

## GEOLOGICAL SURVEY OF NEWTON COUNTY.

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Newton was one of the last counties organized in the State. Situated in the midst of the great northwestern prairie district of Indiana, it long formed a part of Jasper county, and it was not until 1860 that it was organized separately. It is bounded on the north by Lake, on the east by Jasper, south by Benton county, and on the west by part of the eastern boundary of the State of Illinois.

Kentland, the county seat, is situated on the Logansport and Peoria Division of the P., C. & St. L. R. R., and is about one hundred miles northwest of Indianapolis, five miles from the Illinois line, and two miles from the southern boundary of the county. The only other towns of any size are Goodland, in the southeastern corner, and Morocco, near the center of the county.

Newton county contains 400 square miles, of which the number of acres subject to taxation is 252,079, with an additional area of wet and swamp lands, in part belonging to the State, and not taxed, of about 2,000 acres, making a total of 254,079 acres.

The whole of this area was originally about 66 per cent. prairie, and at that time the number of acres in good timber was about 60,000; to which may be added about 25,000 acres of brush and small timber.

The Kankakee river flows from east to south of west along the whole of the northern boundary, forming the dividing line between it and Lake county. Throughout its whole course it is sluggish and tortuous. The Iroquois river flows across the county in a nearly west direction, through the southern half, while Curtis creek flows in a general southeasterly direction

near the east central part, joining the Iroquois in Jasper county, and Beaver creek (the former outlet of Beaver lake) runs south and west through the central parts into the State of Illinois.

These were originally strong streams of water, with a full flow, generally yellowish in color, from the decay of vegetable matter on its banks and from the iron in the marshes and swamps, while from the present constant source of supply of water they are not addicted to extreme very low stages or to sudden overflows. Their waters being of gentle current and muddy bottoms, are well adapted for the homes of non-migratory fishes, especially of the lake type; hence the Kankakee, Iroquois, and other streams are the delight of fishermen, who are rewarded with the best and brightest of the finny race.

Beaver lake, near the central part of the county, was formerly drained in a south and west direction by Beaver creek. Its original area was about 25,000 acres, having a depth of from two to six feet, averaging about three and a half feet. It was drained by the State ditch from its northern extremity into the Kankakee river, and now the area covered with water is less than 1,000 acres. Of this original lake bed, 2,500 acres are at present in cultivation, while the balance is being rapidly drained and prepared for tillage.

Little lake, in the southwestern, and Mud lake, in the northwestern corner of Colfax township, are smaller bodies of water, lying south and east of Beaver lake.

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## SURFACE CONFIGURATION.

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The general aspect of the county is a great plain, being an elevated plateau well up toward the summit of the glacial drift.

Since, and during that epoch in geological history, the surface has been molded by sluiceways from melting ice and the waters of the present actual streams, formerly in greater volume. This has resulted in the formation of wide valleys, through which all the streams flow, with intervening ridges of from fifty to eighty feet above the valley centers.

The ridge dividing the waters which flow into the Iroquois from those of the Wabash system, is close to the southern boundary of the county. Another important ridge, not quite so well defined, divides the Iroquois from the Kankakee.

These ridges afford ample facilities for the drainage of the northern and central districts; which will be treated further on, under the head of "Economic Geology."

In the northern third of the county, the soil is largely composed of loose sand; hence, while it is not so well adapted to ordinary agricultural purposes, yet for special crops, with manures, it has been found productive and profitable.

This last district is palpably lacustral in its characteristics. Sloughs, swamps and marshy thoroughfares indicate the old beds of lakes, while the sandy divides between them show the ancient shore lines. But, significant of that time of many lakes, the whole region is traversed by sandy ridges on the northeastern shore of such lakes, having an invariable trend from northwest to southeast, with sloping sides to the southwest, and abrupt banks to the northeast. Heretofore it has been supposed that these were simply the shore lines of such bodies at different stages of water.

The foregoing circumstances, however, added to a careful examination of the fact that these sand ridges are not laminated as by a deposit by water, show that their origin is due to other causes.

The prevailing summer and autumnal winds at that time, as at present, were from the southwest. It is well known that loose sand is rapidly and powerfully drifted before a strong wind, as is seen at the "Hoosier Slide" and adjoining regions at Michigan City, as well as in the *donnes* or sandy lands of France. Hence, in the direction from which the winds came, the slope of these sand ridges faces toward the southwest, and their abrupt bank is opposite to it, or toward the northeast.

At occasional points, where an uninterrupted wind impinged against these ridges, or where the grass and brush had been removed by Indian encampments, or by the passage of herds of buffalo, a break would occur upon the surface; the loose sand would be subjected to the action of the winds, and portions of such ridges would be blown away, to be built up in the shape of new ridges, or mounds and hillocks, leaving behind cup-

shaped basins or hollows, at the place of removal. Instances of such action may be seen all along the eastern and southeastern ridges surrounding Beaver lake. These knolls and sharp conical mounds naturally attracted the attention of our mound builder predecessors, and are sometimes mistaken for their own handiwork.

On the divide between the Kankakee and the Iroquois are ridges, knolls and areas, underlaid by good beds of gravel, which had scarcely been noticed until the time of my visit. This matter, of considerable practical value, will be noticed under the head of "Economic Geology."

### RECENT GEOLOGY.

The surface of the county is so deeply covered with soil, sand and loam, which had their origin in causes still in action, such as lake, river and pond deposits, that but little study is afforded of the greater modifying causes of the glacial and ancient lacustral epochs. The presence of the great ice drift is attested by the boulders, gravels, and imported rocks from the distant North, as seen in the ditches and hillsides of this region, as well as occasionally in the open prairies. The deep wells throughout the county pierce the great boulder drift or clays of the "Ice age," and there is found a constant bed of this material covering the underlying rocks to a depth of from 60 to 150 feet or more. This would indicate that powerful denuding currents swept from east to west over the county, cutting out deep, wide valleys in the rocky beds below, and removing remarkable amounts of stony material.

Following upon this came the great northern ice flow, which filled up these valleys, and deposited its immense burden of clay, boulders and gravels upon the surface to the depths mentioned above.

The phenomena of these ancient erosions and denudations and the replacement of the surface of the county are indicated by the following sections of bores and deep wells:

*Section in Alex. J. Kent's Well.*

Section 22, township 27 north, range 9 west, one mile north-east of Kentland, bored 1869 and 1870.

Soil, black.....	2 ft. 06 in.
Gray clay, bowlders.....	10 00
Boulder, blue clay.....	70 00
The same, with partings of sand and fine gravel..	100 00
Black slate, with bituminous partings.....	70 00
Devonian limestone.....	20 00
Upper Silurian limestone.....	48 00
Total.....	320 ft. 06 in.

*Section in Kentland Well, Public Square.*

Section 21, township 27 north, range 9 west.

Soil.....	2 ft. 00 in.
Blue glacial clay.....	148 00
Black slate.....	73 00
Devonian limestone.....	25 00
Upper Silurian limestone.....	120 00
Total.....	368 ft. 00 in.

Water flowed at 300 feet.

*Section at Kent's Warehouse, Kentland.*

Section 21, township 27 north, range 9 west.

Soil.....	2 ft. 00 in.
Blue boulder clay.....	80 00
Black slate.....	80 00
Total.....	162 ft. 00 in.

No water.

*Section at Kent's Farm, Two Miles Southwest of Kentland.*

Section 29, township 27 north, range 9 west.

Blue clay.....	50 ft. 00 in.
Hard limestone.....	00 00
Total.....	50 ft. 00 in.

*Section at Kent's Farm, Four Miles Northeast of Kentland.*

Section 18, township 27 north, range 8 west.

Blue clay.....	50 ft. 00 in.
Water, in limestone.....	3 00
Total.....	53 ft. 00 in.

*Section at Besicker's.*

Section 14, township 28 north, range 10 west, 8 miles north-west of Kentland, 1½ miles east of State line.

Soil.....	3 ft. 00 in.
Yellow clay.....	6 00
Blue glacial clay.....	156 00
Gravel and sand.....	6 00
Total.....	171 ft. 00 in.

*Section at Mark Petersen's Farm, Eight Miles Northwest of Kentland.*

Section 11, township 28 north, range 10 west, half a mile east of State line.

Soil.....	2 ft. 00 in.
Yellow clay.....	6 00
Blue boulder clay.....	154 00
Fine gravel.....	6 00
Sand.....	2 00
Total.....	170 ft. 00 in.

*Section at P. Strickler's, Ten Miles West-northwest of Kentland, Half a Mile West of State Line.*

Soil.....	3 ft. 00 in.
Yellow clay.....	4 00
Yellow sand.....	1 00
Blue boulder clay.....	117 00
Black slate.....	25 00
Limestone, Devonian.....	35 00
Limestone, Silurian.....	10 00
Total.....	195 ft. 00 in.

*Section on Same Farm.*

Soil.....	3 ft. 00 in.
Blue clay.....	122 00
Water, in black slate.....	1 00
Total.....	126 ft. 00 in.

Other wells in the adjoining regions of Illinois give slate and limestone at 110 to 125 feet, showing the deep erosion of the ancient Valley of the Iroquois from northeast to west-southwest, and invites drainage in that direction.

*Section at W. C. Russell's.*

Section 14, township 28 north, range 10 west, 8 miles north-west of Kentland.

Soil and drift.....	125 ft. 00 in.
Black slate.....	10 00
Total.....	135 ft. 00 in.

*Section at J. V. Speck's.*

Section 13, township 27 north, range 10 west, 5 miles north-west of Kentland.

Four wells, 55 to 86 feet in blue clay; wood and plant remains, with brown swamp muck at bottom.....	80 ft. 00 in.
Sand and gravel.....	6 00
Total.....	86 ft. 00 in.

Did not go down to slate or stone.

This would indicate the ancient or early river bed south of Speck's and north of Kentland.

In the Iroquois valley many wells have been bored close along the stream; all of these, so close to the river that the high water backs up to them, flow the year round. All are charged with iron and some with burning gas.

*Average Section in Wells, Four Miles North of Kentland.*

Soil.....	2 ft. 00 in.
Quick sand.....	12 to 15 00
Blue clay.....	30 00
Hard-pan gravel.....	5 00
Blue sand.....	4 00
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Total.....	56 ft. 00 in.

This average section indicates a great thickening of fluviatile deposits, and suggests the possibility that the channel of the Iroquois is being filled up.

*Section at Isaac Eastburn's.*

Section 23, township 27 north, range 10 west, 4 miles west of Kentland at State Line.

Black soil.....	3 ft. 00 in.
Yellow clay.....	6 00
Blue glacial clay.....	25 00
Blue glacial clay with partings of sand.....	46 00
Gravel and fine sand.....	3 00
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Total.....	83 ft. 00 in.

The foregoing wells were bored by David McKenzie, to whom the Survey is indebted for the statements here given.

*Section—Average of Twelve Wells Bored by Hyer Brothers in and near Kentland.*

Soil.....	2 ft. 00 in.
Yellow clay.....	10 00
Blue glacial clay.....	45 00
Sand, sharp.....	2 00
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Total.....	59 ft. 00 in.

Water rises to within eighteen or twenty feet of the surface.



*Section in Drake's Well.*

Section 25, township 27 north, range 9 west.

Soil.....	1 ft. 00 in.
Yellow clay.....	12 00
Blue glacial clay .....	20 00
Gravel and sand.....	2 00

Total.....	35 ft. 00 in.
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Artesian flow.

*Section at Ed. Brush's, Three Miles Southwest of Kentland.*

Soil.....	2 ft. 00 in.
Yellow clay.....	7 00
Sand and gravel.....	4 00
Blue clay.....	68 00
Hardpan gravel.....	4 00
Limestone.....	1 00

Total.....	86 ft. 00 in.
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In this bore, artesian water rises to level of the ground.

*Section at Ezra Jones', near Brook, Eleven Miles Northeast of Kentland.*

Soil.....	2 ft. 00 in.
Yellow clay and sand.....	10 00
Blue glacial clay .....	45 00
Sand.....	1 06
Rock bottom.....	00 00

Total.....	58 ft. 06 in.
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*Section in Gas Well, Francis Lowe's, One-Quarter Mile Southwest of Kentland.*

Soil.....	2 ft. 00 in.
Yellow clay.....	10 00
Blue clay.....	45 00
Quicksand .....	12 00
Black slate bottom.....	00 00

Total.....	69 ft. 00 in.
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Burning gas was discharged with violent periodic bursts, throwing sand and water thirty feet in the air. When gas was discharging, the tube trembled with agitation, and the outer tube became electrified, giving shocks.

Another gas well in the town continued to discharge for twelve years.

From these bores it is evident that the ancient valley of the Iroquois river existed one to two miles south of its present bed, and had a depth below the surface from 150 to 200 feet, deepening to the west. It is also known by a bore near the south line of Iroquois county, Illinois, that one of these ancient east-west valleys had a depth of 500 feet through soil and boulder drift to its rocky bed.

These indications seem to show that a new bed for the Iroquois, opened one or two miles south of the present channel, and produced across the line to some watercourse 100 to 150 feet lower than the present surface of that valley, would cut for itself a deep channel through the clay sub-stratum, drain this and adjoining regions to the east, and benefit the citizens of this section of country, and the State of Indiana, to the extent of millions of dollars.

At the thriving village of Morocco, Lowden & McCorcle have established an extensive creamery for the manufacture of butter and the shipment of that product and milk to the Chicago markets. A good supply of fresh water was necessary, hence a bore for a well was being put down, but unfinished, when visited.

*Section in Well at Morocco.*

Yellow clay.....	14 ft. 00 in.
Blue clay.....	113 00
Niagara limestone to bottom.....	9 00
Total.....	136 ft. 00 in.

## PALEOZOIC GEOLOGY.

As before mentioned, nearly the whole surface of this county is deeply covered with glacial drift impenetrable to the geologist's eye. It is known from the geology of the adjoining regions to the north, and from deep bores, that the northern part of the county is underlaid with Niagara limestone of the Upper Silurian age; that the Valley of the Iroquois is underlaid by Genessee shale (or black slate) of the Devonian age. Inferentially, the southern portion of the county should be underlaid by rocks of the Upper Devonian Groups, or of the Sub-Carboniferous age.

But three and a half miles southeast of Kentland the rocky beds come to the surface, or nearly approach it, over an area of more than 100 acres. At one of these exposures the bedding is nearly horizontal—at the other, in close proximity, the rocks were in nearly a vertical position, with a north-south trend, showing either serious dislocations or deposition under circumstances which gave origin to the most pronounced false bedding.

At the latter station the stone was a slightly crystalline, bluish-gray limestone, with great nodules of *cone-in-cone* one to two feet in diameter, indicating pressure of superimposed material while it was in a plastic condition.

At the time of my first visit, accompanied by Assistant George K. Greene, after a most careful and thorough search, not a single fossil, or fragment of a fossil, was found which could determine the age of these rocks.

On a subsequent visit, Mr. Greene was able to find, at one of these—McKee's Quarry (Sec. 25, T. 27 N., R. 9 W.)—some slabs, containing the following fossils:

<i>Tetradium fibratum</i> .....	Safford.
<i>Zygospira modesta</i> .....	Say.
<i>Streptorhyncus</i> .....	Sp.?
<i>Leperditia</i> .....	Sp.?
<i>Ptilodictya</i> .....	Sp.?
<i>Orthoceras</i> .....	Sp.?

Fragments of stems of *Glyptocrinus*.

These fossils indicate that the rocks are Silurian, and probably of Lower Silurian age. The mass is too large to admit of explanation by its transportation during the Ice period; while the uniform, undisturbed condition of the strata of this and adjoining States will not allow the presumption of upheaval and such dislocation of strata as would account for these phenomena.

As shown by the bores reported, it is surrounded to the north and west, and at levels 150 to 200 feet lower than this point, by later Devonian shales and limestones; on the south and east, still at a lower level, are the rocks of the Keokuk Group of the still later Carboniferous age.

This quarry is a mystery. Its investigation invites and will reward the future geologist, who may be enriched with better light than is now available. At present the only explanation which can be here given is that once the Silurian rocks of this and adjoining regions may have been built up to a thickness of 200 or 300 feet more than they are at present, and that eroding forces at the close of the Silurian age removed all the upper beds of that age to a depth of 200 or 300 feet, leaving this small area an immovable island in the surging waters, and afterwards the later Devonian and Carboniferous beds were deposited around and against the sides of this monumental island. More light and research is needed and invited.

Near Goodland, eight miles east of Kentland, the following exposures occur upon Cherry creek, which show the occurrence of the Keokuk and Knobstone shales of the Sub-Carboniferous, and the black slate of the Devonian rocks.

*Section on Blake Wilson's Farm, Grant Township.*

Section 25, township 27 north, range 8 west.

Buff and light-colored limestone (Keokuk), containing Geodes, fragments of Crinoid stems and Bryozoans.....	12 ft. 00 in.
Knob shale with <i>Discina newberryi</i> and <i>Lingula spatula</i> .....	5 00
Total.....	17 ft. 00 in.

*Section on William Foster's Farm.*

Southwest one-half of section 25, township 27 north, range 8 west.

Blue clay and shaly limestone (Keokuk group), containing Geodes, geodized shells and Crinoid stems.....	4 ft. 00 in.
Ferruginous sandstone, containing <i>vermiform fu-</i> <i>coids</i> and <i>Taonurus</i> .....Sp?.....	6 00
Total.....	10 ft. 00 in.

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## ARCHÆOLOGY.

Stone implements of the Prehistoric age are often found scattered over this county, more especially those used for the taking of fish. While the sand-hillocks and knolls of the northern part of the county are often mistaken for works of the Mound Builders, it is true that many such elevations have been capped by the homes and tumuli of that race. The elevated sandy ridge east of the southern part of Beaver lake, built up by the winds to a height of seventy or eighty feet, which gives a wide outlook toward the rising sun and a grand view of the lake in its ancient dimensions, was extensively occupied by the Mound Builders.

Several clusters are reported, one of which contained seven mounds from two to twelve feet in height, and from twenty to eighty feet in diameter. Partially explored, two of these gave up bones, pottery and implements of our extinct predecessors.

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## ECONOMIC GEOLOGY.

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### SOIL.

The soil of the southern half of the county is a rich, black pond alluvium or mold, varied by areas of loamy soil. It has been enriched and manured by the decomposition of plants for

thousands of years, and is fully equal to the richest and best lands of the world. No manures are used or required. Since the first settlement, these farms, instead of deteriorating, have increased in productive power, and will continue for years to grow richer and better as the country is improved. The oldest fields of the county were seen bearing full crops of corn, oats, and other cereals, while it is even better adapted to the growth of grazing and meadow grasses.

The citizens are generally prosperous, as indicated by comfortable residences and improved farms.

The northern areas, as before mentioned, are sand ridges, sandy loams, with intermediate alluvial lake basins. These need special treatment, and are being cultivated by immigrants from Chicago and the East with astonishing success.

#### DRAINAGE.

To enable the farmer to reap full returns from the rich soil above mentioned, drainage is a necessity. The alternate ridges and valleys of this county afford a certain mode of effectually bringing these soils to the highest state of cultivation by the facilities they offer.

A plan devised by a competent engineer—running open ditches from the southern part of the county to the Iroquois, or from the northern ridges to the neighboring streams, located upon each north-south section line, and cut down to the underlying clays, will, by their pronounced fall, continually deepen and clear their own way. These will afford ample facilities for the use of tiles on adjoining lands, make improved roads possible along their banks, and bless the people of the county with bountiful returns of health, wealth, and their concomitants—intelligence and morality.

Bores in deep wells show that the ancient valley of the Iroquois, a short distance south of its present course, was in early ages deeply eroded, and when a new course is reopened through this channel, as in the future it may and will be, it will offer ample facilities for the drainage of all the center of this and the southern parts of Jasper county.

## RAILROAD FACILITIES.

The Logansport & Peoria branch of the P., C. & St. L. Railroad gives facilities for the shipment of produce and the importation of coal and other necessary commodities through the southern half, while the Chicago & Indianapolis Air Line traverses the northeastern part of the county.

The Goodland & Chicago Railroad, now in process of construction, passes through the eastern parts, and another line is projected by way of Kentland, north, through the center of the county. The proposed Continental Railroad passes in an east-west course along the Iroquois Valley. These roads will afford abundant facilities for external commerce.

## ROADS.

In time of wet weather the roads of this county are simply abominable, and deny the citizens the proper enjoyment of civilization, the fruits of labor and social life.

With the system of open ditches before mentioned, a possible road bed is attainable. The stone of McKee's quarry, when properly broken, will afford abundant material of excellent quality for "metaling" the highways of the southern part of the county.

Throughout the region north of Kentland, the common excuse for the impassible roads was the lack of material with which to improve them. Upon examining the knolls and dividing ridges north of the Iroquois, beds of gravel from *six* to *twelve* feet in thickness were found, near to and south of Morocco, at Kennedy's and A. Doty's. Four miles southeast of Morocco, in Sec. 31, T. 29 N., R. 8 W., there is a gravel hill having an area of ten acres, indicating a good supply, as also on the land of G. W. Carmichael. This gravel is the detritus of the boulder drift, and of such quality as to offer the best possible material for constructing turnpikes and other good roads.

Other beds exist along the whole course of this ridge, and the supply is sufficient to afford good roads, passable at any season of the year in every part of the county. It seems strange that this bounty of nature, this grand source of comfort has hitherto been so constantly overlooked.

## CLAYS.

Clays, for brick and tile, of good quality, are found in all parts where heavy growths of timber have existed, and in some of the island groves; they invite use by the prudent builder and farmer.

## CEREALS AND GRASSES.

On rolling lands, or those partially ditched, the crops of corn, wheat and oats were excellent, showing heavy and profitable yields. Sorghum is cultivated and does well, while the cultivation of flax-seed could be made profitable.

The black lands, in a state of nature, were covered with a luxuriant growth of wild grass, and when subdued they readily set to tame grasses, including blue grass.

## FRUITS.

The more elevated sandy hills and ridges are well suited to the growth of fruits. Grapevines and the small fruits are especially productive and profitable, and meet a ready market in the city of Chicago.

## GARDEN VEGETABLES.

These grow luxuriantly in the warm, rich soils of this county, with profit to the farmer and joy to the housewife. The remuneration in their cultivation invites the devotion of larger areas to this purpose.

## GARDEN SEEDS.

Several farms in the northern parts are devoted to the raising of garden seeds for the great dealers in Michigan, New England and the Eastern seaboard. The choicest grades of seeds, raised on Indiana soil, are bettered(?) and largely improved(?) by shipment from hence to the great dealers, who *return* them with flashy show-bills, well-engraved envelopes and doubled prices!

The garden seeds produced here are equal if not superior to those raised elsewhere, and return a handsome profit, or 200 to 300 per cent. upon the labor bestowed.



## FISH AND GAME.

The streams of this county are filled with the most delicious of lake fish, while the woods and swamps, in season, are crowded with game. Fishing and hunting stations abound along the Kankakee and adjoining waters, and trips to these regions afford rest, pleasure and healthful exercise to many of our own citizens as well as people from the neighboring cities and States.

## THANKS.

Thanks are due, and hereby returned, to Captain Conner, Dr. B. C. McCain, W. W. Pfrimmer, Master Willie Drake, Geo. G. Jenkins and the citizens generally for hospitality, guidance and useful and advantageous assistance.