limestone flagging with clay partings, (North Vernon).....                      | 8 to 12 inches. |
| 6. Hard, blue, stratified limestone, (North Vernon).....  | 22 inches.      |
| 7. Hard, blue, stratified limestone, (North Vernon).....  | 16 inches.      |
| 8. White, stratified limestone, flinty, coniferous.....   | 4 to 5 feet.    |
| 9. White limestone in strata of 8, 16, 20 and 48 inches. It affords some good stone caps, sills, etc..... | 8 to 9 feet.    |



10. Rough limestone, double flint ledge.....	4 to 5 feet.
11. Dolomite limestone, yellow, silicious in the upper part.	
12. White clay shale .....	2 to 4 feet.
13. Gray stratified limestone, blue in bank, makes good lime.....	4 feet.
14. Gray stratified limestone with cherty layers .....	3 to 5 feet.
15. Deep blue, fine grained, compact limestone in strata of 16 to 22 inches.....	6 feet.
To the bed of Carney's creek and to the south fork Muscatatuck .....	20 feet.

The above is a characteristic section of the out-crop of rocks at Vernon, where, on account of the deep gorges cut by many small streams and the short curves of the larger streams, various grades of stone are reached and easily quarried, in fact, nature has in ages past opened a series of quarries and laid bare the stone in this vicinity, from top to bottom of the Niagara series.

Following the South Fork into Campbell township, southeast of Butlerville, section 35, we have on Joseph Hole's branch.

1. Light colored clay soil with yellow sand and a trace of black sand, also, ocherous clay and white and yellow chert.....	10 to 43 feet.
2. Millstone grit, a mass of siliceous fossils...	3 to 5 feet.
3. Dolomite limestone, bituminous and containing nests of carbonate of lime (Ice-land spar), stone, weathers rough.....	5 to 6 feet.
4. Gray stratified limestone (Niagara), in layers of 12 to 18 inches, containing good building stone, and when burned makes good lime, and contains here crinoid stems, and specimens of fossil orthoceratites.....	4 to 6 feet.
5. Shaly and weathering limestone, projecting along the bluffs, containing orthoceras..	10 to 15 feet.
6. Flagging limestone (Niagara), "Flat Rock" .....	10 feet.
7. Brown and salmon colored magnesian limestone, Clinton.....	6 feet.
8. Magnesian limestone.....	2 to 4 feet.
9. Clay shale, containing ( <i>Tetradium fibratum</i> ) T. S.....	2 to 3 feet.

10. Very dark, compact stratified limestone, bituminous, in strata of 6, 12, and 18 inches, with some shaly layers, containing Zaphrentis corals ..... 6 to 10 feet.
11. Very dark, shaly, bituminous limestone the bed of South Fork.

The above section is a fair representation of the crop in this region, as seen along numerous small streams and in deep gorges leading into the south fork from the east and west. The numerous exposed strata of Niagara limestone along the brakes afford an unlimited amount of excellent crystalline limestone for building purposes or for lime. Wood abounds here, and lime could be produced at small cost and the weathered, thin layers of stone will in time afford an abundance of material for building stone fences, when this, at present, well timbered region shall require it. Numerous small caverns occur in this strata, from which flow never-failing springs; also, sinks and large weathered vertical holes, some of which are very interesting on account of showing the weathering and decomposition of the rocks. In company with James Hole, Esq., I visited a noted locality of weathered cavities which some have imagined were made by pre-historic people. Three of these vertical holes, four to five feet in diameter, which penetrate the limestone strata to the depth of 25 to 30 feet, exhibit the appearance of having been excavated with a large auger.

On the west side of the South Fork, on the land of John C. Lee, north of Butlerville, section 24, Campbell township, the Niagara limestone out-crops in numerous places and presents a series of ledges suitable for building purposes. These crops are within one mile of the O. & M, railway, and afford fine sites for quarries. In Sand creek township, northwest of Campbell township, east side of Sand creek, section 11, on the land of William Kellar, the following out-crop occurs:

1. Ocherous clay soil with sand and boulders. 3 to 15 feet.
2. New Albany black shale in the summit of the hills..... 12 feet.

3. Blue stratified limestone, (N. V.) strata..... 2 to 5 feet.
4. Dolomite limestone, not seen.
5. Stratified gray limestone, Niagara, magnesian below ..... 12 to 15 feet.

Another section on Sand creek, at Craig's bend, below the Tunnel mill of John S. Calhoun, shows:

1. A light colored siliceous soil, with chert below ..... 3 to 6 feet.
2. Dolomite limestone.
3. Light colored stratified limestone in the crop, but gray within, in strata of 6 inches to 2 feet 2 inches..... 4 to 6 feet.
4. Gray shaly limestone with cherty layers, Niagara ..... 12 to 16 feet.
5. Flagging layers of limestone, 4 to 6 inches, "Flat Rock," to the bed of Sand creek... 20 in.

Dolomite limestone of the above sections out-crop on section 3, a short distance southwest of Brewersville, on the land of Daniel Bacon, and the indications are favorable that it is here a good building material; indeed, several layers of the above sections will afford durable building stone and good flagging; also, produce good lime if burned.

Having previously given some sections under the Lower Silurian division of the subject, showing the Niagara out-crop on the north fork of the Muscatatuck, in Columbia township, about Zenas, suffice it to say that the Niagara crop in that section on Wolf creek, Ice creek and other streams furnishes advantageous sites for opening good quarries.

#### DEVONIAN AGE.

##### *Hamilton Group.*

**Corniferous limestone:** Having traced this formation from the Falls of the Ohio river through Clarke, Scott and Jefferson counties, the layers have been found very uniform, and maintain the well marked characteristics of the stone, being rich in fossil corals of radiate and columnar forms: *Zaphrentis gigantea*, *Z. rafinesquii* and *Favosites goldfussi*, which always abound, the latter affording most excellent cabinet specimens, of large and small size, and in many

instances, bleached as white as snow, so that the delicate columns are distinct and beautiful. While the greater part of this species of coral is composed of very pure white lime, yet some specimens show a trace of iron, which gives them a beautiful shading. A coral bed appears at the quarry of Reynolds, Saulpaugh & Co., below Paris crossing, formerly the bluffs of Graham creek, and on the land of James McGannon.

1. Ocherous clay soil.....	20 feet.
2. New Albany black shale.....	4 feet.
3. Blue stratified crystalline limestone, in strata of 2 ft., 2 ft. 6 in., to 3 ft. 1 in.	
4. Other layers to "quick ledge".....	2 feet.
5. Corniferous limestone containing, <i>Favosites goldfussi</i> and <i>Zaphrentis</i> corals.....	16 to 18 feet.

No. 5 of this section appears west of Paris crossing, to Solomon Deputy's, sec. 30, on Coffee creek; also on Slate branch, land of Calvin Hudson, where the following section is seen:

1. Light colored clay soil, with sand.....	8 to 15 feet.
2. New Albany black shale, with fossils in the lower layers.....	30 to 45 feet.
3. Grey stratified limestone, with fossil crinoid stems.....	2 to 4 feet.
4. Blue stratified limestone, (N. V. limestone).....	4 to 6 feet.
5. Corniferous limestone, containing fossil corals, etc., to the bed of Coffee creek.	

The Corniferous limestone also contains a fine display of fossil corals on Neal's creek, adjoining old Paris, and along the bluffs of Graham creek; also, in some localities about Old Vernon, on the Muscatatuck. It will appear, from the sections given, that the "White limestone" and also the Dolomite limestone come in at various points in the place of Corniferous. This will be seen in the following section on Sand creek, land of James Moffitt:

- |  |                |
|--|----------------|
| 1. Ocherous clay soil.....   | 2 to 12 feet.  |
| 2. Black shale, (N. A.) found only on the<br>highest points.....   | 1 to 20 feet.  |
| 3. Dark-blue stratified limestone, (N. V.) in<br>the crop 6 to 14 inches.....  | 3 to 6 feet.   |
| 4. Brown, coarse grained limestone, contain-<br>ing <i>Spirifer acuminatus</i> , corals.....   | 3 to 4 feet.   |
| 5. Soft white limestone showing Corniferous<br>fossils and crystals of pure carbonate of<br>lime, and when burned produces a white<br>lime ..... | 10 to 15 feet. |
| 6. Magnesian limestone to the bed of Sand<br>creek.....  | 4 to 6 feet.   |

The stone comprised in No. 5 of the above section is highly prized in this and some other localities for its purity and the facility with which it may be burned into caustic lime. It has a good reputation and is known in the market as "Scipio white lime." No. 5 of the above section is not suitable in this locality for building purposes since it is liable to decay when exposed to the weather as may be seen in the piers of the J. M. & I. railroad bridge over Sand creek west of Scipio. It is not expedient or necessary that these layers should be used for exposed work, as the Vernon blue limestone crops on all the hill sides immediately above the white layers.

In Campbell township, the Corniferous limestone loses almost entirely its usual lithological character, as will be seen from the following section at Dudley Andrews', in this township, southeast of Butlerville, and on Campbell creek, a tributary of the South Fork.

- |   |                |
|---|----------------|
| 1. Clay soil with sand and chert.....   | ?              |
| 2. Siliceous fossil bed, "millstone grit," con-<br>taining corals, fossil shells and an occa-<br>sional trilobite and conocardium (Cornif-<br>erous)..... | 3 to 5 feet.   |
| 3. Brown, magnesian limestone, soft, weather-<br>ing .....  | 6 to 11 feet.  |
| 4. Gray and light blue limestone, flagging and<br>foundation stone, makes good lime,<br>(Niagara).....  | 10 to 40 feet. |
| 5. Magnesian limestone to the bed of South Fork.  |                |

No. 2 of the above section, as stated, is here very fossiliferous.

Immense quantities of large and small fossils are found on the hill sides and along the streams. The buhr stone is composed of small fossil corals and shells which give it a cellular structure, from which it derives the name of "mill-stone grit." In composition it is an impure flint or chert, and was used by the early settlers for constructing mill-stones. These siliceous layers do not appear at North Vernon, as will appear from the following section on Jordan's branch, commencing at Gallus Kuchner's quarry :

- |   |               |
|---|---------------|
| 1. Ocherous clay soil.....  | 1 to 12 feet. |
| 2. Hard pan of blue clay and other shades.....  | 6 feet.       |
| 3. New Albany black shale, with two to three inches of yellow bog ore at the base.....  | 42 feet.      |
| 4. Gray crystalline limestone, stratified with blue layers below, layers of 6, 10 and 18 inches, to 2 to 3 feet 3 inches..... | 6 feet.       |

The gray ledge of the above section contains a very great abundance of crinoid stems on the surface, with plates of *Cariocrinus ornatus* and other crinoidea; also, *Zophrentis gigantea*, *Cyathophyllum rugosum*, *Favosites goldfussi*, and a massive branching coral not yet described, *Lucina proavia*, *Spirifer acuminatus*, a *Spiriferoides*, an *Athyris* and *Dalmania peloine*, Hall, originally described from the Falls of the Ohio. The blue ledges contain *Plathyceras dumosum* Con, a variety with distinct spines, some of the spines are three to four inches in length; also other fossil shells.

- |   |               |
|---|---------------|
| 5. Gray limestone, with chert "flint ledge"   | 5 feet.       |
| 6. Soft white limestone, with chert in the upper 6 inches, contains fossil shells, splits well, strata 2 feet to 20 inches..... | 5 to 6 feet.  |
| 7. White limestone striped with gray, "splitting ledge," splits in thin layers, makes good lime .....                           | 4 to 5 feet.  |
| 8. Blue and gray limestone.....   | 6 to 8 feet.  |
| 9. Dolomite limestone in strata of 2 to 6 feet with chert in some parts, and sand and clay layers .....                         | 8 to 10 feet. |
| 10. Rough brown magnesian limestone to the bed of the Muscatatuck, above Vernon   | 6 to 12 feet. |

Below Old Vernon, on the Muscatatuck, we have the following section on the land of Joseph Saddler:

1. Clay soil ..... 4 to 30 feet.
2. Black shale ..... 3 to 20 feet.
3. Chert ..... 5 to 6 inches.
4. Gray and blue stratified limestone in thick and thin layers, with cherty concretions, flagging stone..... 4 feet.
5. Gray stratified limestone, with crinoid stems on the surface..... 6 feet.
7. White limestone, striped gray, splitting ..... 5 feet.
8. Various shades of limestone..... 8 feet.
9. Dolomite, sandy, rough brown..... 10 to 12 feet.
10. Dark brown, rough magnesian, with chert and calc spar..... 5 to 8 feet.

To the Muscatatuck creek.

The following section was taken at the Huckleberry quarry beneath the bridge on the Vernon & Paris road.

1. Clay soil ..... 5 to 12 feet.
2. New Albany black shale..... 2 to 8 feet.
3. Blue limestone..... 4 to 6 feet.
4. Flagging, ledge ..... 4 feet.
5. White limestone..... 4 to 5 feet.
6. Dolomite limestone.
7. Light blue shaly limestone, disintegrating in the lower part, in strata of 8 to 14 in. 5 to 6 feet.
8. Light brown magnesian limestone..... 1 to 6 inches.
9. Gray limestone, thick and thin layers, showing Orthoceratites, Niagara flags, to the bed of the Muscatatuck..... 5 to 8 feet.

The next deposit in the ascending series is the

#### NORTH VERNON LIMESTONE,

So designated from being first extensively quarried at that place, and shipped to various points by rail. This stone has acquired some reputation as the "North Vernon blue limestone." It lies at the horizon of the hydraulic limestone of Clarke county on the south, and is here a continuation of the same bed, but is a differently constituted rock. In Clarke county the entire beds, which are from 12 to 14 feet in thickness, are used for hydraulic cement, and known to

the trade as Louisville cement. The capping in the Vernon beds is in many places a gray crystalline limestone, resembling the cap stone of the cement. The strata of gray stone in many places overlying the blue, often contains a great number of crinoid stems; some plates of *Cariocrinus ornatus*, and some Corniferous corals.

The most valued layers are: a dark blue, compact, fine grained, stratified limestone, of good dimensions for bridge piers, flagging, foundation, and indeed for any work that requires durable material. The weight of this stone when dressed is from 180 to 185 lbs. per cubic foot. Since my survey of Jefferson county, an excellent quarry of this stone has been opened at Dupont, a locality referred to at that time as containing good stone. As the various layers are well exposed at this time, being freed from the debris which had covered the outcrop, I will repeat the section more in detail, for the quarry is here of great value. Some account of the railroad quarry was given in the last report (1874).

The quarry at Dupont is located on the land of Fernando Robertson and has been worked the past season by Henry Wrape & Co., of North Vernon. The arrangement of the strata is shown in the following section:

1. Clay soil.....	2 to 3 feet.
2. New Albany black shale.....	6 in. to 1 foot.
3. Gray stratified limestone.....	3 feet.
4. Dark gray stratified limestone.....	2 feet.
5. Three to four inches of iron ore.....	4 in.
6. Fine, blue stratified limestone.....	14½ in.
7. Dark blue ledge, flagging.....	7 in.
8. Fine blue ledge, flagging.....	5 in.
9. Shaly ledge, flagging.....	4 in.
10. Blue ledge, containing white chert concretions.....	8 in.
11. Blue ledge.....	13 in.
12. Blue ledge.....	20 in.
13. White limestone, corniferous.....	10 to 12 feet.
14. Dolomite limestone.....	5 to 6 feet.
15. Magnesian limestone to the bed of Lewis' creek.	

This quarry has been vigorously worked during the past season, employing 50 to 75 hands, cutting several thousand



yards of dimension stone, which have been shipped by rail from this quarry to Cincinnati, to be used in the piers of the Southern Railway bridge over Ohio river at that place. Large quantities of flagging and other grades of stone have also been shipped by rail to various points. The North Vernon blue limestone, as it is commonly designated, covers a considerable area in this county. It is seen in Jefferson on the south, and extends to Graham creek on the east, and is superimposed by the black shale, in the western part of the county, beyond Hardinsburg. It appears in the northwestern part of the county, at Scipio and Brewersville. The commercial value of the North Vernon limestone can not be truly estimated at present, as its reputation is increasing from year to year. It is most favorably located along the line of the Ohio & Mississippi railroad, and the Louisville branch of that road, also along the Jeffersonville, Madison and Indianapolis railroad. These roads lead to large and flourishing cities where the demand for stone is constantly increasing.

Herewith I submit the following communication from the well-known and experienced contractors, Reynolds, Saulpaugh & Co., now engaged in the construction of the piers of Southern Railway bridge over Ohio river at Cincinnati :

OFFICE OF REYNOLDS, SAULPAUGH & Co.,

CINCINNATI, O., Sept. 20, 1875.

PROF. WM. W. BORDEN,

*Assistant Geo. Survey,*

New Albany, Indiana:

SIR—Deeming it a matter of professional interest to yourself as well as others, we would respectfully call your attention, as a geologist, to the rock formation at and in the vicinity of Paris Crossing, Indiana.

During the present year we have opened and operated a

quarry on the farm of James McGannon, Esq., near the railroad station above named, and have taken therefrom, to present date, about 8000 cubic yards of dimension stone, which we are using in the construction of the substructure of the Cincinnati Southern Railway Company's Ohio river bridge, at Cincinnati, Ohio. The quarry we are working had never been tested prior to our commencing operations, but when stripped and developed, we found it consisted of the following strata:

The first, or top strata being 2 feet thick.

The second strata being 3 feet thick.

The third strata being 26 to 28 feet thick.

Each stratum being very uniform in thickness, horizontal in position, good even beds, without intervening layers of earth or other material, and all of blue limestone.

There is also a fourth strata underneath these, of blue limestone, two feet thick, of the kind known among quarrymen as "quick ledge."

We have had large experience in masonry and stone work, especially in the construction of bridge masonry, and we are free to say that this quarry, and those of the vicinity adjoining, are among the very best limestone quarries we have seen west of the Alleghanies, not only for ease and facility in operating, but for firmness of texture and durability of material. Indeed, we hazard nothing in saying that, in our judgment, the three strata first mentioned, for ordinary purposes of foundations for buildings and bridges, under all ordinary circumstances, are equal to Missouri granite.

We should be pleased to have you visit and examine these quarries, at your earliest convenient opportunity, deeming them well worthy your official attention.

We have the honor to be,

Respectfully Yours,

REYNOLDS, SAULPAUGH & Co.

The above firm have employed during the past season from three to four hundred hands, and quarried and cut

some eight thousand yards of stone. This stone is worth on an average when dressed, nine dollars per yard at the quarry, fourteen to fifteen dollars at the bridge, and twenty-two dollars in the piers.

The Kerchner quarry at North Vernon was also worked during the past season by John Droitcour; employs fifty to seventy-five hands in preparing stone for the bridge mentioned above. A section at the Kerchner quarry where worked, gives:

- |  |                              |
|--|------------------------------|
| 1. Ocherous clay soil mixed with black shale.....                              | 2 ft. 00 in. to 4 ft. 00 in. |
| 2. New Albany black shale.....   | 4 ft. 00 in. to 6 ft. 00 in. |
| 3. Dark blue limestone with crinoid stems and shells.....                      | 2 ft. 06 in. to 3 ft. 03 in. |
| 4. Dark gray stratified limestone "flagging ledge".....                        | 10 in.                       |
| 5. Dark blue stratified limestone  | 1 ft. 10 in.                 |
| 6. Dark blue stratified limestone, with fucoid impressions on the surface..... | 1 ft. 2 in.                  |
| 7. Cherty ledge, ("nigger heads")  | 5 feet 00 in.                |

Some sections taken in the Kerchner quarry at the close of the work this season, show as follows. The dip of the ledges in the quarries is  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inches to the southwest, in 100 feet:

- |  |                              |
|--|------------------------------|
| 1. Clay soil, yellow .....   | 4 ft. 00 in. to 5 ft. 00 in. |
| 2. Black shale, New Albany, with fossils, <i>Leiorhynchus quadricostata</i> , <i>Chonetes lepida</i> , <i>Tentaculites fissurella</i> , and <i>Lingula spatulata</i> , also nodules of iron pyrites..... | 4 ft. 00 in. to 6 ft. 6 in.  |
| 3. Dark blue stratified limestone, and partings in places having imbedded on the stone crinoid stems of great length and roots or bases, upper part of the ledge 10 inches..... total                    | 2 ft. 03 in. to 2 ft. 06 in. |
| 4. Deep blue stratified limestone containing nests of white chert adhering to ledge below, which is.....   | 1 ft. 11 in.                 |

On the north side of the hill at the same quarry we find :

1. Light colored clay with ochreous shades below ..... 2 ft. 00 in. to 4 ft. 00 in.
2. Black shale with ochre below, thin strata, 2 in..... 3 ft. 00 in. to 4 ft. 00 in.
3. Gray stratified limestone, containing an abundance of *crinoid* stems, and plates of *Cariocrinus ornatus*, *Zaphrentis* and an undescribed species of branching coral; also fossil *Anchorocrinus* ..... 2 ft. 09 in.
4. Partings of clay..... 0 ft. 02 in. to 0 ft. 03 in.
5. Dark blue stratified limestone, containing nests of white chert, shows on the edge..... 0 ft. 08 in. to 0 ft. 10 in.
6. Dark blue stratified limestone with a very good upper face ..... 1 ft. 08 in.  
Fifty feet west of the above section, in the same outcrop, the gray limestone is absent.  
Clay, black shale and ochre as above, with No. 3 gray limestone..... 6 in. wedge shape to 0
4. Partings of clay.
5. Dark blue stratified limestone, taking the place of the gray of No. 3, same horizon..... 2 ft. 02 in. to 2 ft. 09 in.
6. Flagging ledge containing chert 0 ft. 09 in. to 0 ft. 10 in.

The overlapping of strata of different grades of rock show a washing of material from different localities and in different directions. Messrs. Hicks and Holmes, in Geneva township, section 20, on the J., M. and I. railroad, west of North Vernon, employ 15 to 25 men in quarrying and cutting stone for various purposes. This quarry has the following outcrop :

1. Clay soil..... 3ft. 00 in. to 4 ft. 00 in.
2. N. Albany black shale, with 3 in. of bog iron at the base..... 3 ft. 00 in.
3. Gray stratified limestone with fossils ..... 2 ft. 04 in. to 2 ft. 09 in.
4. Dark blue stratified limestone with fossils..... 15 in.
5. Blue limestone, two ledges, (quarry worked)..... 1 ft. 6 in. and 1 ft. 7 in.

- |   |             |
|---|-------------|
| 6. Blue flagging, curbing, etc., 3 ledges, (quarry worked)..... | each 7 in.  |
| 7. Blue limestone, four ledges, (quarry worked).....            | each 10 in. |
| 8. Blue limestone, thin ledges, (quarry worked).....            | each 9 in.  |
| 9. White limestone.....   |             |
| 10. White limestone, with chert, etc.....                       |             |

A large quantity of stone is cut into sills, caps, steps, water-tables, ranges, etc., and shipped to various points. The Vernon blue limestone shows to the west of this, and outcrops about Queensville, as shown by the following section, taken to the east and west of that place.

Section on the Madison & Indianapolis State road, Geneva township, section 18, land of J. B. Smith, County Commissioner:

- |   |                |
|---|----------------|
| 1. Soil, clay with chert.....   | 6 to 8 feet.   |
| 2. New Albany black shale.....  | 6 to 8 feet.   |
| 3. Vernon blue limestone, upper as seen....   | 1 ft. 4 in.    |
| Other strata, total .....   | 4 to 5 feet.   |
| 5. Grey shaly limestone.....  | 6 to 8 feet.   |
| 6. Pure white stratified limestone; the upper layers weather well where seen in a culvert on the J. M. & I. railroad; the lower part shaly; in all..... | 10 to 15 feet. |
- To branch.

A section west of Queensville, on the J. M. & I. railroad, section 13, Geneva township, land of G. P. Campbell:

- |   |               |
|---|---------------|
| 1. Light-colored clay soil with yellow chert below, and sand and an occasional boulder..... | 6 to 20 feet. |
| 2. Two to three hard strata, with fossils....   | 2 ft. 6 in.   |
| 3. Black shale .....  |               |
| 4. Blue stratified limestone, first ledge.....  | 1 ft. 2. in.  |
| Second ledge.....   | 6 in.         |
| Third ledge.....  | 1 ft. 10 in.  |

This valuable limestone still continues to the west, and crops about Scipio. A good outcrop, not much worked, is seen on Thomas Wilkerson's land near the village. This

stone also crops along Rock creek at Samuel Marshe's, in Geneva township, section 29. The strata exposed are :

- |   |               |
|---|---------------|
| 1. Ochreous siliceous clay soil and boulders...             | 4 to 20 feet. |
| 2. New Albany black shale.....                              | 0 to 8 feet.  |
| 3. Gray stratified limestone.....                           | 2 to 4 feet.  |
| 4. North Vernon blue limestone.....                         | 3 to 4 feet.  |
| 5. White limestone, splits well and makes good<br>lime..... | 6 to 10 feet. |

The dip of the rocks on this stream, as on all the streams in this county, is to the southwest. To the west of this the blue limestone is covered by a thick bed of black shale. South of this, in Spencer township, this stone crops, and may be traced in the bed of Six-mile creek from the most southern exposure on the land of A. L. Swarthout, at Hardinburg, for some three or four miles, but rising in the direction of Queensville, where it is found on the summit of the hills. The blue limestone is in thick strata and quite even bedded at Hardinburg, but lies lower down in the valleys. The following section was taken at the railroad quarry, crossing of the Hardinburg and Paris road on Six-mile creek :

- |  |               |
|--|---------------|
| 1. Light yellow clay soil with sand and boulders.....  | 2 to 15 feet. |
| 2. New Albany black shale, containing fossils and pyrites.....   | 4 to 15 feet. |
| 3. Thin ledge of coarse-grained limestone, composed of crinoid stems and fossil shells.....  | 2 to 4 in.    |
| 4. Vernon blue limestone, 2 to 4 strata exposed to the bed of the creek, the surface of the stone shows an abundance of fucoid markings..... | 4 ft.         |

South of Hardinburg along Six-mile creek, and also to the west of that place, the blue limestone is again encumbered with the black shale. These limestone beds are continuous from Hardinburg to Paris crossing, and in many places lie under heavy beds of black shale and soil. The great demand during this season for compact and durable limestone for bridge work and other purposes has given a fresh impetus to the quarry business in this section, and many new quarries are being opened. John Droitcour, of North Vernon, has

recently opened a quarry on the land of W. H. Lawrence, a short distance east of Commiskey Station, on the Louisville branch of the O. & M. railroad. The crop shows :

- |  |                              |
|--|------------------------------|
| 1. Clay soil.....                                      | 1 ft. 00 in. to 2 ft. 06 in. |
| 2. Blue limestone flagging.....                        | 06 in.                       |
| 3. Blue limestone.....                                 | 08 in.                       |
| 4. Blue limestone beds.....                            | 2 ft. 00 in. to 2 ft. 06 in. |
| 5. Blue limestone, 3 to 4 layers of<br>5 to 10 in..... | 20 in.                       |
| 6. Blue limestone.....                                 | 2 ft.                        |
| 7. Blue limestone.....                                 | 14 to 15 in.                 |

This quarry has been leased by Mr. Droitcour for a term of years. In this part of Montgomery township, bordering on Graham creek, the blue limestone is easy of access. A fine exposure is seen on the bluffs above Jesse Tate's cave, section 28, and at several other places on his land ; also, on the land about Lowery cave, section 21 ; also, on the land of J. B. Johnson, west of Commiskey, section 20, and within a half mile of the railroad ; others again one mile north on the railroad at Sherman, and on the land of W. H. Conner, northeast quarter section 17. A section on Conner's branch, which rises a short distance above the railroad, contains :

- |  |               |
|--|---------------|
| 1. Ochreous clay, with white chert below.....                                | 2 to 10 feet. |
| 2. New Albany black shale.....   | 5 to 10 feet. |
| 3. North Vernon blue limestone not worked<br>which shows 3 and 4 strata..... | 6 to 18 in.   |

This stone crops on Coffee creek, a short distance to the west. Following the line of the O. & M. railway to Lovett, section 33, land of John S. Thomas, bordering on Graham creek, the country becomes broken, and on section 3, township 5, range 8 east, Lovett township, the blue limestone out-crops at several localities. The various quarries of this stone throughout the county will be able to supply any demand that may be likely to occur. Near Old Vernon is Fowler's quarry, widow Reid's quarry, and east of Vernon on the J. M. & I. railroad is the quarry previously mentioned of Chris. Harman, the quarry of Aulge & Durth, the McMannus quarry, worked by James Vansickle. To mention all the quarries would be to give the out-crop on every

branch or hill-side. Adjacent to North Vernon, on the land of T. O. Johnson, the blue limestone crops, and from indications good quarries may be opened on his land.

Next in order in the Hamilton group is the

NEW ALBANY BLACK SHALE—EQUIVALENT OF THE GEN-  
ESSEE SHALE, N. Y.

These beds are continuous from the base of the knobs below New Albany to the north through Floyd, Clarke, Scott and Jennings counties, excepting where the beds have been cut through by weathering and by streams, thus showing the shale beds to have been continuous at a former period. The heaviest deposits of black shale are in the western part of the above counties where the beds are superimposed by the knob range, or the table lands which occupy the horizon of the knobs, with the thin edges or eastern border resting on the Devonian and Niagara rocks.

The black shale appears in nearly all the sections given above. It is the surface rock in this county and always maintains the same stratigraphical position.

The black shale in Jennings county, is in the main, as in the counties to the south, of a thin, laminated structure, and crumbles upon exposure; yet, in some localities it can be quarried in thick, compact slabs, and is used for walling wells, and has been utilized in steam boiler furnaces, withstanding great heat after the volatile combustible matter has been burned out. Black shale, as the name indicates, is generally of a very dark color when first exposed, and in many places very bituminous. When saturated with moisture it resembles cannel coal; in some localities it has an ochereous shade, probably due to the oxidation of the pyrites which it contains. The dark-coloring matter of the shale is of vegetable origin, and is found to contain ten or twelve per cent. of oil. The carbonaceous matter renders it of considerable heating power, but, up to the present time, it has not been much utilized as a fuel. It is perhaps worthy of note, that in New York the spontaneous flow of carbureted hydrogen gas, from a similar shale, has been



extensively employed for lighting buildings. When burning, this shale evolves a heavy smoke having the smell of burning coal, but unlike the latter, it suffers no perceptible diminution of bulk, the residue being a stone of light appearance with a base of silica and alumina. This residue, if ground and incorporated with fire clay, would probably make a good fire brick. The bituminous nature of the black shale has led many persons to suppose that the out-crop of shale banks are an indication of coal. The occurrence of seams of one to two inches of pure bituminous coal in the shale, in some sections, has had a tendency to strengthen this belief. In some places it contains masses or concretions of very hard, impure limestone. These concretions are often spherical and from a few inches to three to four feet in diameter.

Heavy beds of shale occur along Coffee creek at its junction with Big creek, and to the west to the line of Jackson county, cropping to the east and west of Coffee creek in thick beds, as on the land of Solomon Deputy, section 30, Montgomery township, where the crop is from thirty to forty feet, showing thin seams of coal, also thin layers, and nodules of pyrites. Some layers of blue as well as black shale occur in this locality. The water flowing over or from the black shale deposits gelatinous oxide of iron; well-water from the shale has generally an astringent inky taste. As before stated, the shale beds are very continuous in the western tier of townships in this county—Marion, Spencer and Geneva. In Spencer township it covers the blue limestone from the Muscatatuck on the south and west to Hardinburg. At the latter place, in the bed of Six Mile creek, the base of the shale is again seen with a crop of blue limestone. The fossils usual to the shale are found in this locality; also crinoid stems penetrating it from a stratum of limestone below. These masses of stems give evidence of an abundance of crinoidea in the limestone series of the Hamilton Group. The imprint of fossil plants, calamites, are frequently seen, and fossil wood of conifera. Mr. J. Swarthout, of Hardinburg, has a good

pecimen of this wood in his possession. From the large amount of pyrites found in the shale on a small stream in this region, it has received the name of Silver creek. To the north of this, in Geneva township, heavy shale beds occur, as around Scipio, and to the west and east on Sand creek, in Center, Vernon and some in Bigger township. At the North Vernon quarries, an abundance of *Tentaculites fissurella* appear imbedded in the shale near the lower part of the series. Good specimens of black shale fossils are to be found on T. O. Johnson's land, a short distance northwest of North Vernon at the juncture of the blue limestone with the black shale. The fossils occurring here are *Leiorhynchus quadricostatus*, *Chonetes lepida*, *Tentaculites fissurella*, and *Lingula spatulata*.

#### QUATERNARY BEDS.

The Quaternary rests immediately upon the Paleozoic rocks noticed in the preceding pages.

The influence which this period had upon the general appearance of the country is very marked. In this part of the State, where the strata are conformable, glaciation worked great changes by cutting away strata and gave rise to a variety of enjoyable scenery. It is true that the streams, by their erosive force, have lent their aid in cutting down the rock formations to a greater or less depth, and in producing valleys and bluffs which give an undulating appearance to the surface of the deep beds of clay, sand and gravel. It has been found, on what is here called "Flats," that in sinking wells to the depth of forty to fifty feet no stone is met, yet, perhaps, a short distance on either side, heavy ledges of limestone are struck in shallow wells.

It is the generally accepted opinion that the drift came from the north, and is made up of white, yellow, black and various shades of colored sand derived from the coarser gravel and boulders. The greater part of the drift is made up of mineral matter foreign to the rocks of this State. Small particles of very pure gold are frequently found in the sands. Boulders of stratified rocks are sometimes

found, while granite boulders of various sizes are met with throughout the county, in many places quite large and abundant.

Boulders are rarely seen upon the "flats," but upon the inclined slopes where the clays have been washed down ; thus, large boulders are more frequently seen on the borders of large streams. They occur quite frequently on the region bordering the South Fork of the Muscatatuck, and especially on the land of Joseph Hole, in Campbell township, section 35. The largest boulder seen in the county is found here, and measures eight feet in length and five feet in width and thickness. It is a very dark and hard granite.

The drift throughout the county affords an abundance of sand which is washed down into the streams. Sand is especially abundant, and some boulders in the northwestern part on Sand creek.

#### CHAMPLAIN PERIOD.

This comprises the ancient stratified siliceous clays, which are generally of light and dark yellow shades below, and terminating in a blue clay. The blue glacial clay is often found to contain imbedded trunks, limbs, roots and leaves of trees. This is a very marked feature of the clays about Paris Crossing. Timber has been exhumed from several wells at Paris Crossing that are situated on lands elevated some sixty to seventy feet above the bed of Graham creek. I examined the material taken from a well recently sunk here by Mr. John F. Files, in which the following deposits were passed through :

- |   |               |
|---|---------------|
| 1. Light colored clay, with deeper shades below.....  | 10 feet.      |
| 2. Ochre colored clay with flint pebbles, in creasing in hardness towards the bottom                                | 19 feet.      |
| 3. Very hard bed clay and gravel.....   | 2 to 3 feet.  |
| 4. Blue drift clay, very sandy, with water ; also, limbs, twigs and roots of trees, continuing to the depth of..... | 7 to 10 feet. |

Here the ingress of the water prevented the deepening of the well, and the wall was commenced upon the driftwood.

After the first round of stone curbing was placed down, a limb six inches in diameter was taken from the center of the well. At the time of my visit they were using this wood for fuel, and Mr. Files stated that he supposed he had taken as much as a half cord of wood from the well. Specimens of this wood, which has the appearance of being birch, have been forwarded to the State collection. It is of a dark color but not carbonized, and in many parts very much crushed and twisted, showing that it had been subjected to very great force. The clay lands of the "flats," which form the water sheds between all the streams, are of the Champlain period, and contain vegetable material which was borne down from the higher lands and deposited far above the flood tides of the streams of the present age.

The compact, tenacious character of the clay soil of this region is not remunerative under the old mode of growing crops, but it may be rendered so by liberal underdraining.

There are deposits of blue clay in the lower parts of these beds, often but two or three feet from the surface, well suited to the manufacture of tiles. Frequently irregular layers of yellow sand are found in the Champlain clays, sometimes these over-lapping one another, and again they appear horizontal.

#### ALLUVIAL, OR RECENT.

This deposit is seen along all the streams, and composes the low lands or river flats. It is derived from the weathering or disintegration of the rocks, from the washing down of the glacial drift, the undermining of terrace deposits of sand and gravel, and the dark vegetal mold washed down from the hill-sides.

The most productive lands in the county, are those situated in the creek bottoms and along the base of limestone crops. On the limestone slopes, bluegrass finds a congenial soil; one that is rich in all substances that tend to promote its vigorous growth. In the bottoms the soil is generally porous clay loam or sandy loam, which affords natural drainage for superabundant water, and renders it easy to

cultivate, warm and productive. The up-lands are largely derived from the decomposition of the black shale. The soil is mostly clay, and rather difficult to cultivate profitably, without first being drained.

North of Scipio, bordering on Wyalusing and Rat Tail creeks, the land is very broken. Bordering on Sand creek, section 1, Geneva township, at Thomas Wilkerson's it is more gently undulating.

#### ANTIQUITIES.

Pre-historic stone implements are found throughout the county, such as stone axes, flint arrow-points, spear heads, knives, fleshers, and various stone ornaments, evidently the work of a pre-historic race. These relics are most frequently met with along the larger streams, or on some elevation at the confluence of water courses. The intelligence of this race is farther shown by remains of extensive structures of earth and stone, evincing design and some skill in labor. The remains of the largest work of the mound-builders in this county is to be seen on the bluffs elevated 75 to 100 feet above the bed of the creek on the land of John E. Calhoun at a short bend in Sand creek, and a short distance from Brewersville, in Sand Creek township. It is a stone mound 71 feet in diameter, showing at this time, a height of 3 to 5 feet above the surrounding surface. The exterior walls appear to be made of stones placed on edge, but the central portion did not show any regular arrangement of the stones.

I was informed by Daniel Bacon, who resides in Brewersville and saw this mound thirty years ago, that it was at that time twelve to fifteen feet in height, and that upon opening it bones and charcoal were found beneath a flat stone near the centre. Large quantities of stone have been hauled from it and there is upon the ground a spring-house or out door cellar constructed of stone taken from it. It also furnished the stone for the underpinning of two or more houses. The rock in this mound, is principally from the bluffs below, with an occasional boulder. A

neck of land 25 to 30 feet in width intervenes between the rock mound and what is supposed to be a natural mound situated on the bluff some three hundred yards distant. The summit of this mound is fifty to seventy-five feet above the creek bed. There are indications of two stone walls across the neck about fifty feet apart. A road passes along the narrow neck which unites the peninsula of five to six acres with the mainland. A rich alluvial bottom lies to the southwest of the creek. Numerous blocks of stone, five or six feet in height, which have fallen from the bluff above, lie scattered along the neck and are weathered into fanciful forms.

Other mounds occur west of Butlerville on the North Fork of Muscatatuck creek. A number of pre-historic implements have been donated to the State Cabinet by various liberal persons in the county, all of which have been forwarded with the donor's name.

#### AGRICULTURE.

The agricultural interests of the county are conducted by the County Agricultural Society, which owns nicely located grounds near North Vernon. The following are the present officers: John W. Coryea, President; Jas. B. Smith, Vice-President; Geo. W. Swarthout, Secretary; Joseph Hole, Treasurer; Charles Brenner, Marshal. The Patrons of Husbandry have a number of working granges throughout the county. This county does not contain any very large tract of fertile lands, yet the lands average in fertility with those of many other counties in the State. The "Flats," when properly cared for by drainage, will in time become the most valuable lands in the county. These lands are not subject to denudation by washing, and whatever fertilizers they may receive as plant food, will afford a generous return. The good effect of adding fertilizers has been noticed for a number of years.

The "Flats" are in the main composed of cold, tenacious clay soil, and without drainage are rather unremunerative,

except for meadow land ; yet by reason of the drouth of 1874, they yielded good corn crops. The past season was too wet, rain continuing almost unabated for forty-two days.

As a general rule, the rolling lands bordering the numerous streams are more productive than the "Flats." Bordering on Sand creek, North and South Fork of the Muscatatuck, and Big and Little Graham, are rich alluvial bottoms yielding bounteous corn crops. In fact, all the small streams of Coffee creek have more or less of such lands along their border.

The principal productions are corn, wheat, oats, rye, buck-wheat and hay. The wheat, oats and hay crop was almost an entire failure this season, on account of the continuous rains at harvest time.

A considerable area is in pasture, and large numbers of mules, horses and cattle are raised for the Cincinnati and other markets. Large numbers of hogs are also fattened for various markets. The disease known as hog cholera is quite prevalent this season, and the most practical farmers attribute the disease to parasites, which find lodgment in the intestines of the hog, and finally develop themselves into worms, which destroys its health and terminates in death. Wood ashes, salt and sulphur are considered good preventives.

#### MILK TRADE.

Milk was first shipped by rail to Louisville from Clarke county in 1873. During the present year (1875), Elisha Carr has shipped from that place over \$3,000.00 worth of milk. Paris, in this county, is also beginning to ship considerable milk.

#### FRUIT.

The usual varieties of summer and winter apples do well ; occasionally, cherries and pears. Peaches are not extensively grown. Wild blackberries are quite a source of income at some points, also wild grapes. Strawberries are successfully grown about Butlerville.

## TIMBER.

Jennings county was formerly covered with a very heavy growth of timber. The timbered lands of this county may be classed under two heads; first the "flats," which were originally covered with large and tall timber: white oak, beech, gum, soft maple, burr oak, hickory, and some other varieties, with a thick undergrowth in many sections, interwoven with native grape vines. The undergrowth is the thickest on the wet "flats," where the beech was almost entirely killed by the heavy frost of May 8, 1833. In some sections, the tops of the white oak timber was killed. The frost of that spring was late and severe, killing all the fruit in this section of the State, except a few late varieties of apples. Second, the rolling land, where the timber is white oak, black oak, beech, sugar, linden, ash, black walnut, white walnut, cherry, poplar, with an undergrowth on rich bottoms of pawpaw, and an occasional large sassafras. On the land of Joseph Hole, Esq., bordering the South Fork, are two sassafras trees, the first measuring four feet in diameter four feet from the ground, the other somewhat less. These trees stood near each other. The first tree was cut for saw stocks and shingles; the top of the last cut, forty feet from the stump, measured three feet in diameter. On the bottom lands along the streams, sycamore, hackberry, elm and buckeye flourish. These forests have, as a general thing, been stripped of the best timber. The white oak has been extensively cut for staves, the upper parts of the trees being left to decay upon the ground. In some sections the native forests remain almost untouched, and from these we can form some conception of their vigorous growth.

There are a number of saw and grist mills throughout the county, which will be mentioned with the towns in which they are located.

## MINERALS.

The principal minerals of value in this county are, building stone, limestone for lime, brick and tile clay. The continuous beds of North Vernon blue limestone are



very valuable and extend over a large area of the county, as already stated. The amount of this stone quarried this season for the Cincinnati Southern railroad bridge, over the Ohio river, besides a great many other shipments which are constantly being made from the various quarries, has given employment to a large number of hands within the county. The layers of blue limestone will, alone, in the course of time, bring an immense revenue, while immediately below are the white limestone layers which afford good material for white quick-lime. Quick-lime is now manufactured at Scipio by Daniel Miller, and by Christopher Harman east of Old Vernon on the J. M. & I. railroad, and at other points. Below the white limestone are the Niagara rocks, which are noted for making good lime, and for building and flagging purposes. Good ocherous clay, suitable for red brick is found convenient to all the large towns. Good bricks are burned at Old Vernon, also at North Vernon. Sand for all ordinary purposes is to be found along all the streams throughout the county.

#### GOLD.

Some particles of gold have been panned from the bed of the south fork of the Muscatatuck. This gold ("color") was found in combination with the black sand washed down from the glacial drift of the uplands. The excitement occasioned by this discovery was very great at the time, and some useless labor was spent in sinking a shaft, as the drift and accompanying gold dust was foreign to the State. It was useless to penetrate limestone strata below in search of it. A small per cent. of gold is mingled with the "drift" throughout the State.

#### MANUFACTURES AND IMPORTANT TOWNS.

Vernon, the county seat, has a very romantic situation on the bluffs of the Muscatatuck, at the junction of the North and South Forks. It is a town of 500 to 600 inhabitants, and has railroad communication by the J., M. & I. railroad. The court house is a very nice brick structure,

ornamented with white limestone from the surrounding quarries. It was designed by Isaac Hodgson, Esq., of Indianapolis.

The leading industries of the place are: R. Lovett, spokes and hubs; J. H. Wagner & Co., foundry and plow shop; S. Vawter, stave and heading factory; Doll, Reynolds & Co., woolen and flour mill; Cotton & Reade, wagons, buggies, pumps and rakes; M. Butler, plow manufactory. *Vernon Banner*, C. E. Wagner, editor and publisher. One mile east of Vernon is the Tunnel mill, owned by Wm. H. Sidell and Robert Manville. This mill is engaged in the manufacture of various grades of wrapping paper from straw and rags. The brand is the Tunnel Paper Mill, Manville & Sidell, Vernon, Ind. Wheat and corn are ground at this mill. The building is a three and a half story stone structure; the power is obtained by water from the creek above, brought through a tunnel 300 feet in length and 20 feet fall.

North Vernon is situated at the junction of the Ohio and Mississippi railroad, the Louisville branch, and the crossing of the Madison branch of the J. M. & I. railroad, and is a city of 2,500 inhabitants. The manufacturing interests are: Tripton Flour Mill, by Eldro Hicks; H. Meyers, furniture and planing mill; Tripp, Jones & Brougner, woolen mill; Fred. Evans & Co., chair and furniture factory; Thomas C. Jones, chairs; Barnard Haily, wagons; Whitesell & Bro., wagons; also, harness shops and cigar factories.

The various religious denominations are represented by the Methodists, Presbyterians, Catholics and Baptists. Good schools are also located here.

Scipio is situated on the J., M. & I. railroad. Here the Scipio white lime is burned by Daniel Miller.

Queensville is located on the same road between this and North Vernon.

Paris is an old town, situated on the bluffs of Graham creek.

Paris Crossing is on the O. & M. railroad, and has a merchant mill owned by Harvey Hartwell.

Commiskey, Sherman and Lovett are located on the O. & M. railroad, south of North Vernon.

Butlerville and Nebraska on the east. Two large saw and lath mills cut a large amount of building material at Butlerville, owned by Thomas Bewley. Woolf & Neale have a mill at Nebraska.

Zenas is situated on the North Fork, Columbia township.

Brewersville, on Sand creek, has a saw mill owned by John E. Calhoun.

Hardinburg, on the O. & M. railroad, has a merchant mill.

#### OIL AND GAS WELLS.

During the coal oil excitement some years ago, a bore was sunk at North Vernon to the depth of 915 feet without finding oil. Two other bores were sunk at the Tunnel Mill east of Old Vernon. In the first at the depth of about 100 feet, gas was struck which ignited and burned 12 hours, when it was extinguished. This bore was abandoned and another sunk near by to the depth of over 900 feet without any beneficial result.

#### CONCLUSION.

In conclusion, I desire to return my thanks to the citizens of Jennings county for courtesy and favors. Space will admit of naming but few: P. C. McGannon, Auditor of Jennings county; Joseph B. Smith, Queensville, Edward Marsh, Six-Miles, Charles J. Corgell, Vernon, County Commissioners; T. O. Johnson, John N. Marsh (Editor *Sun*), Col. H. Tripp, W. C. Norris (Editor *Plaindealer*), T. J. Snodgrass, Gallus Kerchner, North Vernon; B. F. Russell, M. D., Solomon Deputy, W. Davis, Paris; W. H. Conner, Sherman; E. P. Nellis, J. M. Lyle, M. D., Commiskey; John S. Thomas, Lovett; H. C. Bruner, J. P. Swarthout, Hardinburg; E. L. Parker, Queensville; Thos. Wilkerson, James H. Wilkerson, Scipio; John E. Calhoun, Daniel Bacon, Brewersville; R. A. Johnson, Zenas; J. A. Grinstead, S. Elliott, Nebraska; Mr. Sutton, Joseph Hole, C. D. Shank and Harry Gibson, Butlerville.