Prof. E. T. Cox:

State Geologist:

Dear Sir:—In compliance with your letter of instructions of 8th April, 1873, I proceeded to the northern part of the State and made examinations and collected statistics and other available information in the counties of Dekalb, Steuben, Lagrange, Noble, Elkhart, St. Joseph and Laporte, and herewith respectfully submit my report on the same.

A letter was, also, addressed to the chief officer of each Railway company having a road, wholly or in part, in Indiana, north of the Wabash river, requesting a copy of the profile and section, or that part of the road lying in this State, sent to your office. The Lake Shore & Michigan Southern Railroad Company promptly complied with the request. Letters were received from four other companies stating that they did not possess any such data. The remainder are yet to hear from.

Cordially thanking you for your kindness, I remain,

Yours truly,

G. M. Levette.

Indianapolis, Ind., 1st March, 1874.
REPORT OF OBSERVATIONS

MADE IN THE COUNTIES OF

DEKALB, STEUBEN, LAGRANGE, ELKHART, NOBLE, ST. JOSEPH AND LAPORTE.

BY G. M. LEVETTE.

The above counties lie wholly within the Boulder Drift or Quaternary epoch, and are covered with transported material to a great depth. Bores have been put down at different points in the northern part of the State, some of which reached the underlying limestone rock, of the Devonian age, at a depth of eighty-eight feet, while others have gone to the depth of two hundred and twelve feet all the way through glacial clay.

A well was sunk at Fort Wayne, and reached the limestone, (upper Silurian) at eighty-eight feet. At the town of Elkhart, about fifty miles northwest of Fort Wayne, a well was bored to the depth of one hundred and twenty-five feet, and stopped among small boulders without reaching the bed rock. About twenty-five miles west of this, at South Bend, near the St. Joseph river, three wells were sunk, varying in depth from ninety-two to one hundred and three feet. Having secured the desired artesian flow of water, none of these reached the underlying rock. Still
further west, about twenty miles, at New Buffalo, in the State of Michigan, near the Laporte county line, the Michigan Central Railroad Company bored a well to the depth of two hundred and twelve feet and reached the rock at that point. A few miles west of this, at Michigan City, within the grounds of the Northern Indiana Penitentiary, a well has been bored to the depth of five hundred and forty-one feet, one hundred and seventy-two, of which, were through the sand and clay of the Boulder Drift.

Excepting the bore at Michigan City no detailed record could be procured, of any of the deep wells within the counties named; yet the general statement regarding each well, whether made by parties who done the boring or those who paid for it, that "it was nearly all clay, a little sand or gravel on top, and now and then a boulder," develops the fact that the great bulk, more than ninetenths, of the material of the boulder drift over the northern part of the State, is a stiff tenacious clay, with boulders and pebbles irregularly scattered through it, and with occasional partings of sand and gravel. At some points this clay has become very hard and is known among miners and well borers as "hard-pan." It is perfectly impervious to water and serves as the puddled bottom of nearly all the beautiful lakes scattered throughout the counties named.

At South Bend the wells reached a stratum of water which rises to the surface and flows in steady streams, but not with any great force. The wells stop in a bed of small boulders which, probably, rest on the underlying stratified rock. Other wells have been sunk to the same horizon without reaching a supply of water. It is not, therefore, a uniform source of supply; though the success at South Bend is encouraging and their example a worthy one to those who desire a steady flow of water.

That these enormous deposits of material, equal in solid contents to a small range of mountains, and covering the whole of northern Indiana, the southern part of Michigan and the northwest part of Ohio, to an average depth of, perhaps, a hundred feet, were brought down from points
north of the great lakes by the agency of glaciers, moving fields of ice, or icebergs floating in a sea which then covered the whole Mississippi valley from the Polar Ocean to the Gulf of Mexico, is now almost universally accepted by geologists as a fixed and incontrovertible fact. The glacial hypothesis of Prof. L. Agassiz, with slight modifications, explains in a rational and satisfactory manner all the conditions existing in this section of country.

The decomposition by atmospheric agencies, and the homogeneous mixture of the great variety of materials constituting the Boulder drift, gives to this section, a soil unsurpassed in productiveness, and being unbroken by abrupt hills or deep ravines, it has offered great attractions to those who would migrate from the thickly populated communities and worn out soil of the eastern states, to some more favored spot where a home could be secured with less outlay of time and capital.

The general surface of the country is rolling, but nowhere can it be called hilly. About one-third of the territory included in these counties was originally covered with heavy timber which has been, until recently, unsparingly destroyed. The remainder being either "oak openings," as they are called, or prairies, with a few swamps and innumerable small lakes. The "oak openings" are sparsely covered with a stunted growth of white or burr oak. The soil of the prairies and "openings" is lighter, containing more sand than that of the timbered lands. Each character of soil is particularly adapted to the more perfect growth of some special crop, and when a single farm of a few hundred acres encloses the loamy clay soil of the timber, the sandy loam of the prairie, the lighter sand of the "openings" and the arenaceous muck of the drained swamp, the fortunate cultivator possesses decided advantages over more specialized localities.

On the eastern side of the district, the land, originally timbered, is largely in excess of prairies and "openings," but as we go west the proportion of prairie lands increase until on the western margin of the State the forests are
limited in extent and the prairies cover much the larger portion of the territory.

All the counties named, are bountifully watered by lakes and numberless small rills and creeks which join, one with another, and form important tributaries of some of the large and well known streams of this and adjoining states.

In the northeast corner of the State the land is, comparatively, high and the small streams, in the eastern half of the county of Steuben and the whole of Dekalb, are tributary to the Maumee river, which flows into Lake Erie; while those in the northern part of the counties of Steuben, St. Joseph, and nearly the whole of Lagrange and Elkhart, find their way into the St. Joseph river and thence to Lake Michigan. In Noble county, the small streams having their rise in the northeast corner, separate, some flowing eastward into the Maumee, some northward into the St. Joseph, and others in a southerly course into Eel river, and thence through the Wabash and Ohio rivers into the "Father of Waters." This would indicate a high crest or divide, in this region, but such is not the case; the Grand Rapids & Indiana railroad passes directly over this watershed without appreciable grades or deep cuts.

In the southwest corner of Elkhart and in the southern part of St. Joseph and Laporte counties the streams join the Kankakee river and, by the circuitous route and sluggish current of that stream, become tributary to the Illinois river and flow thence to the Mississippi. Some small streams, in the north part of Laporte county, flow directly into Lake Michigan. No plunging rapids or precipitous falls occur in any of these streams. Those in the eastern counties do not have a sufficient flow of water to furnish power worthy of note. The Elkhart and St. Joseph rivers have a very gradual and continuous fall, and where dammed, at Goshen, Elkhart, Mishawaka and South Bend, furnish in the aggregate, several thousand horse power throughout the whole year. Large manufacturing establishments are in operation at these points, and others are in
course of construction, the details of which will be more fully given under the heads of the respective counties.

This is eminently an agricultural district; but little capital being invested in manufacturing, except at the above named towns, where the hydraulic power has been utilized. The soil is easily brought from a "state of nature" to that of productive cultivation, is very fertile and yields bountiful crops of all the grains, grasses and fruits usually grown in this latitude and climate.

The following is a list of the timber trees found in this part of the State, and are named in the order of their abundance:

Beech ......................... Fagus ferruginea.
White oak ..................... Quercus alba.
Burr oak ...................... Quercus macrocarpa.
Black oak ..................... Quercus nigra.
Red oak ....................... Quercus rubra.
Sugar-tree .................... Acer saccharinum.
Elm ........................... Ulmus americana.
Poplar ........................ Liriodendron tulipifera.
White ash .................... Fraxinus americana.
Blue ash ..................... Fraxinus quadrangulata.
Hard maple .................. Acer rubrum.
Pignut hickory ............... Carya sulcata.
Black ash .................... Fraxinus sambucifolia.
Shellbark hickory ........... Carya alba.
Basswood .................... Tilia americana.
Black walnut ................ Juglans nigra.
Cherry ........................ Prunus pennsylvanica.
Sycamore ..................... Platanus occidentalis.
Sassafras .................... Sassafras officinale.
White walnut ................ Juglans cinerea.
Tamarack ..................... Larix americana.
Cottonwood .................. Populus monolifera.
White pine ................... Pinus strobus.
Coffee-nut ................... Gymnocladus canadensis.
Red cedar .................... Juniperus virginiana.
Box elder .................... Negundo aceroides.
OBSERVATIONS.

This order of arrangement is an approximation deduced from opinions given by lumber dealers and land owners in various sections of the district visited, and though nearly correct now, would have been widely at fault before the great demand for lumber for furniture and general manufacturing, had drawn so largely on the supply of walnut, ash and hickory.

Considerable deposits of bog iron ore, peat and marl are found in the marshes and low grounds and near the lakes, in some localities, a more complete account of which will be given in treating of the counties separately.

Through lines of railway have been constructed, between the east and west and the north and south, over this territory, so that almost every acre is within easy distance of some depot where all the products of the soil, forest or factory may be disposed of, for cash, at ruling market prices.

Scattered over these counties are some hundreds of lakes, varying from a few acres to several square miles in superficial area, and from a few feet to many fathoms in depth. In some instances these are fed by small streams which gather and pour into them the drainage of the surrounding country. Springs, issuing from the gravel and sand, are not uncommon along their margins. Some of these lakes have no visible outlets, while others are connected, one with another, by flowing streams and through similar outlets become tributary to neighboring creeks and rivers. They are very generally stocked with an abundance of fish, which furnish an easily obtained and wholesome article of diet to all who care to avail themselves of the privilege of taking them.

These crystal sheets of water not only offer rare attractions for boating, fishing and gunning, but lend ever varying charms to the beautiful landscape of which they form a part; and whether viewed as they lie unruffled in the haze of an Indian summer sun, or lashed to foaming fury by the passing storm, or when clasped cold and lifeless in the
embrace of winter, they are objects of unceasing interest; only awaiting the pen of a Cooper or Willis to give them well deserved fame and immortality.

The bountiful educational provision, for which Indiana has long been proverbial, is brought to the full measure of its usefulness in this part of the State. That popular fountain of universal education—the Public School—is here held as a sacred trust, entailed to the ever rising generation by the wise founders of the system, and is, alike, free to all without regard to color, sex or nationality.

Many of the pioneers, the first to follow the Indian trail into an almost trackless waste of prairie, lake and forest, are still living on the same tracts of land which their well directed toil and perseverance has transformed from primitive wildness to luxurious homes, adorned with all the appliances of modern civilization.

A marked degree of intelligence, thrift and enterprise characterized the people in all the districts visited. Neat, comfortable, vine-clad homes meet the eye at every turn. Villages and towns have sprung into existence at convenient intervals, where school houses and churches indicate the trend of public sentiment. The citizens have availed themselves of the progressive spirit of the times and gathered about them the comforts and luxuries of an advanced civilization, and on every hand is seen the evidences of a high degree of culture and refinement.

While prosecuting investigations, and traveling in the counties enumerated at the head of this paper, I was placed under great obligations, for information, attention and courtesies, to many of the citizens, among whom I will name the following:


Hon. W. J. Howard, G. Brown, County Clerk, F. W. McCartney, Dr. G. W. McConnell, John A. Cowan and Dr. W. C. Weicht, of Angola, Steuben county.
DEKALB COUNTY.


Honorable Lucius Hubbard, A. B. Miller, Editor of the “Tribune,” A. Beal, Editor of the “St. Joe Valley Register,” and T. G. Turner, of South Bend, St. Joseph county.

John Sutherland, President of the Indiana State Board of Agriculture, Dr. T. Higday, Sims Major, Editor of the “Herald,” and H. E. Wadsworth, Editor of the “Argus,” of Laporte, and Hon. F. H. Winterbotham, H. H. Walker, W. W. Higgins, Mayor, Captain E. Bennett, C. Mayne, Warden of the Penitentiary and C. A. Manning, Deputy Warden, of Michigan City, Laporte county.

DEKALB COUNTY.

Dekalb county is bounded on the north by Steuben, on the east by the state of Ohio, on the south by Allen county and on the west by Noble. This county was organized in 1836, and named in honor of Baron DeKalb, a patriotic German who espoused the cause of the American Colonies in their struggle for Independence.

The county contains 3,690 square miles. At the time of its organization the population was but little over 1,000. In 1870 it numbered 17,167. It was originally settled by
a small colony of Germans, from Pennsylvania, who have since been reinforced by brethren from the Fatherland.

The surface is neither level nor hilly, but sufficiently undulating to insure good drainage. The soil is good and well adapted to growing cereals and grasses.

Not many years ago this county was covered with a heavy forest, much of which has been destroyed in clearing the land for tillage; and the great and constantly increasing demand for lumber for building and manufacturing purposes is rapidly depleting it. Among the desirable timber trees are found White, Black, Red and Burr Oaks, Hard and Soft Maples, Hickory, Elm, Ash, Black Walnut, Cherry, Beech, Sycamore and Cottonwood. Quite an important trade is carried on in the manufacture of staves and headings of red and black oak and shingles from other timber. The great demand for black walnut, for furniture and finishing purposes, has drawn heavily on the original bountiful supply of that timber, and at the current rate of consumption many of the present citizens of the county may live to know it as the rarest and most costly of indigenous timber trees.

The St. Joseph-of-the-Maumee furnishes a limited amount of water power, three flouring mills are run by water on that stream. Several steam flouring and saw mills are in operation in other parts.

The surface is well watered on the eastern side by the St. Joseph-of-the-Maumee and its numerous small tributaries, and on the western side by Big and Little Cedar creeks which join in Allen county and flow into the St. Joseph. By this it will be seen that this county lies wholly on the eastern side of the dividing ridge, or water shed, that separates the streams which flow into Lake Erie and eastward from those which flow into the Wabash river and thence to the Gulf of Mexico. The water in the streams has a smoky color, owing to the presence of organic matter taken up from the peat beds, which are not uncommon, along the water courses in this part of the State.

Wells, sunk to the depth of eight to twelve feet, reach a
stratum of water slightly colored but palatable, yet too "hard" for laundry purposes; by sinking the wells fifteen feet further a second stratum of water is reached which is clear, cold and "hard" and in some instances slightly chalybeate; tube wells are often introduced to reach this second supply and when they are driven twenty feet further, or about forty-five feet from the surface of the ground, another stratum is found, clear but often strongly chalybeate. In the neighborhood of Auburn, the county seat, the water of the lower stratum rises in the wells nearly to the surface of the ground, and eastward of that town it is sometimes artesian.

A superior article of clay is found in various parts, free from gravel and which makes durable bricks of a uniform texture and good color. An abundance of brick clay, and the present low price of fuel compensates in a manner, for the entire absence of building or paving stone in this county.

Dekalb is traversed in an east-west direction by the Lake Shore & Michigan Southern railroad; in a north-south direction by the Fort Wayne, Jackson & Saginaw railroad and in a northeast-southwest course by the Detroit, Eel River & Illinois railroad, and in an east-west direction by the Baltimore, Pittsburg & Chicago railroad, thus affording ample transportation, in all directions, for the products of the soil and forest, and direct communication for the citizens, with the Capital of the State and all the important cities of the country.

A few of the citizens are engaged in converting the timber into merchantable forms, but with these exceptions and the necessary percentage of mechanics to supply and keep in repair the machinery and various mechanical adjuncts of an enlightened and progressive agricultural community, the population of this county devote themselves to tilling the soil.

Auburn, the county seat, is a thriving town of about one thousand inhabitants and is situated near the geographical centre, at the crossing of the Fort Wayne, Jackson &
Saginaw, and the Detroit, Eel River & Illinois railroads. The only other considerable town and commercial point in the county is Waterloo, six miles north, where the Lake Shore & Michigan Southern, and the Fort Wayne, Jackson & Saginaw railroads cross each other, and contains about fifteen hundred inhabitants.

I could not learn definitely of any mounds in the county, though stone axes, flint arrow heads, spear points, scrapers and other relics of the Mound Builders have been picked up on the surface, which would indicate that this strange people had at least hunted over this territory, though, perhaps the land in this region was, during their reign, too low and marshy to afford inviting sites for the erection of their time defying temples.

STEUBEN COUNTY.

Steuben county is in the extreme northeast corner of the State and is bounded on the north and east by the States of Michigan and Ohio, on the south by Dekalb county, and on the west by Lagrange. It was first settled by a small colony from Ohio in 1833, which has since been steadily augmented by immigration from New York and New England. The county was organized in 1837, and named in honor of Baron Steuben, a foreigner, who rendered efficient service as a general in the Federal Army during the Revolutionary War. The first census after the organization, indicated a population of two thousand five hundred and seventy-eight, which had increased to twelve thousand eight hundred and fifty-four in 1870. It contains about three hundred and thirty-five square miles and has its surface gently broken by small hills, though nowhere so much as to prevent cultivation. The general surface is considerable higher than that of Dekalb, the next county
south, the surface gradually rising from the south line to about the middle and is nearly evenly divided between timber lands, “oak openings” and sandy prairies.

The timbered lands have a heavy clay soil, which is very productive and noted for the great crops of wheat and grass which it yields. The prairies and “oak openings” are quite similar in character being sandy and light, and, in the first settlement of this part of the State, were considered less productive than the heavier soils, and rather neglected until a denser population brought all the lands into requisition, when more careful attention and comparison developed the fact that the “oak openings” equalled any other soil in the district, producing most excellent crops of all the cereals and grasses. The northern part is noted for large orchards which rarely fail to yield good crops of superior winter apples which are shipped to less favored localities.

The surface is well watered by Pigeon, Crooked and Fish creeks and their numerous small tributaries, none of which are of sufficient volume to furnish water power of any note. A number of lakes are scattered over the county, ranging from a quarter of a mile to five miles in length. Thirty-five of them are named:

Balls, Bass, Belle, Cedar, Center, Clear, Crooked, Cross, Fish, Fox, Gage, George,* Golden, Goose, Hog,* Hogback, Howard, Island, James, Jimerson, Lime, Lime-kiln, Little Turkey, Long,† Loon, Marsh, Mill, Mud, Otter, Pigeon, Pleasant,* Silver, Tamarack, Turkey and Walker.

In addition to these there are several smaller lakes known only by the names of the owners of the farms on which they are located.

All these are bountifully stocked with several species of fish which furnish the tables of the citizens with cheap, delicate and nutritious food. Among the fish taken, and perhaps the most abundant in these lakes, is the justly celebrated western game fish—the Bass, (Centrarchus fasciatus,—DeKay.) which is to the western angler what the

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* Partly in Michigan.
† Partly in Ohio.
salmon and speckled trout are to the Waltonians of the Eastern States. The water is usually clear. In some instances the shores are abrupt with the forest growing to the edge of the gravelly terrace; others are approached over a gradually declining beach of clean sand and gravel. Some are very deep, while a few, called “grass lakes” are shallow and are being gradually filled up by the growth of marsh grass and water plants around the edges. During the seasons of migration, spring and autumn, great numbers of water fowl alight here for food and rest, usually remaining but a few days, with the exception of a few individuals of the smaller species which stay all summer and breed.

The land owners of this county are awake to the importance and value of their forests in which may be found White, Black and Red Oak, White Walnut, Ash, Beech and Maple, with some Sycamore and Tamarack.

Bog iron ore has been found in the edges of a few of the marshes, but nowhere in sufficient quantity for profitable working.

Peat occurs in parts of the county and may, when the surrounding country has been denuded of its present stock of firewood, be dug and dried, or condensed and formed into convenient sizes by machinery, and used as fuel. On the shores of some of the lakes are beds of marl, several feet in thickness, made up of small fresh water shells and earthy matter. Up to the present time its use as a fertilizer has been very limited, but its beneficial effects is acknowledged by those who have tried it. Marl dug from these local deposits and burned, is a passable substitute for lime for building purposes, though not a rival of the famous Huntington and Peru brands. Before railroads were constructed through this section of the country, builders were compelled to haul lime a long distance or resort to this inferior local substitute. Its chief value will be as a fertilizer when the soil shall have been worn thin by long tillage.

Easily accessible deposits of most excellent brick clay occur in many parts of the county.
Agriculture is the chief occupation of the citizens, who are worthy representatives of the energy, thrift and intelligence which characterized their New England ancestors.

Saw mills, flouring mills, foundries, machine and other shops are scattered over the county as determined by the wants of an agricultural people.

The Fort Wayne, Jackson & Saginaw railroad crosses about the centre of the county in a north—south direction. The Chicago & Canada Southern railroad has been graded across the southern edge of the county in a east—west course.

Angola, the county seat, is a thrifty town, of about twelve hundred inhabitants, on the line of the Fort Wayne, Jackson & Saginaw railroad and is the centre of a fertile and highly cultivated district. Other thriving towns are located in the county, though the county seat is the principal commercial centre. A few small mounds are known. Just east of Pleasant lake the outlines of two can be distinctly traced; no one seemed to know whether either of them had ever been opened. On the north shore of Silver lake, twenty feet above the water, are five mounds, the largest about twenty feet in diameter and three to five feet high; some years ago J. W. Gale, with two or three friends, opened one of these and found human bones, but no stone implements. In the southwest corner of the county on the north shore of Little Turkey lake are ten small mounds. Dr. W. C. Weicht was one of a party who dug into one of these some years ago, no implements or pottery, but six different layers of human bones were found, distinctly separated by thin strata of earth; the skeletons lay on their backs, extended full length. This mound was about ten feet in longer diameter and six feet in the shorter, by five feet high.

It is doubtful whether these bones were those of any older race than the American Indians, yet it is strange that the elevated surface and dry soil of this district, with its alternations of dense forest and open or thinly wooded
prairie, and its numerous lakes, well stocked with fish and water fowl, did not offer that lost race—the true mound builders—sufficient attraction to induce them to attempt a defense of this aboriginal Eden, with some of their large and remarkable earth-works.

LAGRANGE COUNTY.

Lagrange county is bounded on the north by the State of Michigan, on the east by Steuben county, on the south by Noble and on the west by Elkhart. It was organized in 1832 and named after the country seat or villa of General Lafayette, in France. It was originally settled by New Englanders, since which time many Ohioans and Pennsylvanians have moved in. In 1840 the inhabitants numbered three thousand six hundred and sixty-four; in 1870 the census returned a population of fourteen thousand one hundred and forty-eight. The county is twenty-four miles from east to west, sixteen and a half from north to south, and contains three hundred and ninety-nine square miles.

In some parts the surface is gently rolling while in others it is quite hilly, and all, except a few small marshes, is susceptible of easy cultivation. Nearly one-half of the area was originally covered with dense forests on a heavy clay soil which, when brought under cultivation, yields good crops of the grains and grasses; the remainder is mostly "oak openings," with two or three small prairies, the soil of which is a light, sandy loam, easily cultivated and generously rewards the toil of the husbandman.

On the south side of Pigeon river, extending in a north-west and southeast course, from near the eastern boundary of the county to the marshes on the western side, is a belt of sand, varying from one to three miles in width. In the southern part, near the Noble county line, is a ridge of sand,
thirty to forty feet high and from one hundred to one hun-
dred and fifty feet wide, called the "Hog-back." It is less
than one mile long and extends from the low land, at its
eastern end, in a westerly direction, to the hills where it
disappears.

The soil and climate here are favorable to the cultivation
of the apple; orchards look well and rarely fail to yield
good crops, and thousands of barrels of winter apples are
annually shipped to eastern markets.

The cranberry thrives on the peaty soil around the
marshes in this part of the State; there are several large
"patches" in the western part of the county. The univer-
sal popularity of this fruit renders its cultivation a certain
source of revenue; considerable quantities are annually
shipped to market.

In the forests are found Red, White and Black Oak,
Poplar, Smooth and Sheil-bark Hickory, Hard and Soft
Maple, Beech, Elm, Ash and Tamarack; White and Black
Walnut were once plenty, but have been thinned out within
the past few years.

The northern and central parts are watered by Pigeon
river and its tributaries. The river flows across the county,
passes out at the northern boundary, where it enters the
State of Michigan and becomes tributary to the St. Joseph.
Elkhart river runs in a northwest direction across the
southwest corner of the county. Several beautiful lakes
occur, among which are: Adams, Atwood, Blackman,
Cedar, Cotton, Eve, Fish, Grass, Lake of the Woods, Little
Turkey, Long, Mott, Olin, Oliver, Pretty, Shipshewana,
Stone, Turkey, Twin Lakes, Wall and Wilmer, and a num-
ber of others too small to be dignified with names on the
county map.

Here, as elsewhere throughout the northern part of the
State, these lakes form an attractive and picturesque fore-
ground to the landscape, and, from the windows of the
swiftly gliding railway coach, occasional glimpses of prairie,
lake and woodland arouse the weary traveler to look again
upon the passing picture.
No extensive manufacturing is carried on here, a few flouring mills, saw mills, foundries, machine and other shops are located at different points over the county.

Clay, suitable for the manufacture of brick, is abundant and is a first-class article as attested by an inspection of those used in the construction of buildings in and about the county seat.

Bog iron ore is found in considerable quantities in the marshes, along Pigeon river, west of Lima. About the year 1850 a forge was started at Lima and worked this ore into bar iron, a very fair article was made which commanded a good price. The ore being difficult of access, and fuel (charcoal) increasing in price, the forge was abandoned about the time the Lake Shore & Michigan Southern Railroad placed this part of the country in quick and cheap communication with the iron manufacturers of Cleveland and Pittsburg.

Large deposits of peat occur in some of the marshes on the western border.

The Lake Shore & Michigan Southern Railroad crosses in an east-west direction. The Grand Rapids & Indiana Railroad passes through in a north-south direction, and the Chicago & Canada Southern is partly graded across the southern border.

Lima was the seat of Justice from the organization in 1832, until 1844, when it was moved to its present site in the town of Lagrange, nearer the geographical center. Lagrange is on the line of the G. R. & I. R. R., and has a population of over one thousand two hundred; it is the largest town in the county, though Lima and Ontario are thrifty rivals.

The section of high, undulating, lake-dotted country, of which Lagrange county is a part, does not seem to have been the home, or even the haunt, of any considerable number of the Mound-builders. One small earthwork is all that is known in the county; that is on Brush prairie, in the eastern part. It is about fifty feet across, nearly circular and raised two feet above the surface of the prairie;
near the center is a small mound, about eight feet in diameter and three feet high. An excavation made in this central mound, some years ago, exposed decaying human bones, some broken pottery and a few stone implements.

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NOBLE COUNTY.

Noble county is bounded on the north by Lagrange, east by Dekalb, south by Allen and Whitley and west by Kosciusko and Elkhart counties. The first settlements made within these limits were by emigrants from Ohio and Pennsylvania. At this time nearly every State east of Indiana, is represented in this attractive agricultural district.

The county was organized in 1836 and named in honor of Noah Noble, then Governor of the State. It contains four hundred and twenty square miles and had in 1840, at the time of the first census, a population of two thousand seven hundred and two. Its steady and healthy growth is indicated by the census of 1870, showing a population of twenty thousand three hundred and eighty-nine. The surface is diversified with hills alternating with burr oak "openings" and about evenly divided between the two; many small prairies occur and one of several thousand acres near Ligonier, in the northwest corner of the county. The soil of the timbered land is loam and clay with a stiff clay subsoil and is proverbially productive. That of the "burr-oak openings" is lighter, containing sand, is easily cultivated and is considered the best in the county. The soil of the prairie is a dark peaty loam and sand with a subsoil of gravel or sand. Corn, wheat, oats and the grasses are grown to great perfection, and apples and other fruits amply reward the attention their cultivation has received. Peat bogs or marshes occur at intervals some of which
appear to have been lakes now bridged over by the growth of aquatic plants, marsh grass and shrubbery; a few of them have become densely covered with small trees and underbrush, the tough roots of which, interlacing with each other, have strengthened the treacherous bridge and give the surface the appearance of enduring solidity. In several instances, in the northern part of the State, railroads have been constructed across these apparently solid meadows or wooded marshes which after a short term of use have sunk below the established grade, and in some cases broke through the surface crust, necessitating the construction of a temporary route around the marsh. Adding earth or gravel to the sinking road bed, to keep it up to a proper grade, increases the weight until the sinking burden has reached the bottom of the old lake and rests upon a solid foundation. In every case, thus far, these "sink holes" have been bridged over on piles driven into the solid earth, or filled by hauling in gravel until the road beds are safe. In no case was the sinking so sudden as to cause the loss of life or merchandise in transit.

White Oak is the most abundant timber tree; Red, Black and Burr Oak, Hickory, Poplar, Elm, Maple, Ash, and Beech, are still plenty; White and Black Walnut and Coffee-nut occur sparingly and Tamarack is seen in some of the swamps.

The northern part of the county is watered by the Elkhart river and its tributaries, the eastern part by numerous small tributaries of the St. Joseph-of-the-Maumee, and the southern part by some branches of Eel river. Near Lisbon in the northeast corner, is the summit or crest from which the streams run northwestward into Lake Michigan, eastward into Lake Erie and southwestward into the Wabash river.

The monotonous succession of gently undulating surface is charmingly diversified by numerous lakes, some of which are set in the emerald green of surrounding forests, while others reflect from their zephyr rippled surfaces the golden harvest of cereals grown upon the surrounding lands.
The citizens claim that this county contains more than one hundred lakes. The following are named on the county map: Bixler, Bottle, Crane, Deep, Deer, Diamond, Eagle, Engle, Latta, Long, Marl, Muncie, Round, Sand, Sanford, Sap, Silver, Skinner, Sparta, Tamarack, Tippecanoe, and Waldron, and a chain of twenty small lakes in the southeast corner.

But little manufacturing is carried on here, and we find only such shops, mills and factories as are necessary to supply the needs of an exclusively agricultural community.

The Lake Shore & Michigan Southern railroad passes through in an east-west direction; the Grand Rapids & Indiana railroad crosses in a north-south course, and the Baltimore, Pittsburg & Chicago railroad is in course of construction in an east-west course, passing near the county seat.

Albion, the capital, is situated near the geographical centre and is a thriving town of nearly one thousand inhabitants. Kendalville, in the northeast part, at the crossing of the Lake Shore & Michigan Southern and Grand Rapids & Indiana railroads, is the largest town in the county and an important commercial centre of a fertile and highly cultivated district. Ligonier, the second in size, is west of Kendalville on the Lake Shore & Michigan Southern railroad; it is a place of marked thrift and enterprise and numbers about two thousand inhabitants. Rome city, Wawaka, Brimfield, Lisbon, Avilla, Walcottville and Rochester are all promising towns, entertaining metropolitan hopes which time and well directed energy may enable them to realize.

Extensive beds of bog iron ore occur. The largest deposit is on Ore Prairie in the western part. It lies in the edge of the marsh about one foot beneath the surface, is about twenty feet wide and from four to eight feet thick.

In 1845 Messrs. French & Beers erected a Catlin forge, for reducing this ore, at Rochester on the Elkhart river in the northwest corner of the county. About the time the
Forge was completed, and before it was put in operation, the original proprietors sold to W. F. Lee of Mishawaka in St. Joe county, A. D. Webster of Rochester, N Y. and D. M. Beers of Newtown, Conn., who put the forge in blast, employing about sixty men in digging and hauling ore, burning and hauling charcoal and working the forge. About four hundred bushels of charcoal were burned in making one ton of bar iron from three tons of ore. The product was ten tons of bar iron per week which was sold at one hundred dollars per ton. Ore diggers, colliers and common laborers were paid fifty cents per day and boarded, while “bloomers” and “hammers-men” received two dollars per day and board. The tract of land on Ore Prairie from which the ore was dug, was then owned by Hon. Henry L. Ellsworth, of Lafayette, Ind., who received a royalty of twelve and a half cents per ton for all ore taken out. The firm continued in the business until the spring of 1850, when they sold to Wood & Bromley of Lagrange who carried it on a few years and abandoned the enterprise. *

Immense deposits of peat occur in the lower lands, along the marshes and over the “bridged lakes.” A partly completed “fill” of the Baltimore, Pittsburg & Chicago railroad broke through the crust of a subterranean lake, a half mile west of the town of Albion, and exposed a deposit of peat eighteen feet in thickness. Fish with perfect eyes and the colors common to the species, came up with the water, on the submerged embankment, clearly indicating that this hidden lake was somewhere connected with water exposed to the rays of the sun.

In the dim, distant future when the wants of a dense population shall demand the cultivation of every available foot of this fertile section of country and fuel shall have become the costliest item of household economy, these deposits of peat will be sources of wealth to the owners and

*For the above data am I indebted to Nelson Prentiss Esq., who was book-keeper for the Forge Co.
ELKHART COUNTY.

This county joins the State of Michigan on the north, is bounded on the east by Lagrange and Noble counties, on the south by Kosciusko, and on the west by Marshall and St. Joseph.

It was organized in 1830, and here was erected the first court house, in Indiana, north of the Wabash river. At that date, all the territory now constituting the counties of Lagrange and Steuben and the north part of Dekalb and Noble, was included in the civil township of Mongoquonong, and under the jurisdiction of Elkhart county. The census of 1830 gave (exclusive of the large township above named,) a population of nine hundred and thirty-five; in 1870 the inhabitants numbered twenty-six thousand and twenty-six, to which some thousands have been added since that date.

This county is twenty-two and a half miles from north to south, twenty-one from east to west and has an area of 472.5 square miles. It was named after Elkhart river, which received its name from an island near the mouth,
in the outline of which, the Indians saw a fancied resemblance to the heart of an elk.

A portion, perhaps one-third, of the surface was at the time of the first settlement covered with a growth of very large trees and a dense undergrowth of bushes and shrubs; the remainder is mostly "burr oak openings" and prairie, while a small percent is covered with peat bogs, lakes and marshes. The soil of the "openings" is a sandy loam with clay subsoil, and highly esteemed for its large yield of wheat and grass; after years of successive cropping this is promptly restored to its original productiveness by turning under a crop of clover. The strong clay soil of the woodland is very productive, especially of corn and the grasses. The black peaty loam of the prairies and drained swamps is famous for corn and grass, except during seasons of long drought.

Apples, grapes and other fruits are very generally cultivated and, when not cut off by late frosts, are a source of profit to the grower. Cranberries are a natural production of some of the marshes and though no attention has been paid to their cultivation, they constitute an important interest with some classes of the community. Careful planting and tillage of this important fruit, on selected ground would return as large a percent as any other crop for which the same character of soil is adapted.

The timber has been lavishly sacrificed to the great demand for economic uses, yet the following species are found in considerable quantities: Beech, White, Burr and Black Oak, Maple, Elm, Ash, Hickory, Poplar, Sycamore, Cherry and Black Walnut; Tamarack was abundant until the draining and drying of the swamps invited the prairie fires to sweep over them and destroy the timber.

The largest stream in the county—the St. Joseph river—enters from the State of Michigan, about six miles west of the northeast corner and flows in a southwest course into St. Joseph county. Its principal tributaries are Elkhart, Little Elkhart and Christian rivers; these with many other smaller streams and lakes, water every part. The drainage
is wholly into the St. Joseph, except a small district in the southwest corner, from which the streams find their way to the Kankakee river.

At Goshen, the county seat, the Elkhart river has been dammed and has a fall of eighteen feet, which, with the present average annual flow of water, gives fifteen hundred horse-power, equivalent to one hundred and fifty run of burrs. This, at present, is but partly utilized; the following are run by water: Two flouring mills, three furniture factories, one woolen, one saw and one oil mill; in addition to which, other manufacturing establishments, using steam power, are located in and about this attractive commercial point, which is surrounded by a productive agricultural district and has ample railway facilities over the Air Line branch of the Lake Shore & Michigan Southern and the Cincinnati, Wabash & Michigan railroads.

Elkhart, a rapidly growing place and important manufacturing center is situated at the confluence of the Elkhart, St. Joseph and Christian rivers, all of which are dammed at this point, affording an aggregate of eight thousand three hundred horse-power.*

Enterprising capitalists have availed themselves of this grand and permanent supply of power, and several mills and factories are completed and others in course of construction; among those in operation are three flouring, two paper and three planing mills, one wagon, one starch and three furniture factories, several saw mills and other smaller establishments. Others using steam as a motor, are located near the town; prominent among which may be mentioned the repair shops of the western division of the Lake Shore & Michigan Southern Railroad. These are extensive works and give employment to several hundred skilled mechanics. The pay roll of the Company, at this point, amounts to seventy thousand dollars per month. The principal building, of the repair shops, is six hundred feet long and one hundred and twenty wide, with four wings, each one

*Estimated by John W. Irwin, Hydraulic Engineer.
hundred feet long. The establishment is furnished with all the necessary machinery for building and repairing locomotive engines and cars. A gigantic Corliss engine furnishes, silently and uninterruptedly, the power required. In addition to these shops, the Railroad Company have, at this point, an immense "round house" for sheltering locomotive engines, foundries, store-houses for fuel and general railroad supplies, a comfortable, tastefully arranged library and reading room for employees of the company, and "quarters" for engineers and firemen when off duty. Near the junction of the Air Line Branch of the L. S. & M. S. R. R., a commodious passenger depot is located, in which the local railway officials have neat and convenient offices, and to which is, also, attached a first-class eating house where all trains stop for meals.

In addition to the fine water power furnished by the St. Joseph and Elkhart rivers at Goshen and Elkhart, other valuable mill sites are found on these streams, especially at the sylvan village of Bristol on the main line of the L. S. & M. S. railroad, at the confluence of the Little Elkhart and St. Joseph rivers. At this point the water power, of these two streams, offer facilities, for the erection of mills and factories, not surpassed in the State.

Besides the towns of Elkhart, Goshen and Bristol, the following thriving points are named in the order of their population, as reported by the census of 1870, viz.: Waukarusa, Benton, Locke, New Paris and Millersburg.

This county has, within its borders, a few lakes, the most important of which are: Boot, Cooley, Heaton, Mud and Simonton, in the northwest corner, and a number of smaller ones in the southern part. Like those in the neighboring counties they contain great numbers of fish, and are the popular resorts of picnic parties and persons in quest of piscatorial sports.

The Lake Shore & Michigan Southern railroad crosses in an east-west direction, passing into Michigan in the northeast corner of the county. The Air Line Branch, of the above road, diverges from the main line at Elkhart
running southeast through the county seat and thence to Toledo. The Cincinnati, Wabash & Michigan railroad connects with the Air Line at Goshen and is running from that point, in a southerly direction, to Marion, Grant county, with a fair prospect of being completed to Cincinnati. The route of the proposed Chicago & Canada Southern railroad crosses the southern border in an east-west course.

Extensive deposits of peat occur in the low lands; and where the bogs or marshes have been drained and the reclaimed land cultivated, the presence of peat adds a wonderful degree of fertility to the soil, returning fine crops of corn and grass. The great thickness of some of these deposits will furnish an easily cultivated soil of inexhaustible fertility for centuries to come and be none the less valuable when resorted to, to supply the demand for fuel.

Considerable beds of bog iron ore are known to exist in some of the marshes, but not in sufficient quantity to pay for digging.

Brick clay, is abundant in easily accessible beds, of both varieties for making red and buff colored brick; the latter known as "Milwaukee brick," are shipped to different parts of the country, where they are in demand for the ornamentation of public buildings, being alternated with those of a red color, or arranged to form the outlines of fanciful figures, affording a pleasant relief to the monotony of the prevailing color.

Heavy beds of marl are common, the lime from which, is so far below the standard required for durable masonry that these deposits cannot be of any economic value until long continued cultivation has reduced the soil far below its present degree of productiveness, when the demand for a fertilizer will find a corresponding supply in these calcareous deposits.

The feasibility of draining the low marshy lands in the southern part of this county, and those to the west, bordering on the Kankakee river, has been demonstrated by an organization of the citizens, and the construction of a ditch
through a marsh lying south of Elkhart. It was made five feet deep and ten feet wide, at a cost of eleven hundred dollars per mile, or about nineteen cents per lineal foot. The assessment on the adjoining land for the cost of this ditch was but little more than the value of the first crop of hay gathered from the reclaimed marsh.

Some years ago a well was sunk, at the town of Elkhart, to a depth of one hundred and twenty-five feet with the hope of securing an artesian flow of water, but the drill coming in contact with boulders, which offered a greater resistance than any material previously encountered, the projectors became discouraged and further drilling was discontinued. The material passed through, for the first twenty-five feet, was gravel, and the whole of the succeeding one hundred feet was "hard pan" or indurated glacial clay with occasional thin strata of quicksand.

No mounds or other evidences of a prolonged residence of the Mound Builders were reported in this district. The stone spear points and arrow heads, picked up from the surface, were as probably lost there by the American Indians during their hunting or hostile excursions, as by the Mound Builders at an earlier period of time, and until a definite line, sustained by conclusive evidence, can be drawn between the different implements made and used by these widely distinct races, the true history of these initial steps in the mechanic arts, must remain a matter of conjecture.

ST. JOSEPH COUNTY.

This county is bounded on the north by the State of Michigan, on the east by Elkhart county, on the south by Marshall and Starke, and on the west by Laporte. It encloses an area of four hundred and seventy-seven square miles, was organized in 1830 and was originally nearly double its present size; at that time the population was but
two hundred and eighty-seven, the census of 1870 returned
an enumeration of twenty-five thousand three hundred and
twenty-two, showing in a period of forty years a remark-
able increase for a community, which has been until quite
recently, almost exclusively agricultural. The surface of
this county is agreeably diversified with prairies, "oak
openings" and rolling timber lands; the strong, dark soil
of the latter, with a sub-soil of stiff clay is in good repute
for its unfailing yield of all the products of the farm in
this region of country. The light, sandy soil of the
"openings" is easily cultivated and rivals the former in
productiveness when the growth is not arrested by continued
drought, the same may be said of the loamy mold of the
prairies, the inexhaustible fertility of which, causes them to
rank among the most desirable farm lands in this region.
Wheat, corn, rye, oats, potatoes, clover, blue-grass, timothy
and all the fruits, adapted to the latitude, are grown to
great perfection on these varied soils. Agriculture has
here attained the dignity of a science and is studied and
practiced with an eminent degree of intelligent energy.

A few years ago numerous small tracts of low, marshy
ground, too wet for cultivation, were known in the county,
but the remarkable fertility of the soil, in these peaty flats,
has induced the owners to resort to draining by ditches, and
at this time many of them are under cultivation, producing
the finest crops of corn and hay. Kankakee lake, two
miles west of South Bend, was once surrounded by a marsh,
of several thousand acres, which has been ditched and
drained, and a large area of ones impassable peat bogs
reclaimed and cultivated, and ranks among the most fertile
soils of the State. These lands, once thoroughly drained
and, after a few year's cultivation, set in blue-grass, are
unsurpassed for grazing purposes. The black, peaty soil,
varying from five to fifteen feet in depth, is practically
inexhaustible and may be continually cropped for all time
to come.

Within two miles of South Bend, is the eastern terminus
of one of the most extensive peat beds in the world, being
three miles in width and extending westward, down the valley of the Kankakee for more than sixty miles. It varies from five to fifty feet in thickness, and when properly prepared, becomes a fair article of fuel for all domestic uses; though not a rival of Indiana block coal, or the anthracite of Pennsylvania, it is preferable to much of the sulphury clod burned in stoves and under steam boilers throughout the western states. Peat yields a fair proportion of rich illuminating gas, and probably, the time is not far distant when it will be utilized for that purpose.

The enormous consumption of wood and coal on railways may necessitate the working of these peat beds, for fuel, at an earlier date than is at present contemplated. The officers of the University of Notre Dame du Lac, near South Bend, have experimented with this fuel, and report good results.

St. Joseph county had, at the date of the first settlements a limited amount of heavy timber, but the steady drain on it for fuel and manufacturing purposes has materially reduced the original supply. In the remaining forests may be found White and Black Oak, Beech, Elm, Ash, Basswood, Hickory, Sycamore and a small quantity of Black Walnut.

Several lakes are located in the western part; the following are named on the county map: Bass, Bolins, Cedar, Chain, Clear, Cranberry, Deer, Dock, Esmey's, Fish, Goose, Grass, Kankakee, Mud, Ruples, Twin and Wharton's. Many smaller sheets of water, mere ponds, are seen, some of which have been partly drained; others are being gradually filled by the annual encroachment of grass and aquatic plants, on the shallow margins, which, in time, will fill the basins, and waving fields of cereals and grasses will succeed the polliwog and terrapin.

This county is watered by the lakes above named and the St. Joseph and Kankakee rivers and their tributaries. St. Joseph river enters a little north of the middle of the eastern boundary, runs westerly about ten miles and turns north and crosses into the State of Michigan.

Historical data points to LaSalle as the discoverer of this
river, in the year 1679. He explored the great Lakes in the "Griffin," a vessel built and launched on the Niagara river. With Hennepin, Tonti, and a few followers, he built a fort at the mouth of the St. Joseph river, then ascended that stream to the portage, near the present site of South Bend, crossed to the The-au-ki-ki or Kankakee and sailed down that stream to the Illinois.

The St. Joseph is the most important stream in this part of the State, its uniformly rapid current, unfailing supply of water and high banks afford opportunities for hydraulic power, which might be envied by the manufacturing princes of Lowell or Manchester.

In 1832, Alex. Coquillard dug a race-way from Lake Kankakee, two miles west of South Bend, to the St. Joseph river, and secured, from the flow of water, sufficient power to run a grist mill and saw mill. This power was utilized until the construction of the present dam across the St. Joseph at that point.

The prophetic vision of a few enterprising capitalists, then incorporated as the St. Joseph Iron Company, seeing the commercial value of the swift gliding current of the stream, secured the right and constructed the first dam on the river at Mishawaka,* in 1835, which still stands a monument to the skill and energy of its projectors. The hydraulic power, at this place, is equal to any on the river, and though not all utilized, is partly appropriated for running flouring and saw mills, furniture, wagon, edge tool, agricultural implement and woollen factories and planing mills.

In 1833 the "St. Joseph Iron Company" erected a blast furnace at Mishawaka and continued to make bar iron from the bog ore dug from the prairie marshes in the vicinity until 1856, when a falling off in the supply of ore caused the discontinuance of the furnace. This company still controls the hydraulic power and is engaged in various manufacturing enterprises.

*Indian word for "swift water."
About four miles west of this place, where the river makes a sudden turn to the north and forms the bend from which the town of South Bend takes its name, a dam has been erected and furnishes many eligible mill sites and a great amount of unfailing power. This has become a noted point for the manufacture of flour, furniture, paper, agricultural implements, wagons, carriages and sleighs, clover threshers, sash, doors, blinds, pumps, etc., etc.

Both this town and Mishawaka, being connected by the Lake Shore & Michigan Southern railroad with the markets of the east and west, and lying within convenient reach of the great lumber regions of Michigan, offer unusual attractions to persons wishing to engage in manufacturing. Other points on this river are as available for the erection of dams as the two above named, and the amount of hydraulic power this stream might be caused to afford, is almost incalculable.

South Bend is the county seat of St. Joseph county and has a population of over eight thousand, it is a thrifty and enterprising place and surrounded by a highly cultivated district of unsurpassed fertility.

Mishawaka, the second in population in the county, is an important commercial center, and has a population of over three thousand.

The Lake Shore & Michigan Southern railroad crosses the county in an east-west direction. The Peninsular Railroad of Michigan crosses in a northeast and southwest course, passes through the county seat and connects with Chicago and central Michigan. The Baltimore, Pittsburg & Chicago railroad is graded across the southwest corner, and the Chicago & Canada Southern railroad is projected to cross the southern tier of townships.

Bog iron ore has been found in several places in the county, and was successfully worked, for a number of years, in a furnace at Mishawaka, as stated in another part of this report. Although this ore is apparently abundant at some points, and yields a superior article of iron, yet the expense of removing the overlying earth so
increases the cost of the ore that it cannot be furnished in competition with the richer ores of the Lake Superior and Missouri iron districts. The marl beds, in this as in adjoining counties, may be resorted to for fertilizing material when the clay soil shall have been worn thin by long continued cultivation.

About a mile and a half north of South Bend, on a somewhat elevated table land, amid crystal lakes and sylvan groves, is located the University of Notre Dame du Lac.

In 1832 the Rev. Stephen D. Badin secured a large tract of land at this point, with a view of establishing the present Educational Institution, which was founded in 1842, by the Fathers of the Congregation of the Holy Cross, with the very Rev. E. Sorin at the head. By zealous devotion to the moral, social and educational welfare of the youths placed under their charge, the Rev. Fathers have raised this Institution to the front rank. Rev. A. Lemonier is President and the number of pupils four hundred and seventy.

A short distance from Notre Dame, near the St Joseph river, the Sisters of the Holy Cross (under the direction of Mother Superior, Mary of St. Angela,) have established St. Mary's Academy for the education of young ladies. This institution has attained a high rank among its rivals and opened the fall term of 1873 with an attendance of two hundred and twenty-five.

LAPORTE COUNTY.

Laporte county was organized in 1832, and is bounded on the north by the State of Michigan, on the east by St. Joseph county, and on the south by Starke and on the west by Porter. It received its name from Door (La porte) prairie which was named, by the early French settlers, from a narrow opening in the timber through which the prairie was approached. The county contains five hundred and
sixty two square miles and in 1840, the first census after the organization, it had a population of eight thousand one hundred and eighty-four, which in 1870 numbered twenty-seven thousand and sixty-two.

Though a few French were numbered among the first settlers, the greater portion of the present population trace their ancestry to New York, Pennsylvania and New England and retain, in a marked degree the characteristic habits, thrift and energy of their forefathers.

The northern part, about one third of the whole area, is somewhat broken and hilly and was originally covered with timber. White pines of large growth, occurred near Lake Michigan, which have been cut away until but few trees, large enough for saw logs are left standing. Near the Lake shore small white oaks are abundant, while further inland, on the hills, black oak and hickory supplant the first named species. The soil of the hilly portion is a stiff blue clay with occasional beds of gravel or sand, while that near the Lake is a clean white sand. The clay soil is thin and only moderately productive. Springs of clear, cold water are not uncommon among the hills, and small marshy spots and peat bogs occur on the highest lands.

The central and southern parts are mostly prairie, dotted over with groves of burr oak and pig-nut hickory, elm, sugar tree, bass wood and cherry.

The two principal prairies are Rolling and Door or Laporte. The first named lies in the eastern part of the county and the latter in the central and western part. The soil of these is a light sandy loam of exceeding fertility and easily cultivated, and, from the first settlement, has been held in high esteem for the production of cereals, grasses and fruits. These high, rolling, fertile lands, dotted over with small groves of timber for the supply of fuel and building material and being easily brought under cultivation, offered irresistible temptations to the pioneer agriculturist, and insured the early settlement and improvement of all this beautiful domain, almost every acre of which, is now enclosed and annually yields its share of some special crop.
The limited supply of timber has rendered the cultivation of hedges a subject of serious interest in this region, and here may be seen, miles of Osage-orange or Bois d'arc (Maclura aurantiaea,) hedge, very thrifty and apparently well suited to this soil and climate.

Small streams of water traverse these prairies in a southerly direction and flow into the broad, sluggish Kankakee, which runs westwardly across the southern border of the county. Along this stream there is a broad, wet marsh, a great peat bed, which is, in some places forty feet deep, and covered with a rank growth of marsh grass and flowering plants. A reasonable expenditure of engineering skill and labor would drain the greater portion of these wet lands and render them very desirable for grazing or the production of hay.

North of and near the town of Laporte, are six or seven lakes varying, from a quarter of a mile, to a mile and a half, in length and covering, in the aggregate, several thousand acres of land. They are, usually, shallow near the edges, the depth increasing as the central part is approached, and there ranging from ten to fifty feet. Some are entirely free from any growth of vegetation and are remarkably clear and mirror like when unruffled by the winds, while others, especially those which receive considerable drainage from the adjoining lands are thickly set with aquatic plants of the water lily family. *Nymphaea odorata* and *Nuphar advena* are very abundant, covering the surface of the water with their large rounded leaves and filling the lake with an enormous growth of tubers, roots and leaf stalks; compact matted masses of roots have been cut through for a thickness of six feet; this rapid accumulation of organic matter, aided by the drainage washings after every shower, will build up the bottom above the present water level and, in time, a marsh will succeed the lake.

The water chinquapin (*Nelumbium luteum*) is occasionally seen in some of the less frequented lakes, where its broad leaves furnish shelter for the smaller aquatic animals and the great white flowers share their perfume with the passing breeze.
These lakes have, recently, been connected, one with another, by a ditch broad and wide enough to allow the passage of a small steamboat—the "Viola"—which was placed there in the summer of 1873 and runs the circuit of the connected lakes, about ten miles, for the accommodation of tourists and pic-nic parties.

These, like other lakes in northern Indiana, have been subject to fluctuation of surface levels, or a gradual sinking away of the water, from five to seven feet, during a period of from six to ten years and, in turn, as gradually rising again, to or near, its original level in about the same length of time. This oscillation has continued through unequal periods of time since the earliest observation of white men, and, doubtless dates back to the time when the glacial sea retired and left these basins in their present isolated situation.

Before communication was opened, by ditching, there was a difference of levels in adjoining lakes; the water in one, at times, standing several inches higher than in the next.

The same phenomenon was observed in adjacent lakes in Steuben county.

The annual rainfall, recorded through a series of years, does not correspond to the oscillation of the water levels of these lakes, nor have they been observed to rise any more rapidly during a wet, than during a dry season, or vice versa; but rather to continue to the maximum during a period of rising, or to the minimum during a period of subsidence.

Until within the past decade these lakes have not been of much economic value to the citizens of the town or county. Beyond affording ice and fish for local use they were but little more than a cluster of glittering jewels, heirlooms of a past geologic age, set in the seasons changing tints and and lying carelessly upon the bosom of the reigning goddess—Ceres. But the constantly growing demand for some artificial means of reducing the temperature of many articles of diet and almost all beverages, has rendered the
item of ice nearly as much of a necessity during the summer months as fuel is through the winter. The uniformly cold winters of the latitude of Laporte renders the ice crop of the lakes as certain as the wheat crop of the adjoining prairies. Capitalists have availed themselves of these conditions and erected commodious houses, which are annually filled with the spontaneous winter production of the clear, pure lakes.

Cutting, storing and shipping ice has become an important industry at this place as the following statement will show.

In the winter of 1873-4, forty-five houses, holding two thousand tons each, were filled with ice, in addition to which, some thousands of tons were shipped, direct from the lake for storage in Indianapolis and elsewhere. John Hilt of Laporte and V. T. Malott of Indianapolis, own twenty-six houses and annually store over fifty thousand tons, the whole of which is shipped, by railroad, to Indianapolis, Louisville and other points. Thompson & Co. are also extensive dealers and ship the greater portion of their ice to Chicago. Several other parties have houses here and ship to Chicago, Lafayette, Indianapolis, Cincinnati, Louisville and intermediate places.

These are but the initial steps in a business which will grow with each succeeding year and become a leading interest in the commerce of this section of country, not only returning a remunerative per cent on the capital invested, but furnishing employment to the laboring classes during a season when many, would otherwise, feel the pinching hand of want.

Laporte, the capital of Laporte county, is pleasantly situated on the north side of Door Prairie, immediately adjoining the lakes referred to on a preceding page. It is a little north of the geographical center of the county, and has a population of about nine thousand. The town is growing rapidly and has recently added the metropolitan features of gas and water works. Among the manufacturing establishments may be mentioned flouring mills,
furniture, agricultural implement, wheel and sash and door factories; machine shops, where are manufactured threshing machines, portable engines, water wheels, etc., and many other minor establishments.

The Lake Shore & Michigan Southern and the Indianapolis, Peru & Chicago railways place this town in direct communication with the principal cities and markets of the country, affording facilities, equal to any in the north part of the State, for the collection of raw material and the sale of manufactured articles.

Two miles north of the town of Laporte, is the highest ridge of land in the county, which, by barometric measurement, is two hundred and seventy feet above Lake Michigan, only eleven miles distant. This crest divides the drainage which finds its way into the Lake from that which flows into the Mississippi river.

Passing this watershed, in the direction of Lake Michigan, we find a marginal belt of lower lands descending gradually to the north, the surface of which is marked with elevations known as "lake ridges," generally of clean washed sand, and lying nearly parallel to the lake shore. These ridges of sand mark the ancient shore lines of the lake, where its subsidence was arrested for a greater or less period of time.

That these successive ridges were, in turn, the shore lines of the lake, is clearly inferable, when we see the winds and waves repeating the same process at Michigan City, at the present time. Each succeeding wave brings up, from the depths of the lake, its small cargo of clean, white sand, and lands it well upon the beach. As soon as a change in the direction of the wind drives the water out and allows the sand to dry, it is carried by the same invisible force and piled up at the first atmospheric eddy produced by the trees and bushes which usually grow near the water line. The process of building up is necessarily gradual, and the well rooted vegetation reproduces itself on the top and sides of the ridge, and in the course of time a knoll, or hill, or range
of hills is formed, from one hundred to one hundred and seventy-five feet in height.

If, from any cause, this protective growth of vegetation is destroyed, the unshielded sand is deprived of moisture by the direct rays of the sun, the decaying rootlets lose their power of clasping and binding the parts together, and the loosened sand, once more at the mercy of the wind, is drifted and scattered over the adjoining country. A notable example of this is seen near the mouth of the harbor at Michigan City. The sand hill known as "Hoosier Slide," originally covered with small white oaks and other hardy vegetation, was, at the time of Prof. Owen's visit, in Sept. 1860, one hundred and seventy-five feet high; subsequently, the trees were cut away for fuel, since which time it has been an unresisting victim of the winds, and now (1874) it is but one hundred and twenty feet above the lake.

The first ridge, along the present shore line, rises above the water level from thirty to eighty-five feet, this is broken at irregular intervals by valleys, at oblique angles, and occasionally a tall peak rises many feet above its fellows, a space of half a mile succeeds this ridge, having an elevation of fifteen to twenty feet; on this is built the town of Michigan City. The top of the second beach or ridge is fifty feet, and the half mile of valley beyond is thirty-five feet above the water. The third beach is forty-five feet, the fourth is ninety-five and the fifth is two hundred and twenty-five feet above the lake. It may be remarked that the fourth beach line contains a considerable amount of gravel, perhaps indicating a fixed water level for a, comparatively, long period of time.

The shallow portions of the present lake, near the shore, are uniformly floored with sand, but in the deep central areas the bottom is composed of stiff, tenacious clay, intercalating partings or pockets of sand, from whence, probably, comes the supply which is, constantly, being piled up and drifted about the shores by the wind. It may be inferred
that the ancient lake was governed by a like law, as the railway cuts which traverse these wide, descending shore lines, frequently discover beds of clay, (the Erie clay of Canadian Geologists) and wherever this clay is pierced by wells, the supply of water is found in the sand partings.

No continuous sand ridges are found beyond the fifth from the lake, though for some distance further inland the valleys and hollows are, more or less, floored with this wave-washed material. The lakes in the vicinity of Laporte are south of the water-shed and no evidences are traceable of their having been a part of ancient Lake Michigan since the subsidence of the glacial sea.

Michigan City is the second town in size, has a population of about six thousand and is situated on Lake Michigan in the northwest corner of the county. Traill creek, a small stream coming from the hills to the south, passes through the town; the mouth of this creek has been deepened and widened and docks constructed, affording anchorage and protection to the vessels which ply between this and other ports on the great lakes. Branch railway tracks run along the docks and every facility is furnished for loading or unloading the merchandise transhipped at this point. The United States government has, at different times, made small appropriations for improving this harbor and it is now one of the best on the south end of the Lake.

Great quantities of lumber are annually received here, from the north, for shipment by rail to the interior. The following statistics were furnished by Capt. E. Bennett, U. S. officer in charge of the Harbor.

During the year 1873 the following merchandise was received at this port, for transportation inland:

45,960,000 feet of sawed lumber.
45,132,000 shingles.
19,541,000 pieces of lath.
8,300 tons of iron ore.
And for shipment, by water, to other ports, the following:

- 1512 tons of Indiana block coal.
- 1110 tons of nut coal.
- 100 tons of anthracite coal.
- 4000 barrels of lime and cement.
- 150 tons of hay.

Quantities of fish are taken in the Lake and shipped to various points to the south and west, furnishing employment to several vessels and a number of men. The fish are taken in nets which are from four to five feet wide and twenty to thirty feet long. These are carried in vessels eight or ten miles from shore and sunk to the bottom where the water is from one hundred and fifty to two hundred feet deep, buoys and flags marking the locality. White fish (*Corregonus alosa*) is the most abundant species, constituting nine-tenths of the whole number taken, the flesh of which is pure white, juicy and when properly broiled, ranks with epichures as the most delicious fish taken in western waters. The Maskinonge* or Muskalunge (*Esox estor.*) is abundant and frequently taken in nets with White-fish, and, also, Mackinaw trout (*Salmo amethystus*), both of which are highly esteemed and command a ready sale in all the markets of the west; the demand for all the species being, usually greater than the supply.

Fishing is pursued, as a regular business, throughout the year, except during the coldest winter months. For the year 1873 the shipments of fish from Michigan City were about two hundred and seventy tons, worth, at wholesale, twenty-seven thousand dollars.

Ornithologists will be interested in learning that a species of ducks known as “old wives” (*Harelda glacialis*) are

*From the Ojibwa Indian name, “Maskanonja,” meaning “long snout.”*
frequently taken in the nets, set by the fisherman, on the bottom of the lake, in one hundred and eighty feet of water. However incredible it may seem that water fowl should dive to such a depth, the fishermen assert that these birds are often found in the nets, and on one occasion they report the capture of three hundred at one haul.

The Michigan Central railroad Company have large and well arranged repair shops at this place, giving employment to a number of skilled mechanics. The Indianapolis, Peru & Chicago, and the Louisville & Chicago railroads have their northern termini here, and the latter have established a car factory and, also, shops for general repairing.

About a mile west of the town, on a dry, sandy plain, is located the Northern Indiana Penitentiary, where coopering, wagon and chair making are conducted on an extensive scale, the labor being performed by the convicts.

Within the walls of the Penitentiary a well has been bored to the depth of five hundred and forty-one and a half feet, of which the following is a section:

<table>
<thead>
<tr>
<th>Layer</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface sand</td>
<td>48 ft. 00 in.</td>
</tr>
<tr>
<td>Clay</td>
<td>4 ft. 00 in.</td>
</tr>
<tr>
<td>Sand</td>
<td>24 ft. 00 in.</td>
</tr>
<tr>
<td>Clay</td>
<td>66 ft. 00 in.</td>
</tr>
<tr>
<td>Sand</td>
<td>30 ft. 00 in.</td>
</tr>
<tr>
<td>Slate (Marcellus shale)</td>
<td>76 ft. 00 in.</td>
</tr>
<tr>
<td>Limestone (Upper silurian, with fossils)</td>
<td>293 ft. 06 in.</td>
</tr>
<tr>
<td></td>
<td>541 ft. 06 in.</td>
</tr>
</tbody>
</table>

This bore terminates in a porous limestone rock, from which flows a stream of mineral water, strongly impregnated with sulphuretted hydrogen. The water rises twenty-two feet above the surface of the ground, discharges about three hundred gallons per minute and has a temperature of $57^\circ$ Fahr.

A qualitative analysis of the water was made, by a chemist
in Chicago (name not given) at the request of the Prison authorities, which indicated the presence of the following constituents:

Carbonate of lime,
Bi-carbonate of magnesia,
Bi-carbonate of soda,
Bi-carbonate of potash,
Sulphate of soda,
Chloride of sodium,
Chloride of potassium.

Gives an alkaline reaction and is strongly charged with sulphuretted hydrogen and carbonic acid gas.

It is a decided alterative and may prove remedial in diseases of the liver, kidneys and skin.

The soil in the vicinity of the town, is too sandy for the production of cereals and grasses. Apples and pears do well and the sandy knolls are especially adapted to the growth of the Huckleberry bush, which is native and very prolific. The fruit is highly esteemed and much sought after for table use; of the small fruits which ripen in midsummer, it ranks next to the blackberry in popularity, having a delicate flavor and generally considered wholesome. The first marketable berries are gathered in July and an abundant daily crop is produced for about six weeks. The shipments, in the height of the season reach near three hundred bushels per day, being, to the berry gatherers, a dispensation of ten thousand dollars per annum.

The Cranberry plant is indigenous to the marshy lands of this region, and when the season of growth is not too dry the wild vines produce good crops; but a much greater yield, of larger and better flavored berries, is secured when the vines are planted on drained marsh land which has been prepared by cultivation and the natural growth of bushes, weeds and grass destroyed, and which can be flooded, or covered with water, during the winter.

The ease with which this fruit can be kept through the winter months, without decomposition or change, has ren-
dered it very popular with provident house-wives, and no
public or family dinner is considered complete without an
accompanying dish of this important and healthful appetizer.

About two miles northwest of Michigan City is a marsh
of sixty acres of planted or cultivated vines, which, it is
asserted, yields, annually from one hundred to two hundred
bushels of berries per acre. This is, doubtless, a very
profitable industry, and one that may be embarked in with
a small cash outlay.

The timber of this county is more remarkable for vari-
ety than for quantity. White and Red Oak, Hickory and
Tamarack are found along the marshes in the southern part,
while the prairies in the central portion are dotted over
with groves composed of Burr Oak, Sugar-tree, Elm, Pignut
and Shell-bark Hickory, Cherry, Bass-wood and Sassafras.
In the hilly portions, to the north and east, are seen
Beech, White and Red Oak, Elm, Poplar and Sugar-tree,
White and Blue Ash, Shell-bark Hickory, Bass-wood,
Black and White Walnut, Cherry, Sycamore, Sassafras,
Cottonwood, Tamarack, with a few Red Cedars, and as we
approach the lake, the once abundant White Pine, is seen in
small groves.

Bog iron ore occurs in considerable quantities in the
marshes along the Kankakee river, and when some plan
has been devised for converting the peat, with which it is
associated, into fuel adapted to use in a blast furnace, each
may add to the value of the other and, mutually, tend to
bring the much abused Kankakee marsh into more favor-
able notice.

The almost universal desire of agricultural communities
for railway connection with the chief markets of the
country would seem to have been fully gratified, if not
surfeited, in this county.

Of the following list of railways, seven are in operation
and two in course of construction:

The Lake Shore & Michigan Southern railroad crosses
the county in an east-west direction; the Indianapolis, Peru
& Chicago railroad crosses in a north-south course, both
passing through the county seat, and the latter connects at Michigan City with the Michigan Central Railroad which skirts the shore of the Lake in the northwest corner of the county. The Louisville & Chicago Railroad passes in a due north-south line along the west edge, terminating at Michigan City. The Peninsular Railway of Michigan crosses near the center in a northeast-southwest course. The Pittsburg, Fort Wayne & Chicago Railroad passes over the southwest corner, and a short distance south of that is the line of the Cincinnati, Logansport & Chicago road. The Baltimore, Pittsburg & Chicago Railroad is graded across the southern end, and the proposed route of the Chicago & Canada Southern has been surveyed near the same path.

About twelve miles south of Laporte, on the low bank of a small creek, which is tributary to the Kankakee river, are several mounds, built up almost entirely of sand and ranging from six to twenty feet in height; some of these were dug into, by the citizens of the neighborhood, and one human skull, two copper hatchets, two broken earthen vessels and a pipe, taken out. The latter is carved from a dark-red clay stone, (not from the red pipe stone quarry of Minnesota,) and is a unique specimen of pre-historic art, unmistakably intended to perpetuate, in a convenient and useful form, the graceful outline and seductive charms of a favorite mistress; a thought, though rude in its inception and execution, the ante-type of that refined devotion which is expressed in marble and on canvass by the most enlightened people of modern times.

Others of this group of tumuli were, subsequently, opened under the direction of Dr. T. Higday, of Laporte, (to whom I am indebted for information.) In one they sunk a pit to a depth of thirteen feet, discovering three human skeletons, near the heads of which were two copper hatchets, two copper needles, a piece of galena, (sulphuret of lead,) several pieces of mica and a pipe carved to represent some animal, perhaps a ground-hog, (Arctomus monax), also one earthen vessel containing black mold.
The largest one of the group, near the water's edge, had been partly cut away by the current of the stream, this was opened by removing the overlying earth with road scrapers and teams; thirteen feet from the top a layer of ashes was found, two inches thick near the center, and three feet deeper, two adult skeletons were exposed, one of which was resting upon the decayed remains of what was supposed to have been a log of wood. Along with these skeletons were found a pipe, a copper needle, fragments of pottery and part of a marine shell (Cardium magnum.) Two smaller mounds were opened, revealing nothing, which would indicate that they were erected for other than sepulchral uses.

The black mold contained in the vessels above mentioned, and in many others found in similar situations, is regarded by some archaeologists as the remains of food, placed there at the time of burial, for sustenance until the deceased had become settled in the "happy hunting ground" beyond the grave.

This is a reasonable inference and one around which clusters a world of interest; coming from the dark, forgotten past, as a ray of light that has bridged centuries to tell its wondrous story; a simple, devotional act of a crude, unlettered people, pointing with unmistakable significance to their faith in that immortality to which humanity instinctively aspires.