

McDonald's, or Homan's creek, Hadley creek and Mill creek intersect the southern southwestern portion. These streams, together with abundant, fine, fresh water springs, furnish a plentiful supply of water for the stock growers. The uplands of the county are nearly equally divided into timber and prairie, the timber portions being mainly restricted to the broken lands in the vicinity of the streams. The general elevation of the prairie region above the level of the Mississippi, at low water, is from two hundred to two hundred and eighty feet. Except for about two miles in the vicinity of Quincy, where the bluffs approach near to the river bank, a belt of alluvial bottom land from one to five miles in width extends the whole length of the county; from north to south, along the western border. By means of drainage and the erection of levees to prevent overflow from the river, they have been made the finest farm lands in the country. The destruction of native forests in Adams county has been very great, but there still remains small portions of these former extensive tracts, containing nearly one hundred species of native forest trees, oak, hickory, ash, elm, walnut, maple, sycamore, red bud, hawthorn and others.

The climate of Adams county is pleasant and healthful, and perpetual breezes blow over the cultivated lands, modifying the summer heat. The seasons come with great regularity, favoring agriculture, and the rainfall is abundant and seasonable, averaging about 38 to 40 inches. The fluctuations in temperature are often great and sudden, especially in the transition seasons, but the vital statistics show that the climate is remarkably healthful, while the crop reports bear witness to its high fitness for agricultural development and the growth of great and valuable supplies of breadstuffs. New methods of scientific farming, the use of modern machinery, the extension of careful under-draining and the intelligence of hundreds of skilled farmers, are developing valuable agricultural properties.

The population of the county at the last census, 1900, was nearly 70,000.

The equalized assessed valuation of lands in the county for the year 1904 was \$3,705,923; of city, town and village lots, \$3,426,690; of personal property, \$3,184,810; of railroads, \$11,-178,420 (C., B. & Q.; A. & St. L.; Wabash., and O.K.C.&E.).

The total state tax; for this county in the same years, \$56,897.75; county tax, \$77,527.15; school tax was \$168,059.44; road and bridge tax, \$33,-696.48 ; other taxes, sufficient: to make a total for the county, including cities and villages, \$605,-828.06.

The finances of Adams county are on the securest of foundations. At the present time the county has no bonded indebtedness.

## CHAPTER XLVIII.

### THE GEOLOGY OF ADAMS COUNTY.

By William A. Redenbaugh, Ph. D.

To the ordinary reader a purely geological description is like so much Greek. For this reason the author has decided to depart from the usual custom of describing formations and strata with their complicated classifications and confusing nomenclature. Instead, suppose we take a stroll along the bluffs of Quincy. If we visit the quarries in the lower part of the city and look up at the cliffs above us we see, capping the bluff, a layer of clay about sixty feet thick. This rests upon a foundation of solid rock, consisting of limestone with layers of flint or chert in it. If we observe closely we see that the upper twelve or fifteen feet of rock is very cherty and the layers of limestone between the layers of chert are thin, while the lower portion contains less chert and makes excellent building stone.

Geologists have named the lower formation Burlington limestone, the upper thin bedded rock the Keokuk limestone, and the clay surmounting the rock, the loess. As we go toward the north we can trace these layers along the bluffs, and we find opposite the steamboat landing the Keokuk limestone is of such quality that it can be profitably quarried. As we go farther north the Keokuk formation grows thicker, and north of the city is extensively quarried. The thin-bedded cherty layers are overlaid by thicker and more regular beds of bluish-gray limestones, which may be seen to good advantage along some of the small streams northeast of Quincy. The foundation limestone of Gov. Wood's mansion is of this rock, obtained from a quarry about three miles northeast of Quincy. In this quarry the limestone is seen to be overlaid by brown shale containing geodes or "nigger heads." Where the geode beds are well developed the geodes appear as siliceous nodules of various sizes, some of them a foot or more in diameter. Some of them are solid spheres of crystalline quartz covered externally with a thin coating of chalcedony. Others are hollow and have their inner faces covered with beautiful crystals of quartz, calcite or dolomite, or with the mammillary form of chalcedony. Crystals of arragonite, iron pyrites and zinc blende are also occasionally found in these geodes, and the finest cabinet specimens of the crystallized minerals above mentioned to be found in the state are obtained from this bed. The shales and shaly limestones in which

the geodes are embedded yield readily to the influence of frost and moisture, and the geodes are readily weathered out, and may be found in great numbers in the beds of the small streams which intersect these beds. Good specimens can be obtained from the bed of the small creek at Twenty-fourth and Locust streets.

The Keokuk limestone can be traced along the bluffs from Quincy to the north line of the county. At Bear Creek it forms a vertical cliff from forty to fifty feet in height. It is also found on all the small streams in the western part of the county as far south as Mill Creek, and on both forks of that stream, though not on the main creek.

If we attempt to trace this limestone into the eastern part of the county, we find that it is overlaid by still another kind of limestone, called the St. Louis limestone. This can be readily seen along the streams in McKee township, and on the Walnut Fork of Mill Creek in Gilmer township, and again on the tributaries of Bear Creek in Mendon township. On the main creek it can be traced for several miles farther east, where it passes under the shales which belong to the coal measures.

The coal measures form the bedrock over the whole of the northeastern part of the county, and are so called because they contain the workable seams of coal. The rocks of this group contain shales, sandstones, bituminous slates and bands of limestone, with seams of coal and fire clay. The whole thickness does not exceed one hundred and twenty feet. There are three seams of coal, known as No. 1, which is deepest down and from 1 1/2 to 2 feet thick; No. 2, 2 to 3 feet thick; and No. 3, about 1 2/3 feet thick. The middle coal seam (No. 2) is most regular, and furnishes the best coal in the county. Near Camp Point, on the south fork of Bear Creek, there is an outcrop of it which has been worked for a long time. Likewise outcrops are found along some of the tributaries of Bear Creek in the western part of the township; on Little Missouri Creek in the northeast part of Clayton; on Cedar Creek in the extreme northeastern part of the county; on a small branch of McGee's Creek south of the village of Clayton; and in the extreme southeastern section of Mendon.

South of Clayton the country is quite rolling and hilly, but the ravines seldom expose the bedrock, and no coal is found outcropping, though it probably underlies most of the surface north of McGee's Creek. After crossing the creek at Hughes' Ford, in the southeastern part of the township of McKee, coal is found in the bluff on the south side, with outcrops

of the St. Louis and Keokuk limestones below it. South of Liberty and west of Kingston coal outcrops at various localities along the head waters of McDonald's Creek, and before the construction of the C., B. & Q. railroad the beds were worked quite extensively and the coal hauled on wagons to supply the Quincy market.

In the southern part of the county the coal measures are very irregular in their development and are probably outliers from the main coal fields. North of Columbus the three seams are found in regular order. Coal No. 2, or the Colchester seam is by far the best developed, and probably underlies all of the townships of Camp Point, Clayton, Houston and Northeast, and may be reached by shafts at a depth of from 75 to 150 feet. South of Columbus there is no development of coal which would lead us to expect that this region will ever become a valuable mining region, though sufficient coal may be found in the vicinity of Liberty and Kingston to supply the local demand for some years to come. Mill Creek, on the western borders of this region shows continuous exposures of the limestones which lie entirely below the coal measures and which mark off a horizon below which no workable coal seam has ever been found.

In the northern part of the county the coal measures rest upon the St. Louis limestone. In the extreme southern and southeastern part this limestone is not present, but the coal measures rest directly upon the Keokuk or Burlington limestones, so that when any one of these is reached in searching for coal it is useless to go deeper.

Underneath the Burlington limestone is a formation called the Kinderhook Group, about one hundred feet in thickness, composed of sandy and clay shales and thin beds of impure limestone. About thirty feet of this is exposed beneath the Burlington limestone in the creek bluffs of Fall Creek, about twelve miles south of Quincy. Frequently a bed of black or chocolate-colored shale is found in the lower portion, and because of this many have been led to believe that coal might be found in it. This black shale was reached in a boring in search of coal just below the city of Quincy, at a depth of one hundred and fifty feet. As it lies nearly four hundred feet below any coal seam known in this county, all efforts expended in the search of coal in this formation can only result in failure.

To sum up the rock formations found in the county, a complete section through all of them would show (1) about one hundred feet of the coal measures on top; (2) forty to fifty feet of the St. Louis limestone; (3) eighty to

one hundred feet of the Keokuk group; (4) about one hundred feet of the Burlington limestone, and (5) fifty feet of the partly exposed Kinderhook group at the bottom. A boring in the northeastern part of the county would probably go down through all of these in the succession given above. In the western and southern portions the upper formations have been eroded away, leaving the lower part of the Keokuk group on the surface, with the Burlington exposed beneath it in the bluffs along the Mississippi.

Let us now examine some of the deposits in the bottoms between the bluffs and the river. We find layers of dark bluish-gray or chocolate-brown clays, alternating with layers of sand, a formation quite different from the loess on top of the bluffs. This is called alluvium, and evidently has been layed down by the annual overflow of the river.

If we examine the layers of limestone in the quarries, we find many fossil shells and curious ring-like structures, crinoid stems, the remains of animals of a kind found only in the deep sea. That is to say, these limestone rocks must have been formed at the bottom of the sea. In the different limestones mentioned above we may find characteristic fossils, by means of which the kind of limestone may be recognized wherever it is seen. In the loess have been found the remains of mammoths, mastodons and other extinct animals, indicating that it is a deposit of much later date than the limestones, and was probably formed in a fresh-water lake, into which the bones of land animals and the shells of land snails were swept by streams running into it from the adjacent land.

The alluvium is, of course, a still more modern formation, as it is even now being deposited by the river.

If we travel back into the county away from the river, we find that the loess thins out as we approach the highlands in the interior of the county, and finally gives place to a formation composed of yellowish-brown or bluish clays, mixed with sand, gravel and large boulders of water-worn rock, the whole mass showing little or no trace of stratification. It is simply a heterogeneous mass of the water-worn fragments of all the kinds of rock that are known to occur for several hundred miles to the northward, embedded in brown or blue clays. Most of the large boulders are sandstones, granites, porphyries and various other igneous or metamorphic rocks, which have been transported by some, powerful agency from their mother ledges on the borders of the Great Lakes. There are also many smaller rounded boulders, which have been torn from

the stratified rocks of our own and neighboring states. Fragments of native copper, lead ore, coal and iron are often found in this mass, but this does not imply that there are mines of these minerals in the near vicinity, but that they have been brought from farther north by the same agencies that carried the rest of the material. The technical term for this formation is "drift." It underlies the loess or is overlapped by it, and is therefore older in origin. Thin layers of this drift can be seen between the limestone and the loess along the bluffs at Quincy. A coal shaft at Coatsburg penetrates a bed of it eighty-five feet thick, and beneath it is found a layer of black soil two and one-half feet thick, resting upon a stratified clay. This soil probably an ancient surface soil which overspread the land before the age in which the drift was piled upon it.

If we travel up and down the Mississippi, we observe that the valley is cut out of solid limestone to the depth of from one hundred and fifty to three hundred feet or more, and from five to ten miles in width. In some portions of this valley some of this drift is found underneath the alluvium. Evidently it filled in portions of the valley before the present river was formed, and the rock-bound valley must have been excavated by some mighty agency before the deposit of the drift and before any of the existing water courses were formed.

In order to understand the geological history of Adams county it is necessary to go back to the beginnings of the American continent: Geologists, by long and patient study and by methods of reasoning too complicated to be taken up in this short treatise, have succeeded in classifying the various rocks according to age and origin. The oldest rocks in the continent are found in (1) extensive areas of Canada north of the Great Lakes; (2) an axis through the Appalachian mountain system; (3) a similar axis along the Rockies; (4) numerous strips along the Pacific coast; and (5) small isolated areas in Dakota, Missouri and Texas. There is good, evidence that at one time these areas constituted the only land in what is now North America. The entire region now occupied by the Mississippi basin was at the bottom of the sea. These areas formed nuclei around which the rest of the continent was built. Just as immense deposits are now being made along our coast lines by the river carrying sediment into the sea, so deposits were made along these ancient coast lines; and sooner or later a gradual elevation of the sea bottom brought these deposits to the surface, and thus the continent

slowly grew. Age after age passed, each one consisting of millions of years, and the great sea lying between the Rockies and Alleghanies was gradually crowded out of existence until now only a remnant of it, the Gulf of Mexico, is left. Even this will probably disappear in time, and the Mississippi River will then empty into the Atlantic Ocean; and all the rivers which now empty into the Gulf will become tributaries of it.

It was during the process of the filling in of this sea that the Kinderhook and St. Louis limestones and coal measures of Adams county were deposited one on top of the other. The growth of the land was not a continuous one. Portions of the sea bottom were elevated above sea level and eroded by the weather and the streams, and then depressed below sea level to receive another deposit. This elevation and depression in some cases occurred many times, and accounts for the absence of the St. Louis formation between the Keokuk and the coal measures in the southern part of our county: Again, while the coal measures were being formed there must have been at least as many elevations and depressions of the land as there are seams of coal. Each seam represents a forest which must have grown while the land was above the sea level. This must have been depressed below sea level in order that the limestones and shales might be deposited on top of it, and so on for every seam of coal. We have in our county only a small part of the total thickness of the coal measures, so that after the coal measures were completely formed and perhaps other deposits laid on top and the land became permanently elevated above the sea, it must have been greatly eroded. The streams cut their channels down through the rock, and assisted by the action of the weather, removed much of the rock material, wearing away all the formations down to those now exposed. It was during this period that a great river eroded the rock-bound channel now occupied by the Mississippi, and it is probable that the erosion was so complete that no falls or rapids remained in its course. There was a landscape with its forests, rivers and valleys somewhat similar to that which we have now. Then came the ice age; the climate grew colder; snow accumulated in the region in the vicinity of Hudson's Bay, and became perhaps several miles in depth, forming an immense glacier or ice sheet, which with the tremendous pressure of the ever-increasing snow behind it was pushed out over the land in a southerly direction. The moving ice broke off pieces of rock from the ledges, ground them together and scraped the soil from the surface of the land,

forming a great mass of material which we have designated as "drift." This was pushed into the water courses, filling them up in places, or piled up at the edges of the glacier, where the ice melted. This is why we find in the "drift" so many boulders from the region of the Great Lakes.

There is evidence that as the climate changed the glacier advanced and retreated many times, now piling up material at its end, or dropping it broadcast as it melted away, scooping out basins in the soft rock here, damming up a water course there, so that at the close of the ice age the map of the country was completely changed. Old rivers had been wiped out of existence and new ones formed. Numerous lakes were formed in the scooped out basins and dammed up streams, and it is probable that our loess deposits were formed in one of these lakes. Since that time erosion has been going steadily on. The outlets of many of the glacial lakes have cut down the barriers which enclosed them and drained the lakes. The rivers have settled down and now occupy in part the old pre-glacial water courses, but wherever a fall occurs in a large stream there is in many cases good evidence that a dam exists in the old water course, and the river is making its way around this dam across country, so to speak, and falling back into the old water course below the dam. As time goes on, all the falls and rapids will disappear, all the elevated portions of land will be weathered away by the action of the elements, unless some other stupendous forces intervene and cause a repetition of the phenomena described.

#### ECONOMICAL GEOLOGY.

Soil.-- As an agricultural region this county is hard to surpass. The more elevated alluvial bottom lands bordering the Mississippi are exceedingly productive, and the untillable portions are covered with a heavy growth of valuable timber. The loess deposits, extending through the entire length of the county from north to south and from the brow of the bluff overlooking the Mississippi eastward from five to ten miles, furnish a soil of remarkable fertility. The surface is undulating, giving free surface drainage, while the subsoil is rather porous, so that the land is not in a very large degree subject to the deleterious influences of remarkably wet or dry seasons. This soil is admirably adapted to the growth of fruit and garden track. The drift clays of the eastern part of the county have given the soil of that region the character of a stiff clay loam, better adapted to the growth of wheat and grass than anything else. In the northeastern part

of the county there is a considerable area of level prairie, covered with a deep, black soil, highly charged with vegetable matter derived from the growth and decay of shrubs and grasses which have covered its surface. The subsoil here is not porous, so that it does not permit the surface water to pass freely through it. As a result these lands are likely to suffer greatly from too much water during a wet season.

**Sand and Clays.**—The clay and fine sandy deposits of the loess form, an excellent material for the manufacture of common brick. This may be obtained anywhere in the western part of the county. In the eastern part the drift clays can be mixed with the sand from the beds of streams for this same purpose. Directly underneath the coal seams are deposits of fire clay, which in some places can be worked with the coal and used for the manufacture of fire bricks. Between coal seams No. 1 and No. 2 is a layer of fine light blue clay shale, which where exposed weathers into a fine plastic clay, suitable for the manufacture of pottery.

**Limestones.**—The Burlington, Keokuk and St. Louis limestones described above all furnish excellent material for either building stone, or, when carefully selected, for lime. The Burlington and Keokuk are most accessible around Quincy, and the St. Louis farther east. The Burlington ranks highest, and as the deposit is nearly one hundred feet thick, may be considered as almost inexhaustible.

**Coal.**—About one-half the entire county is underlaid by coal measures, but the coal seams, with the exception of the middle one, are very irregular in their development and therefore of little value for the production of coal. The middle seam has an average thickness of over two feet, and is frequently as much as thirty inches, and is of fair quality. It may be found over all the northeastern portion of the county, if the coal measures are penetrated to the proper depth. The principal drawback to the successful mining of the seam is the shaly character of the roof, necessitating considerable cribbing. This coal seam will afford about two million tons of coal to the square mile, and the time will come when it will pay to work it wherever it can be reached.

## CHAPTER XLIX

AGRICULTURE: THE DISTRICTS OF ILLINOIS—DEVELOPMENT OF LANDS—FARMERS' INSTITUTES - SOILS - CROPS - CATTLE, HOGS, HORSES, POULTRY—ROADS—HORTICULTURE.

By Hon. G. W. Dean.

The County of Adams lies on the Mississippi River, in the State of Illinois, in the center of the great corn belt of the United States. The Base Line runs centrally through it, and it includes ranges 5, 6, 7, 8 and 9 in the most fertile part of the Mississippi Valley. On its western boundary, along the river, lies some of the most fertile lands known for agricultural purposes, and by leveeing and tiling most of it has, been brought into cultivation. That portion known as the bluff lands is among the most fertile of the county. They produce all the grains and vegetables in abundance. These table lands lie more or less along the west side of Payson, Burton, Ellington, Mendon and Ursa townships. All these lands sell readily at high prices; and a considerable portion of them are used for extensive gardening, which pays in proportion to the skill of the gardener. These garden products are the best that rich soil and cultivation can develop. The remaining townships are mostly prairie land, fertile and productive, and although it has been cultivated ever since its earliest settlement, it produces as good crops as in the beginning. Therefore the development of the county's agricultural interests are commensurate with the general progress.

The State of Illinois is divided into three agricultural districts—namely, the northern, the central and the southern. There is also known to agriculturalists a corn belt which virtually feeds the world with corn and its products—pork, beef and mutton. This corn belt runs through the States of Ohio, Indiana, Illinois, Missouri, Iowa, Kansas and Nebraska. These seven states furnish the surplus of agriculture. The others are barely self-sustaining. Illinois furnishes more agricultural exports than any other of these states, and produces the most products of the farm. This corn belt includes the northern and central divisions of Illinois; therefore Adams county, being in the center of that division claims her share of the honor of this great exportation.

The staple field crops are corn, wheat, oats, hay, clover seed, timothy seed and potatoes; these grow vigorously and produce good crops. The soil seems to be peculiarly adapted to these field crops, and more especially to the farmer's garden. Our farmers, as a general rule, have taken fairly good care of their soil.